State Water Resources Control Board Restoration Projects Statewide Order

Program Environmental Impact Report

CONSOLIDATED FINAL

Prepared with ESA

ESA

August 16, 2022

CALIFORNIA
Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

Executive Summary

Introduction

The State Water Resources Control Board (State Water Board) developed an Order for Clean Water Act Section 401 Water Quality Certification and Waste Discharge Requirements for Restoration Projects Statewide (Order) to improve the efficiency of regulatory reviews for projects throughout the state that would restore aquatic or riparian resource functions and/or services. The Order establishes an authorization process for environmentally beneficial restoration project types and associated measures to protect species and the environment.

The State Water Board and Nine Regional Water Quality Control Boards (Regional Boards), which exercise rulemaking and regulatory activities by basins, have authority to regulate discharges of waste that threaten or cause impairment of designated beneficial uses or cause nuisance to waters of the state, including discharges related to restoration activities through issuance of waste discharge requirements (WDRs) pursuant to the Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.).

The State Water Board and Regional Boards also have regulatory authority under Clean Water Act (CWA) Section 401 (water quality certification) for projects that must be authorized by the U.S. Army Corps of Engineers (USACE)[1] under CWA Section 404 and Sections 10 and 14 of the Rivers and Harbors Act of 1899 (U.S. Code Title 33, Section 408). The Order provides WDRs as well as CWA Section 401 Water Quality Certification.

The Order authorizes projects that may discharge directly or indirectly to “waters of the state,”[2] including “waters of the United States” under USACE jurisdiction.

The State Water Board has previously authorized a General Order for Small Habitat Restoration Projects (Order #SB12006GN) that meet the following project size and CEQA eligibility requirements:

[1] All three USACE districts that cover California are participating in the statewide multi-agency program to Facilitate Implementation of Restoration Projects, described later in Section 1.1. USACE’s Sacramento District is the lead for California; the San Francisco and Los Angeles Districts are also participating.

[2] All “waters of the United States” (also known as “federal waters”) within the borders of California are also “waters of the state,” but the converse is not true. “Waters of the United States” is a subset of “waters of the state,” which includes waters outside of federal jurisdiction. Thus, the Order would apply to projects within both state and federal jurisdictions.

(a) The project does not exceed 5 acres or a cumulative total of 500 linear feet[3] of streambank or coastline.

(b) The project qualifies for the California Environmental Quality Act (CEQA) Class 33 categorical exemption (State CEQA Guidelines Section 15333).

Restoration projects that do not qualify for the General Order for the Small Habitat Restoration Projects, or most recent update, or terms of the Order, must obtain an Individual Water Quality Certification and/or WDRs from the State Water Board or appropriate Regional Board.

Figures ES-1 and ES-2 provide a process flow chart for the Order discussed in this Program Environmental Impact Report (PEIR).

To be permitted, a project must meet the Order's definition of a restoration project: an eligible project type that would result in a net increase in aquatic or riparian resource functions and/or services through implementation of relevant protection measures. (Section 1.2, *Categories of Eligible Project Types,* Section 2.6, *Categories of Restoration Projects in the Order,* and Section 2.8, *Programmatic Sideboards, General Protection Measures, and Other Requirements*.)

General administration of the Order will be conducted by the State Water Board. The State Water Board and Regional Boards will be responsible for enrolling individual restoration projects under the Order, as applicable, within their respective jurisdictional boundaries (Section 2.3). For project proponents to use the Order, their restoration projects would need to comply with CEQA. See Section 1.1, *Introduction and Overview* of the Order and below, for additional information on the CEQA process for restoration projects.

The State Water Board, as the CEQA lead agency (for Order development), determined that an environmental impact report (EIR) was the appropriate CEQA document for the Order. The EIR has been prepared in conformance with CEQA (Public Resources Code [PRC] Section 21000 et seq.) and the State CEQA Guidelines (California Code of Regulations Title 14, Section 15000 et seq.). More specifically, the EIR is a program EIR (PEIR) and has been prepared pursuant to and consistent with the requirements of Section 15168 of the State CEQA Guidelines.

Background of the Order

The California floristic province has been ranked as one of 25 biodiversity hotspots of global importance (Myers et al. 2000). Aquatic, riparian, floodplain, and wetland habitats are critical components, supporting the most diverse and species-rich ecosystems in the province and throughout the arid and semiarid portions of North America. Over the last century, the ecosystem services provided by aquatic riparian, floodplain, and wetland habitats have been affected by environmental degradation, land use conversions, and water management. As a result, California has more than 300 threatened and endangered species and more federally protected animals than any other state, and

[3] The Small Habitat Restoration Order may be amended or reissued; therefore, the 5 acres or 500 linear feet requirement is subject to change.

Figure ES-1 Restoration Projects Statewide Order Process Flow Chart

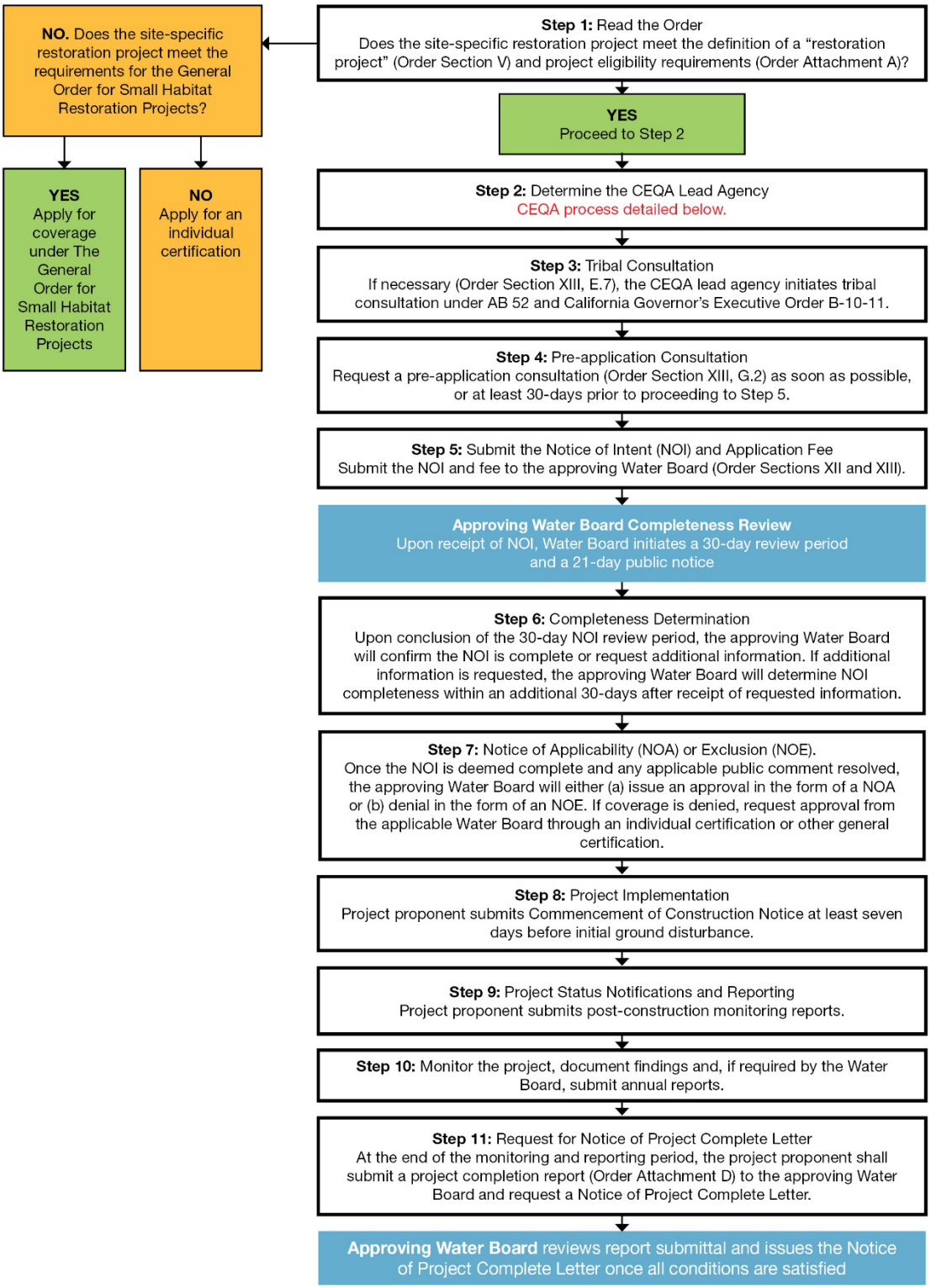
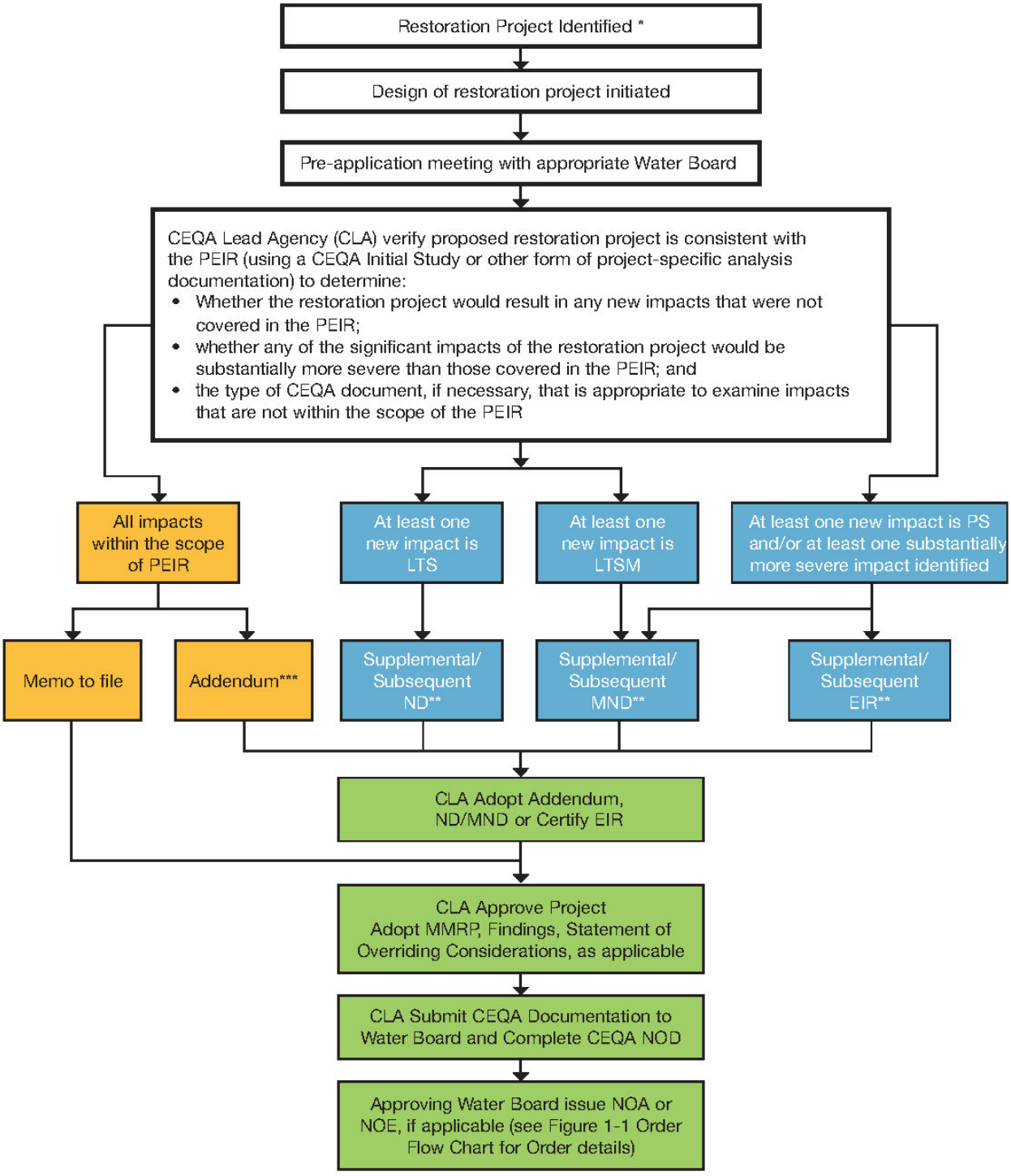


Figure ES-2 Restoration Projects Statewide Order CEQA Process Flow Chart



* Meets the definition of a restoration project and conditions outlined in the Restoration Projects Statewide Order and PEIR and does not meet the requirements for the General Order for Small Habitat Restoration Projects
** Pursuant to CEQA Guidelines Sections 15162 (e.g. major revisions to PEIR) and 15163 (e.g. minor revisions to PEIR and doesn't meet the requirements of Section 15163)
*** Pursuant to CEQA Guidelines Section 15164 (e.g. minor additions or changes to PEIR and doesn't meet the requirements of Sections 15162 or 15163)
EIR = Environmental Impact Report; LTS = Less than significant; LTSM = less than significant with mitigation; ND = Negative Declaration;
MND = Mitigated Negative Declaration; NOA = Notice of Availability; NOD = Notice of Determination; NOE = Notice of Exemption; PS = Potentially Significant, PP = Project Proponent
Note: This figure represents the process to implement restoration projects under the PEIR. Please refer to the CEQA Statute and Guidelines for additional information

ranks second only to Hawaii in the number of protected plants (USFWS 2013). Efforts to enhance and restore habitats and ecological functions and processes throughout the state are ongoing. A wide variety of California state laws, mandates, plans, mitigation requirements, and initiatives—many of which are the result of decades-long debates and reports based on scientific research—call for restoration of aquatic, riparian, and floodplain habitats.

To ensure that funding is used efficiently and that restoration projects are implemented in a timely manner, agencies have already developed programmatic processes that would permit qualifying restoration projects. Examples of these existing permits and processes are included in Appendix D of this PEIR.

Project Purpose and Objectives

Purpose

The State Water Board developed a statewide Order to improve the efficiency of regulatory review for projects that restore aquatic and riparian habitat and improve water quality. The Order establishes a permitting process for a set of environmentally beneficial restoration project types (listed in Section 2.6, *Categories of Restoration Projects in the Order* of this PEIR) and associated measures to protect species and the environment.

Objectives

The objective of the Order is to expedite statewide implementation of restoration projects to improve the environment and make the regulatory process efficient by interpreting state standards in a uniform manner that ensure applicable projects are consistent with federal and state water quality laws.

Geographic Scope

The Order considers a variety of types of aquatic, riparian, wetland, and floodplain restoration projects that may take place throughout California. The State Water Board protects water quality by setting statewide policy and coordinating and supporting the Regional Boards' efforts. Nine Regional Boards conduct rulemaking and regulatory activities by basin and issue water quality control plans (basin plans). Because the Order would be administered and used primarily by the Regional Boards, the study area is defined as the nine water quality control regions (Figure ES-3).

Description of the Order

The categories of restoration project types included in the Order are listed below. These eligible project types are described in detail in Section 2.6, *Categories of Restoration Projects in the Order* of this PEIR. An individual permitted project may incorporate one or more of these project types. Projects may conduct restoration activities such as establishment, reestablishment, rehabilitation, and/or enhancement for any of these project types:

- **Improvements to Stream Crossings and Fish Passage**—for upstream and downstream movement by fish and other species, and to improve functions of streams.

Figure ES-3 Study Area

- **Removal of Small Dams, Tide Gates, Flood Gates, and Legacy Structures**—to improve fish and wildlife migration, tidal and freshwater circulation and flow, and water quality.
- **Bioengineered Bank Stabilization**—to reduce input of fine sediment, enhance aquatic and riparian habitat, and improve water quality.
- **Restoration and Enhancement of Off-Channel and Side-Channel Habitat**—to improve aquatic and riparian habitat for fish and wildlife; to restore the hydrologic, hydraulic, and biogeochemical functions and processes of streams; or both.
- **Water Conservation Projects**—to reduce low-flow stream diversions, through installation of features such as off-stream storage tanks and ponds and necessary off-channel infrastructure.
- **Floodplain Restoration**—to improve ecosystem function by creating hydrologic connections between streams and floodplains, through such measures as breaching and removal of levees, breaching and removal of berm and dike setbacks, and hydraulic reconnection and revegetation.
- **Removal or Remediation of Pilings and Other In-Water Structures**—to improve water quality and aquatic habitat for fish and wildlife.
- **Removal of Nonnative Invasive Species and Revegetation with Native Plants**—to improve watershed functions, such as aquatic and riparian habitat for fish and wildlife.
- **Establishment, Restoration, and Enhancement of Tidal, Subtidal, and Freshwater Wetlands**—to create or improve wetland ecological functions.
- **Establishment, Restoration, and Enhancement of Stream and Riparian Habitat and Upslope Watershed Sites**—to create or restore the functions of streams and riparian areas, including upslope watershed sites that could contribute sediment to streams or disrupt floodplain and riparian functions.

During the Order enrollment process, the approving Water Board will determine whether an individual restoration project is eligible for enrollment under the Order. All projects permitted under the Order must also incorporate applicable general protection measures into their project design to ensure avoidance and minimization of impacts on sensitive resources.

Species protection measures have been included in this PEIR which include avoidance and/or minimization measures developed specifically to address individual covered species or covered species guilds, based upon unique life history and habitat requirements. Further, design guidelines have been developed to help enrollees project proponents ensure that projects are designed, during the development of their individual projects, in a manner that is appropriate and sustainable, minimizes adverse effects on aquatic habitats, maximizes the ecological benefits of the restoration, and is consistent with multiple permitting agency regulatory practices (e.g., CDFW, NMFS, USFWS). A list of general protection measures can be found in Section 2.8.2, General Protection Measures, and Appendix E of this PEIR. A list of species protection measures can be

found in Section 2.10, Species Protection Measures, and Appendix F of this PEIR. See Appendix E of this PEIR for a detailed description of design guidelines.

Typical Construction, Operation, and Maintenance Activities and Methods

The Order does not promote construction or operation and maintenance of specific facilities or other specific physical actions by the State Water Board. The State Water Board also does not propose to construct, operate, or undertake specific physical actions under of the Order. Rather, the Order is designed to permit the actions of project proponents that propose to construct habitat restoration projects in accordance with the sideboards, general protection measures, and other requirements of the Order (described in Section 2.8, *Programmatic Sideboards, General Protection Measures, and Other Requirements* of this PEIR).

The precise locations and detailed characteristics of potential future individual restoration projects that may be permitted under the Order are yet to be determined. Therefore, the PEIR focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis. The PEIR assumes that the Order is implemented and achieves the desired outcomes. Accordingly, the PEIR evaluates the potential impacts of the types of restoration projects that the Order encourages and promotes in the study area. Once proposals for individual restoration projects consistent with the Order are developed, the lead agencies for the individual restoration projects will evaluate whether the impacts are adequately described in the PEIR, or if necessary, will be evaluated in project-level CEQA documents.

Most restoration projects would involve construction activities. These construction activities, in turn, would result in most of the environmental impacts evaluated in this PEIR. The construction activities would be specific to each type of activity, the location of the activity, and numerous other variables related to the unique characteristics of a project.

The magnitude and characteristics of construction activities vary widely, but construction activities for restoration projects share many common features. For that reason, to help support the environmental analysis, Section 2.7.1, *Construction Activities and Methods*, of this PEIR includes a discussion of commonly encountered construction activities that can be anticipated to take place on many if not most projects permitted under the Order, including construction timing, construction materials, equipment types, and construction activities.

Construction of the project types permitted under the Order would disturb natural conditions or infrastructure. Therefore, Section 2.7.2, *Constructed Facilities (Natural and Artificial Infrastructure) and Operations and Maintenance of those Facilities*) describes the maintenance and monitoring activities necessary to support successful establishment of natural conditions and operations and maintenance activities necessary to support the functionality of constructed infrastructure.

Programmatic Sideboards, General Protection Measures, and Other Requirements

In order to qualify for coverage under the Order, projects must meet the appropriate programmatic sideboards, general protection measures, and other conditions described in this PEIR.

Individual restoration projects authorized under the Order should be designed, planned, and implemented in a manner that is consistent with the techniques and minimization measures presented in the guidance documents and manuals listed in Section 2.8.1, *Programmatic Sideboards,* of this PEIR.

Actions not directed by guidance documents or manuals that may be eligible for permitting under the Order include newer, innovative approaches to restoration design that are not yet in the guidance documents or manuals but have demonstrated success. Examples include fishway operation and maintenance, and permanent removal of summer dams and other types of small dams.

All projects permitted under the Order must incorporate applicable general protection measures to ensure avoidance and minimization of impacts to aquatic/riparian resources from construction activities. See Appendix E of this PEIR for full descriptions of these general protection measures and design guidelines.

In addition, the project proponent shall contact the approving Water Board to submit available project information and request a pre-application consultation meeting prior to submittal of the NOI. The approving Water Board may waive pre-application meeting requirement on a case-by-case basis.

Some project types may require additional design review and oversight by other regulatory agency staff and agency engineers, including but not limited to NMFS, USFWS, and CDFW. The aforementioned regulatory agencies may impose specific requirements for certain project types as described in 2.8.4 *Projects Requiring Oversight by Other Agencies* in this PEIR.

This PEIR also identifies activities that are prohibited under the Order in Section 2.8.5, *Activities Prohibited Under the Order*.

Design Guidelines

Project type–specific design guidelines have been developed with assistance from multiple regulatory agencies (e.g., CDFW, NMFS, USFWS) to help project proponents during the design development of their individual projects, in a manner that is appropriate and sustainable, minimizes adverse effects on aquatic habitats, and maximizes the ecological benefits of the restoration (Appendix E of this PEIR). For example, these guidelines include designing restored streams in ways that provide fish passage and withstand probable flooding events. The project proponent may modify design approaches that do not conform with the specific guidelines, based on site-specific conditions or technological constraints or advances, or regionally accepted guidance documents.

Species Protection Measures

For purposes of this CEQA analysis, this PEIR has included a suite of species protection measures that shall be implemented by project proponents, as applicable. Applicable species protection measures are to be implemented in addition to applicable general protection measures (Appendix E of this PEIR), when suitable habitat exists within the currently occupied range of the species and/or a species is determined to be present. Alternative measures, conditions, or technological advances to accommodate individual restoration projects may be proposed by enrollees for regulatory agency approval (NMFS, USFWS, and/or CDFW) approval. See Appendix F of this PEIR for full descriptions of these species protection measures.

Screening of Individual Restoration Projects

As described below, a screening process would be used to determine how project proponents could implement individual restoration projects under the Order and how they may use this PEIR.

At the start of the individual restoration project process (e.g., when the proponent defines the project and begins to develop restoration plans and/or engineering drawings), the project proponent would complete a series of initial screening steps. The purpose of these steps would be to determine whether the project would be eligible for coverage under the Order and to identify how to use this PEIR (Figure ES-1).

Step 1. First, the project proponent would determine whether the individual restoration project qualifies for the General Order for Small Habitat Restoration Projects.

> *Would the project not exceed 5 acres or a cumulative total of 500 linear feet of streambank or coastline and qualify for the CEQA Class 33 categorical exemption (State CEQA Guidelines Section 15333)?*[4]

If the answer is yes (the project meets both requirements), and as long as other requirements of the General Order for Small Habitat Restoration Projects are met, the project proponent would have the option to enroll under the General Order for Small Habitat Restoration Projects. If the proposed project does not meet the requirements for the General Order for Small Habitat Restoration Projects, the project proponent would go to the second step in the screening process.

Step 2. The second step would determine whether the restoration project meets all of the following requirements:

- Falls within the types of projects described in Section 2.6, *Categories of Restoration Projects in the Order,* of this PEIR, and is not a prohibited activity as defined in Section 2.8.5, *Activities Prohibited under the Order.*

[4] Enrollees would need to confirm specific qualification requirements with State Water Board and/or the appropriate Regional Board staff in the event the General Order for Small Habitat Restoration Projects is amended after issuance of the Order.

- Proposes construction and operation and maintenance methods consistent with those described in Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods.*
- Proposes to incorporate applicable sideboards, general protection measures, and design guidelines described in Section 2.8, *Programmatic Sideboards, General Protection Measures, and Other Requirements*.

If the individual restoration project is consistent with these requirements, the project proponent may continue to the next step in the screening process.

Step 3. The third step in the screening process is to determine the type of CEQA documentation needed for the individual restoration project. In accordance with State CEQA Guidelines Section 15168(c), the CEQA lead agency would examine proposed restoration activities that comply with the Order (i.e., meet the requirements listed for Step 2 of the screening process) in light of the information in this PEIR, to determine whether additional CEQA documentation must be prepared. This step is described in greater detail in Section 1.1, *Introduction and Overview of the Order*, and diagrammed in Figure ES-4.

Determining the Next Step under CEQA

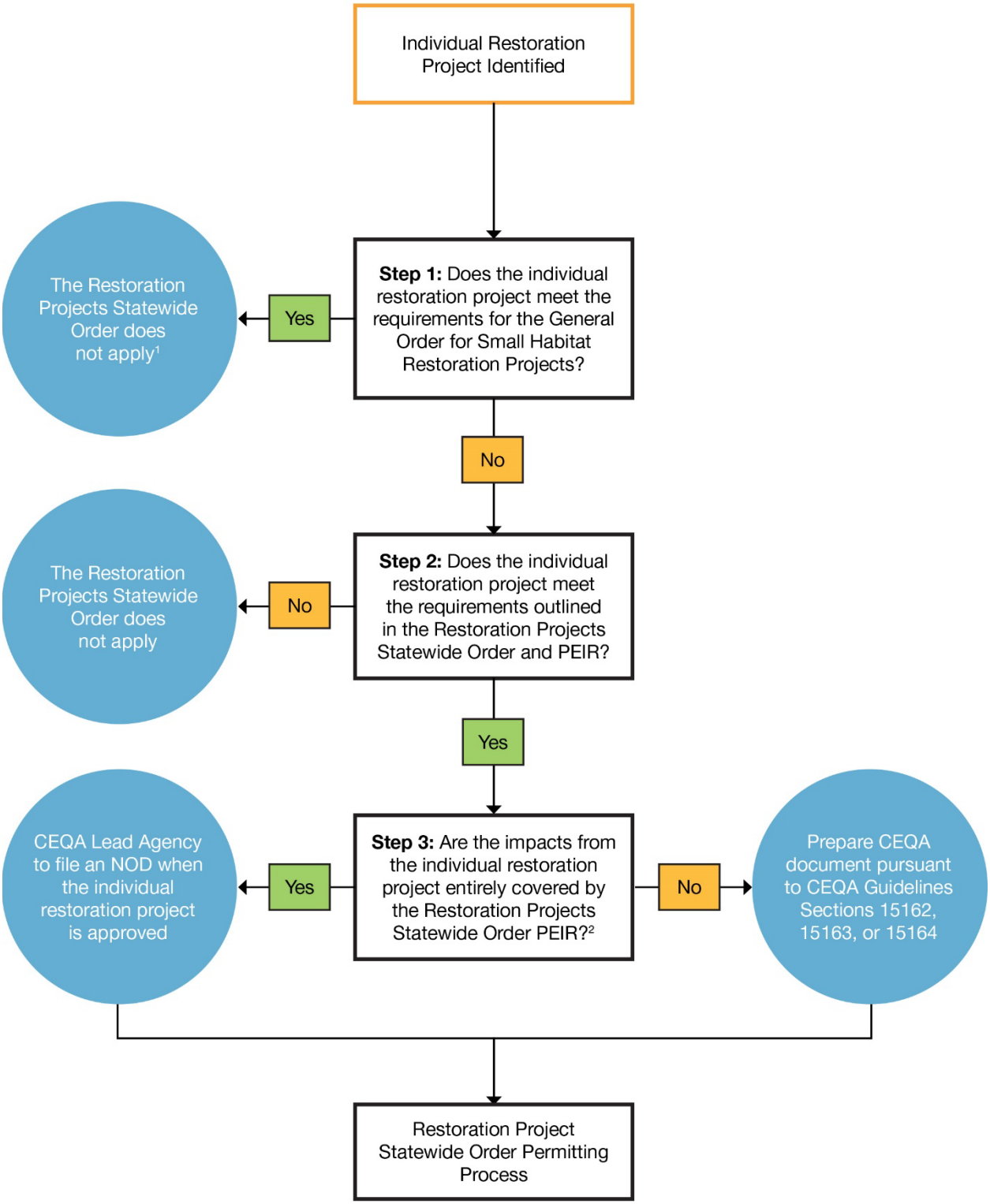
A party implementing an individual restoration project subject to the Order may be a public agency, as defined by State CEQA Guidelines Section 15379, or a private party. If the party implementing the restoration project is a public agency, that agency would typically be a CEQA lead agency for the project or, in some circumstances, a responsible agency (State CEQA Guidelines Sections 15367 and 15381). If the party implementing the individual restoration project is a private entity, that party would coordinate with the public agency with principal responsibility to approve the project, as described in State CEQA Guidelines Section 15050 and 15051. Such public agencies with permitting or other approval authority related to the individual restoration project may include a Regional Board, CDFW, or a county or city, among other public agencies.

Therefore, as used in this PEIR, the term “project proponent” is defined as a public agency or private party that meets the following criteria:

- A public agency that would provide funding in whole or in part for an individual restoration project permitted under the Order.
- A public agency that proposes to carry out or otherwise approve all or some portion of an individual restoration project permitted under the Order.
- A private party that completes, carries out, or funds an individual restoration project. The private party would coordinate with the public agency with principal responsibility to approve the project, as described in State CEQA Guidelines Sections 15050 and 15051.

Any public agency proposing to carry out or approve all or some portion of an individual restoration project subject to the Order must exercise its independent judgment to determine CEQA compliance. Given this PEIR and the statewide scope of the Order, the exercise of discretion by a lead agency for an individual restoration project will be

Figure ES-4 CEQA Flow Chart



1 Obtain coverage under the General Order for Small Habitat Restoration Projects

2 Contact the State Water Board if they will be the lead agency for the site-specific restoration project

guided by State CEQA Guidelines Section 15168. Possible scenarios are described in Section 1.1, *Introduction and Overview of the Order*.

Alternatives to the Proposed Project

The alternatives to the Order considered in this PEIR were developed based on information gathered during development of the Order and during the PEIR scoping process (Section 1.3, *Public Participation and Environmental Review Process*).

In developing the Order, a range of potential actions and other ways to meet the project objectives were considered. Various draft versions of the Order were prepared based on input received from the Regional Boards and technical experts. In addition, comments were received during scoping of the PEIR. See Appendix B for the comments received in response to the notice of preparation (NOP) of the PEIR. Three alternatives were identified for further evaluation in this PEIR: The No Project Alternative and two potentially feasible alternatives to the Order. Tables ES-1 and ES-2 present a summary comparison of the impact levels of the Order and alternatives when compared to the Order. See Chapter 6, *Alternatives*, in this PEIR for a full description of the alternatives to the Order.

Table ES-1
Comparison of Environmental Impacts of the Alternatives Compared to the Order

Issue Area Environmental Impacts	Order**	No Project Alternative	Alternative 1—More Narrow Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.2 Aesthetics	LTSM	Similar*	Similar*	Similar*	Similar*
3.3 Agriculture and Forestry Resources	SU	Similar*	Similar*	Similar*	Similar*
3.4 Air Quality and Greenhouse Gas Emissions	SU	Similar*	Similar*	Similar*	Similar*
3.5 Biological Resources – Terrestrial	SU	Similar*	Similar*	Similar*	Similar*
3.6 Biological Resources – Aquatic	SU	Similar*	Similar*	Similar*	Similar*
3.7 Cultural Resources	SU	Similar*	Similar*	Similar*	Similar*
3.8 Energy Resources	LTS	Similar*	Similar*	Similar*	Similar*
3.9 Geology and Soils	LTSM	Similar*	Similar*	Similar*	Similar*
3.10 Hazards and Hazardous Materials	SU	Similar*	Similar*	Similar*	Similar*

Table ES-1
Comparison of Environmental Impacts of the Alternatives Compared to the Order

Issue Area Environmental Impacts	Order**	No Project Alternative	Alternative 1—More Narrow Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.11 Hydrology and Water Quality	LTSG	Similar*	Similar*	Similar*	Similar*
3.12 Land Use and Planning	SU	Similar*	Similar*	Similar*	Similar*
3.13 Mineral Resources	LTSM	Similar*	Similar*	Similar*	Similar*
3.14 Noise	SU	Similar*	Similar*	Similar*	Similar*
3.15 Population and Housing	LTS	Similar*	Similar*	Similar*	Similar*
3.16 Recreation	LTSM	Similar*	Similar*	Similar*	Similar*
3.17 Transportation	SU	Similar*	Similar*	Similar*	Similar*
3.18 Tribal Cultural Resources	SU	Similar*	Similar*	Similar*	Similar*
3.19 Utilities and Service Systems and Public Services	SU	Similar*	Similar*	Similar*	Similar*
3.20 Wildfire	LTSM	Similar*	Similar*	Similar*	Similar*

Notes:
* The impact related to the alternative could be at a lesser magnitude than the Order, however, it is assumed the final impact conclusion (e.g., LTSM, SU, etc.) will be the similar to the Order. For example, there may be less overall construction related to the alternative, but the construction impacts related to noise, air quality, etc. could result in the same final impact conclusion as the Order.
**This finding represents the most significant finding for the issue area after mitigation
LTS: Less than significant; LTSG: Less than significant after application of General Protection Measure(s); LTSM: Less than significant after application of feasible mitigation measure(s); SU: Potentially Significant; Similar: Similar to Order.

No Project Alternative: The No Project Alternative consists of existing conditions at the time the NOP is published, and what would be reasonably expected to occur in the foreseeable future if the Order had not been adopted, based on current plans and consistent with available infrastructure. Restoration projects initiated by project proponents are assumed to continue to be implemented, and projects would remain subject to the requirement to file a CWA Section 401 water quality certification and/or

waste discharge requirements for each restoration project. Proponents of restoration projects would continue to obtain individual CWA Section 401 water quality certifications and/or waste discharge requirements from the State Water Board and/or Regional Boards. Therefore, the No Project Alternative considered in this PEIR is considered the continuation of the existing regulatory process for restoration projects that do not meet project size and CEQA eligibility requirements of the previous authorized General Order for Small Habitat Restoration Projects.

Alternative 1 – Specify More Narrowly the Types of Restoration Projects Included in the Order: This alternative would allow for larger restoration projects than specified in the Order for Small Habitat Restoration Projects but would be more limited than the Order. Furthermore, this alternative would define the level of restoration necessary for projects to qualify for coverage and would indicate how that level can or should be measured. This alternative differs from the Order in that restoration projects implemented by project proponents that do not meet the size constraints or certain criteria required by this alternative would not be covered under this alternative.

Alternative 2 – Eliminate Certain Aspects of Restoration Projects: This alternative would remove certain elements from the categories of restoration projects, such as the following:

- Bank stabilization projects that may depend on riprap, currently covered under the Stream and Riparian Habitat Establishment, Restoration, and Enhancement category.
- Removal, replacement, modification, retrofit, installation, or resetting of culverts, fords, bridges, and other stream crossings and water control structures of any size, currently covered under the Improvements to Stream Crossings and Fish Passage category
- Removal of small dams, currently covered under the Removal of Small Dams, Tide Gates, Flood Gates, and Legacy Structures category.

This alternative differs from the Order in that it would reduce the types or varieties of restoration projects that would be implemented under the Order.

Alternative 3 – Exclude Entire Categories of Restoration Projects: The alternative would exclude entire categories of restoration projects that would be covered under the Order. For example, under this alternative, all restoration projects associated with the Water Conservation and Floodplain Restoration categories under the Order would not be implemented. This alternative differs from the Order in that it would reduce types of restoration projects that would be implemented under the Order.

Areas of Known Controversy and Concern

The State Water Board issued a notice of preparation (NOP) on October 11, 2019, to satisfy the requirements of CEQA and the State CEQA Guidelines (Appendix B of this PEIR).

A public scoping meeting was held during the 43-day public NOP comment period on Thursday, October 22, 2019, at 1 p.m., at the Byron Sher Auditorium, 1001 I Street,

Sacramento, CA 95814. Issues raised in the NOP comment letters (Appendix B of this PEIR) and scoping meeting identified potential areas of controversy and concern.

The public and various government agencies have identified areas of controversy that pertain to the issues addressed by the Order. General topics raised included:

- Description of the Order evaluated in the Draft PEIR, including concerns about the scope and level of definition of the Order
- Range of alternatives to be evaluated in the Draft PEIR
- Definition of environmental and regulatory setting for the Draft PEIR analysis
- Technical resource areas that should be considered and resource-specific considerations (including, but not limited to biological, cultural, geology and soils, and hydrology)
- Guidance and suggestions for project design and evaluation criteria
- Scope of analysis in the draft PEIR, including consideration of climate change
- Noticing of, and ability for, public participation

The issues raised in these comments are addressed in this EIR, as appropriate, to the extent they pertain to compliance with CEQA.

Requirements for PEIR Certification

Per CEQA Guidelines section 15090(a) the State Water Board certifies that the PEIR has been completed in compliance with CEQA, that the State Water Board has reviewed and considered the information in the PEIR, and that the PEIR reflects the independent judgment and analysis of the State Water Board.

A Notice of Determination (NOD) is filed with the State Clearinghouse and appropriate findings (Appendix I) are adopted as set forth in CEQA Guidelines section 15091. Pursuant to CEQA Guidelines section 15092, a lead agency may only approve or carry out a project for which an EIR has been prepared that identifies one or more significant environmental effects if it makes one or more of the following findings (CEQA Guidelines section 15091(a)):

(1) Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effects as identified in the final EIR.

(2) Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency.

(3) Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the final EIR.

Summary of Environmental Impacts of the Proposed Project

The PEIR impact analysis examines all potentially significant impacts that would occur with implementation of projects under the Order. Impacts and mitigation measures are described for the constructed facilities (natural and artificial infrastructure) and operations and maintenance of those facilities.

As discussed above, the Order does not promote construction or operation and maintenance of specific facilities or other specific physical actions by the State Water Board. The State Water Board also does not propose to construction, operation, or undertake specific physical actions under the Order. For the purposes of ensuring a conservative analysis of environmental impacts the PEIR assumes that the Order is implemented and achieves the desired outcomes. Accordingly, the PEIR evaluates the potential impacts of the types of restoration projects that the Order encourages and promotes in the study area. Once proposals for individual restoration projects consistent with the Order are developed, the lead agencies for the individual restoration projects will evaluate whether the impacts are adequately described in this PEIR, or if necessary, will be evaluated in project-level CEQA Documents.

The impact analysis in this PEIR addresses constructed facilities (natural and artificial infrastructure) and operations and maintenance of those facilities. The individual restoration projects could be constructed, operated, and maintained in many different ways to meet regulatory requirements and guidelines. For this reason, a range of potential effects could result from implementation of these general types of restoration projects. However, specific project details, such as project sizes, configurations, locations, and operations are not known at this time. For this reason, the potential effects that could result from individual restoration projects permitted under the Order are discussed to the extent feasible in a level of detail to facilitate meaningful review and informed public decision making in the broader context of the Order. Therefore, many of the significant impacts would remain significant and unavoidable.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with general protection measures and mitigation measures would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

For many impacts, this conclusion is very conservative. Project proponents that use the Order have a legal duty under CEQA to mitigate impacts to the extent feasible. In addition, many of the mitigation measures identified in this PEIR are standard types of mitigation, are considered to be generally feasible for most projects, and would reduce impacts to less-than-significant levels in many cases. Nevertheless, the State

Water Board cannot guarantee that the mitigation measures will be adopted by the lead agencies for non-covered actions.

Potential environmental impacts of the Order and associated mitigation measures are summarized in Table ES-2.

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.2 Aesthetics	**3.2-1:** Implementing future restoration projects permitted under the Order could result in substantial degradation of visual qualities.	LTS	LTS	**Mitigation Measure AES-1: Minimize Degradation of Visual Quality** ♦ Use compatible colors for proposed structural features, such as fish screens and storage tanks. Use earth tone paints and stains with low levels of reflectivity. ♦ Minimize the vertical profile of proposed structures as much as possible. ♦ Use vegetation plantings on proposed facility walls, such as climbing plants, espaliers, and other forms that soften the appearance of structures. ♦ Provide vegetative screening to soften views of structures. Landscaping should complement the surrounding landscape.	LTS	LTS
	3.2-2: Implementing future restoration projects permitted under the Order could result in substantial adverse effects on scenic vistas and scenic resources.	LTS	LTS	None.	LTS	LTS
	3.2-3: Implementing future restoration projects permitted under the Order could result in new sources of substantial light or glare.	PS	LTS	**Mitigation Measure AES-2: Avoid Effects of Project Lighting** Proposed lighting facilities shall use shields, and lighting shall be directed downward and inward toward the facilities.	LTSM	LTS
3.3 Agriculture and Forestry Resources	**3.3-1:** Restoration projects permitted under the Order could convert Special Designation Farmland to nonagricultural use or conflict with a Williamson Act contract or zoning for agricultural use.	LTS	PS	**Mitigation Measure AG-1: Minimize and Avoid Loss of Special Designation Farmland** The following measures shall be implemented before and during construction of restoration projects permitted under the Order to minimize and avoid loss of Special Designation Farmland, as applicable. ♦ Restoration projects shall be designed to minimize, to the greatest extent feasible, the loss of agricultural land with the highest values. ♦ Restoration projects that will result in permanent conversion of Special Designated Farmland shall preserve other Special Designation Farmland in perpetuity by acquiring an agricultural conservation easement, or by contributing funds to a land trust or other entity qualified to preserve Special Designation Farmland in perpetuity (at a target ratio of 1:1, depending on the nature of the conversion and the characteristics of the Special Designated Farmland to be converted, to compensate for the permanent loss). Based upon the cost and availability of farmland, whether the landowner is sponsoring the project, and other factors, the CEQA lead agency for the individual restoration project should consider whether a 1:1 ratio is appropriate and feasible on a case-by-case basis. For example, contributions to a program such as the California Farmland Conservancy Program, which establishes conservation easements to preserve existing farmland in California, may be prohibitively expensive at a 1:1 ratio where there is a significant amount of affected Special Designated Farmland because it is based on a farm real	LTS	SU

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.3 Agriculture and Forestry Resources (cont.)	3.3-1 (cont.)			estate average value per acre. For example, the farm real estate average value per acre in 2019 was $10,000 [USDA 2019]. ♦ Restoration project features shall be designed to minimize fragmentation or isolation of Special Designation Farmland. Where a project involves acquiring land or easements, the remaining nonproject area shall be of a size sufficient to allow viable farming operations. The project proponents shall be responsible for acquiring easements, making lot line adjustments, and merging affected land parcels into units suitable for continued commercial agricultural management. ♦ Any utility or infrastructure serving agricultural uses shall be reconnected if it is disturbed by project construction. If a project temporarily or permanently cuts off roadway access or removes utility lines, irrigation features, or other infrastructure, the project proponents shall be responsible for restoring access as necessary to ensure that economically viable farming operations are not interrupted. ♦ Where applicable to a project site, buffer areas shall be established between restoration projects and adjacent agricultural land. The buffers shall be sufficient to protect and maintain land capability and flexibility in agricultural operations. Buffers shall be designed to protect the feasibility of ongoing agricultural operations and reduce the effects of construction-related or operational activities (including the potential to introduce special-status species in the agricultural areas) on adjacent or nearby properties. Buffers shall also serve to protect restoration areas from noise, dust, and the application of agricultural chemicals. The width of each buffer shall be determined on a project-by-project basis to account for variations in prevailing winds, crop types, agricultural practices, ecological restoration, or infrastructure. Buffers can function as drainage swales, trails, roads, linear parkways, or other uses compatible with ongoing agricultural operations. **Mitigation Measure AG-2: Minimize Impacts on Lands Protected by Agricultural Zoning or Williamson Act Contract** Restoration projects shall be designed to minimize, to the greatest extent feasible, conflicts and inconsistencies with land protected by agricultural zoning or a Williamson Act contract and the terms of the applicable zoning/contract. **Mitigation Measure GEO-6: Implement Measures for Waterway Construction Activities** See Section 3.9.4, *Impacts and Mitigation Measures*, in Section 3.9, Geology and Soils.		

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.3 Agriculture and Forestry Resources (cont.)	**3.3-2:** Restoration projects permitted under the Order could conflict with existing zoning for forestland, timberland, or timberland zoned Timberland Production, or could result in the loss of forestland from conversion of land to non-forest use.	LTS	LTS	None.	LTS	LTS
	3.3-3: Restoration projects permitted under the Order could involve other changes in the existing environment that, because of their location or nature, could indirectly result in the conversion of Special Designation Farmland to nonagricultural use or conversion of forestland to non-forest use.	PS	LTS	See Section 3.3.4, *Impacts and Mitigation Measures*, in Section 3.3, Agriculture and Forestry Resources, and Appendix E for applicable general protection measures.	LTSG	LTSG
3.4 Air Quality and Greenhouse Gas Emissions	**3.4-1:** Implementing future restoration projects permitted under the Order could conflict with an applicable air quality plan.	PS	LTS	**Mitigation Measure AIR-1: Minimize Conflicts with Applicable Air Quality Plans** Proponents of restoration projects permitted under the Order and their construction contractors shall implement the following measures to minimize conflicts between project construction and applicable air quality plans: ♦ Use equipment and vehicles that comply with CARB requirements and emission standards for on-road and off-road fleets and engines. New engines and retrofit control systems should reduce NOX and PM emissions from diesel-fueled on-road and off-road vehicles and equipment. ♦ Minimize idling times, either by shutting equipment off when not in use or by reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure, Title 13, Section 2485 of the California Code of Regulations). Clear signage should be posted for construction workers at all entrances to the site. ♦ Maintain all equipment in proper working condition according to the manufacturer's specifications. ♦ Use electric equipment when possible. Use lower emitting alternative fuels to power vehicles and equipment where feasible. ♦ Use low–volatile organic compound (VOC) coatings and chemicals; minimize chemical use.	SU	LTS

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.4 Air Quality and Greenhouse Gas Emissions (cont.)	**3.4-2:** Emissions from future restoration projects permitted under the Order could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.	PS	LTS	Mitigation Measure AIR-1.	SU	LTS
	3.4-3: Emissions from future restoration projects permitted under the Order could result in other emissions (such as those leading to odors) that would adversely affect a substantial number of people.	LTS	LTS	None.	LTS	LTS
	3.4-4: Emissions from future restoration projects permitted under the Order could expose sensitive receptors to substantial pollutant concentrations.	PS	LTS	**Mitigation Measure AIR-2: Minimize Construction Air Pollutant Emissions** Air quality analyses prepared for future restoration projects shall evaluate human health risks from potential exposures of sensitive receptors to substantial pollutant concentrations from the projects. The need for a human health risk analysis should be evaluated using approved screening tools, and discussed with the local air quality management district or air pollution control district during the preparation of the air quality analysis. If the project's health risk is determined to be significant, control measures should be implemented to reduce health risks to levels below the applicable air district threshold. Implementation of one or more of the following requirements, where feasible and appropriate, would reduce the effects of construction: ♦ Use equipment with diesel engines designed or retrofitted to minimize DPM emissions, usually through the use of catalytic particulate filters in the exhaust. ♦ Use electric equipment to eliminate local combustion emissions. ♦ Use alternative fuels, such as compressed natural gas or liquefied natural gas. If the restoration project would result in significant emissions of airborne, naturally occurring asbestos, or metals from excavation, hauling, blasting, tunneling, placement, or other handling of rocks or soil, a dust mitigation and air monitoring plan shall identify individual restoration project measures to minimize emissions and ensure that airborne concentrations of the TACs of concern do not exceed regulatory or risk-based trigger levels.	SU	LTS

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.4 Air Quality and Greenhouse Gas Emissions (cont.)	**3.4-5:** Implementing future restoration projects permitted under the Order could result in an increase in GHG emissions that may have a significant impact on the environment.	PS	LTS	**Mitigation Measure AIR-3: Minimize GHG Emissions** Restoration projects permitted under the Order shall implement the GHG mitigation measures listed in the most recent air district guidance documents (e.g., CAPCOA 2010; BAAQMD 2011), as appropriate for the project site and conditions. Current versions of such guidance documents list the following for construction of projects: ♦ Use alternative fuels for construction equipment. ♦ Use electric and hybrid construction equipment. ♦ Limit construction equipment idling beyond regulatory requirements. ♦ Institute a heavy-duty off-road vehicle plan. ♦ Implement a construction vehicle inventory tracking system. ♦ Use local building materials for at least 10 percent of total materials. ♦ Recycle or reuse at least 50 percent of construction waste or demolition materials. In addition, the California Attorney General's Office has developed a list of measures and strategies to reduce GHG emissions at the individual project level. As appropriate, the measures can be included as design features of a restoration project, required as changes to the project, or imposed as mitigation (whether undertaken directly by the project proponent or funded by mitigation fees). The measures are examples; the list is not intended to be exhaustive. The following are best management practices to consider and implement (as applicable) during design, construction, and O&M of project facilities. *Transportation and Motor Vehicles* ♦ Limit idling time for commercial vehicles, including delivery and construction vehicles. ♦ Use low- or zero-emission vehicles, including construction vehicles. ♦ Institute a heavy-duty off-road vehicle plan and a construction vehicle inventory tracking system for construction projects. ♦ Promote ridesharing. ♦ Provide the necessary facilities and infrastructure to encourage the use of low- or zero-emission vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations). ♦ Provide a shuttle service to public transit/work sites. ♦ Provide information on all options for individuals and businesses to reduce transportation-related emissions.	SU	LTS

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.4 Air Quality and Greenhouse Gas Emissions (cont.)	3.4-5 (cont.)			*SmartWay Truck Efficiency* This strategy involves requiring existing trucks/trailers to be retrofitted with the best available "SmartWay Transport" and/or CARB-approved technology. Technologies that reduce GHG emissions from trucks include devices that reduce aerodynamic drag and rolling resistance. Aerodynamic drag may be reduced using devices such as cab roof fairings, cab side gap fairings, cab side skirts, and on the trailer side, skirts, gap fairings, and trailer tail. Rolling resistance can be reduced using single wide tires or low-rolling resistance tires and automatic tire inflation systems on both the tractor and the trailer. *Tire Inflation Program* The strategy involves actions to ensure that vehicle tire pressure is maintained to manufacturer specifications. *Blended Cements* The strategy to reduce CO_2 emissions involves the addition of blending materials such as limestone, fly ash, natural pozzolan, and/or slag to replace some of the clinker in the production of Portland cement. *Anti-Idling Enforcement* The strategy guarantees emissions reductions as claimed by increasing compliance with anti-idling rules, thereby reducing the amount of fuel burned through unnecessary idling. Measures include enhanced field enforcement of anti-idling regulations, increased penalties for violations of anti-idling regulations, and restriction on registrations of heavy-duty diesel vehicles with uncorrected idling violations.		
	3.4-6: Implementing future restoration projects permitted under the Order could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.	PS	LTS	Mitigation Measure AIR-1 through Mitigation Measure AIR-3.	SU	LTS
3.5 Biological Resources – Terrestrial	**3.5-1:** Implementing restoration projects permitted under the Order could adversely affect habitat for special-status plant species.	PS	PS	None.	SU	SU
	3.5-2: Implementing restoration projects permitted under the Order could result in adverse direct effects on special-status wildlife species.	PS	PS	None.	SU	SU

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.5 Biological Resources – Terrestrial (cont.)	**3.5-3:** Implementing restoration projects permitted under the Order could result in adverse effects on riparian habitat or sensitive natural communities.	PS	PS	See Section 3.5.4, *Impacts and Mitigation Measures*, in Section 3.5, Biological Resources - Terrestrial, and Appendix E for applicable general protection measures.	LTSG	SU
	3.5-4: Implementing restoration projects permitted under the Order could result in adverse effects on state and federally protected wetlands through direct removal, hydrological interruption, or other means.	PS	LTS	See Section 3.5.4, *Impacts and Mitigation Measures*, in Section 3.5, Biological Resources - Terrestrial, and Appendix E for applicable general protection measures.	LTSG	LTS
	3.5-5: Implementing restoration projects permitted under the Order could interfere with the movement of native resident and migratory wildlife species.	PS	LTS	See Section 3.5.4, *Impacts and Mitigation Measures*, in Section 3.5, Biological Resources - Terrestrial, and Appendix E for applicable general protection measures.	LTSG	LTSG
	3.5-6: Implementing restoration projects permitted under the Order could conflict with local policies or ordinances protecting biological resources.	PS	PS	See Section 3.5.4, *Impacts and Mitigation Measures*, in Section 3.5, Biological Resources - Terrestrial, and Appendix E for applicable general protection measures.	LTSG	LTSG
	3.5-7: Implementing restoration projects permitted under the Order could conflict with the provisions of an adopted habitat conservation plan or natural community conservation plan.	LTS	PS	**Mitigation Measure TERR-1: Coordinate with CDFW, USFWS, and Permittees Regarding HCPs, NCCPs, and Other Conservation Plans** If the site for a restoration project permitted under the Order is within the planning area for any adopted HCP, NCCP, or similar conservation plan, the CEQA lead agency for the project shall consult with the plan permittee(s), CDFW and/or USFWS, as applicable, to identify any potential conflicts with the plan's goals, objectives, or conservation measures. As part of this consultation, the CEQA lead agency shall seek input regarding potential design features, conservation measures, or other mitigation strategies to avoid potential conflicts and achieve substantial conformance with the objectives of the HCP, NCCP, or similar conservation plan. The CEQA lead agency shall implement these elements as applicable to ensure that the restoration project conforms to applicable goals and policies set forth in the adopted conservation plan.	LTS	LTSM

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.6 Biological Resources – Aquatic	**3.6-1:** Implementing future restoration projects permitted under the Order could result in substantial adverse effects to special-status fish species directly, or indirectly through habitat modifications.	PS	PS	See Section 3.6.4, *Impacts and Mitigation Measures*, in Section 3.6, Biological Resources - Aquatic, and Appendix E for applicable general protection measures.	SU	LTSG
	3.6-2: Implementing future restoration projects permitted under the Order could result in substantial adverse direct effects on the movement of native resident or migratory fish.	LTS	B	None.	LTS	B
3.7 Cultural Resources	**3.7-1:** Implementing future restoration projects permitted under the Order could cause a substantial adverse change in the significance of a historical resource pursuant to State CEQA Guidelines Section 15064.5.	PS	PS	**Mitigation Measure CUL-1: Conduct Inventory and Significance Evaluation of Architectural Resources** Before implementation of any project permitted under the Order, the need for an inventory and significance evaluation of architectural resources in the project area shall be assessed, and, if necessary based upon the type of restoration activity conducted and potential for built features to be present or disturbed. The assessment should consist of a review of maps and aerial photos to see if existing buildings dams, levees, roads, or other built features are in the CEQA project area. If so, and the age of these features is either unknown or is known to be older than 45 years old, then an inventory and evaluation should be completed by, or under the direct supervision of, a qualified architectural historian, defined as one who meets the U.S. Secretary of the Interior's Professional Qualifications Standards for Historical History or History. This inventory and evaluation shall include the following: ♦ Map(s) and verbal description of the project CEQA Area of Potential Effects (C-APE) for cultural resources that delineates both the horizontal and vertical extents of where a project could result in impacts, including both direct and indirect, on cultural resources. ♦ A records search at the appropriate repository of the California Historical Resources Information System for the C-APE and vicinity (typically areas within 0.25 or 0.5 mile, based on setting) to acquire records on previously recorded cultural resources in the C-APE and vicinity and previous cultural resources studies conducted for the C-APE and vicinity. ♦ Background research on the history of the C-APE and vicinity for all projects determined to need additional historical architecture assessment. ♦ If, after review, features of the built environment are determined to be less than 45 years old, a summary statement of their age and references for this determination will be included in the project area description. No further analysis is necessary.	SU	SU

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.7 Cultural Resources (cont.)	3.7-1 (cont.)			♦ If historic-era built resources are determined to likely be present, an architectural field survey of the C-APE, unless previous architectural field surveys no more than two years old have been conducted for the C-APE, in which case a new field survey is not necessary. Any architectural resources identified in the C-APE during the survey shall be recorded on the appropriate California Department of Parks and Recreation 523 forms (i.e., site record forms). ♦ An evaluation of any architectural resources identified in the C-APE for California Register eligibility (i.e., whether they qualify as historical resources, as defined in State CEQA Guidelines Section 15064.5). ♦ An assessment of potential project impacts on any historical resources identified in the C-APE. This should include an analysis of whether the project's potential impacts on the historical resource would be consistent with the U.S. Secretary of the Interior's Standards for the Treatment of Historic Properties and applicable guidelines. ♦ A technical report meeting U.S. Secretary of the Interior's Standards for architectural history technical reporting This report will document the mitigation measures taken and any study results, and following CEQA lead agency review and approval, completes the requirements of this mitigation measure. If potentially significant impacts on historical resources are identified, an approach for reducing such impacts shall be developed before project implementation and in coordination with interested parties (e.g., historical societies, local communities). Typical measures for reducing impacts include: ♦ Modifying the project to avoid impacts on historical resources. ♦ Documentation of historical resources, to the standards of and to be included in the Historic American Building Survey, Historic American Engineering Record, or Historic American Landscapes Survey, as appropriate. As described in the above standards, the documentation shall be conducted by a qualified architectural historian, defined above, and shall include large-format photography, measured drawings, written architectural descriptions, and historical narratives. The completed documentation shall be submitted to the U.S. Library of Congress. ♦ Relocation of historical resources in conformance with the U.S. Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings. ♦ Monitoring construction-related and operational vibrations at historical resources. ♦ For historical resources that are landscapes, preservation of the landscape's historic form, features, and details that have evolved over time, in conformance with the U.S. Secretary of the Interior's Guidance for the Treatment of Cultural Landscapes. ♦ Development and implementation of interpretive programs or displays, and community outreach.		

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.7 Cultural Resources (cont.)	**3.7-2:** Implementing future restoration projects permitted under the Order could cause a substantial adverse change in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5.	PS	PS	**Mitigation Measure CUL-2: Conduct Inventory and Significance Evaluation of Archaeological Resources** Before implementation of any project permitted under the Order that includes ground disturbance, an archaeological records search and sensitivity assessment, inventory and significance evaluation of archaeological resources identified in the C-APE shall be conducted. The inventory and evaluation should be done by or under the direct supervision of a qualified archaeologist, defined as one who meets the U.S. Secretary of the Interior's Professional Qualifications Standards for Archeology, and shall include the following: ♦ Map(s) and verbal description of the project C-APE for cultural resources that delineates both the horizontal and vertical extents of where a project could result in impacts, including both direct and indirect, on cultural resources. ♦ A records search at the appropriate repository of the California Historical Resources Information System (CHRIS) for the C-APE and vicinity (typically areas within 0.25 or 0.5 mile, based on setting) to acquire records on previously recorded cultural resources in the C-APE and vicinity and previous cultural resources studies conducted for the C-APE and vicinity. This task can be performed by either the qualified archaeologist or the appropriate local CHRIS center staff. Outreach to the California Native American Heritage Commission, including a request of a search of the Sacred Lands File for the C-APE, to determine if any documented Native American sacred sites could be affected by the project. ♦ Consultation with California Native American Tribes pursuant to PRC Section 21080.3 to determine whether any indigenous archaeological resource or tribal cultural resources could be affected by the project. Project proponents shall submit a Sacred Lands File & Native American Contacts List Request to the Native American Heritage Commission (NAHC) at the initial stages of project development (or as early as practicable) to determine if a project would have an impact on Native American cultural resources. The project proponent shall coordinate with the approving Water Board or other CEQA lead agency, if applicable, as soon as possible whenever tribes that are traditionally and culturally affiliated to a project area are identified. Any tribe identified by the NAHC will require notification of the proposed project by the lead agency as soon as practicable during early design. Tribes will be consulted if a request is received after initial notification. Consultation will include discussion regarding project design, cultural resource survey, protocols for construction monitoring, and any other tribal concern. Construction of the project will not commence until the approving Water Board or other CEQA lead agency achieves compliance with the California Environmental Protection Agency Tribal Consultation Protocol (April 2018).	SU	SU

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.7 Cultural Resources (cont.)	3.7-2 (cont.)			♦ If the C-APE is in or adjacent to navigable waterways, outreach to the California State Lands Commission to request a search of their Shipwrecks Database, to determine whether any submerged archaeological resources may be present in the C-APE. ♦ Background research on the history, including ethnography and indigenous presence, of the C-APE and vicinity. ♦ An archaeological sensitivity analysis of the C-APE based on mapped geologic formations and soils, previously recorded archaeological resources, previous archaeological studies, and Native American consultation. ♦ If an archaeological study is not warranted based on the above review, a summary of the assessment and justification of the determination will be prepared. If the CEQA lead agency agrees with the determination, no further study is needed. If a study is warranted, as a result of these archival studies and consultations, an archaeological field survey of the C-APE will be conducted. The field survey shall include, at a minimum, a pedestrian survey. If the archaeological sensitivity analysis suggests a high potential for buried archaeological resources in the C-APE, a subsurface survey shall also be conducted. If previous archaeological field surveys no more than two years old have been conducted for the C-APE, a new field survey is not necessary, unless their field methods do not conform to those required above (e.g., no subsurface survey was conducted but C-APE has high potential for buried archaeological resources). Any archaeological resources identified in the C-APE during the survey shall be recorded on the appropriate California Department of Parks and Recreation 523 forms (i.e., site record forms). ♦ An evaluation of any archaeological resources identified in the C-APE for California Register eligibility (i.e., as qualifying as historical resources, as defined in State CEQA Guidelines Section 15064.5) as well as whether they qualify as unique archaeological resources, pursuant to PRC Section 21083.2. Such evaluation may require archaeological testing (excavation), potentially including laboratory analysis, and consultation with relevant Native American representatives (for indigenous resources). ♦ An assessment of potential project impacts on any archaeological resources identified in the C-APE that qualify as historical resources (per State CEQA Guidelines Section 15064.5) and/or unique archaeological resources (per PRC Section 21083.2). This shall include an analysis of whether the project's potential impacts would materially alter a resource's physical characteristics that convey its historical significance and that justify its inclusion (or eligibility for inclusion) in the California Register or a qualified local register.		

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.7 Cultural Resources (cont.)	3.7-2 (cont.)			♦ A technical report meeting U.S. Secretary of the Interior's Standards for archaeological technical reporting. This report will document the mitigation measures taken and any study results, and, following CEQA lead agency review and approval, completes the requirements of this mitigation measure. If potentially significant impacts on archaeological resources that qualify as historical resources (per State CEQA Guidelines Section 15064.5) and/or unique archaeological resources (per PRC Section 21083.2) are identified, develop, before project implementation and in coordination with interested or consulting parties (e.g., Native American representatives [for indigenous resources], historical societies [for historic-era resources], local communities) an approach for reducing such impacts. If any such resources are on or in the tide and submerged lands of California, this process shall also include coordination with the California State Lands Commission. Typical measures for reducing impacts include: ♦ Modify the project to avoid impacts on resources. ♦ Plan parks, green space, or other open space to incorporate the resources. ♦ Develop and implement a detailed archaeological resources management plan to recover the scientifically consequential information from archaeological resources before any excavation at the resource's location. Treatment for most archaeological resources consists of (but is not necessarily limited to) sample excavation, artifact collection, site documentation, and historical research, with the aim to target the recovery of important scientific data contained in the portion(s) of the resource to be affected by the project. ♦ Develop and implement interpretive programs or displays, and conduct community outreach. **Mitigation Measure CUL-3: Implement Measures to Protect Archaeological Resources during Project Construction or Operation** If archaeological resources are encountered during project construction or operation of any project permitted under the Order, all activity within 100 feet of the find shall cease and the find shall be flagged for avoidance. The lead agency and a qualified archaeologist, defined as one meeting the U.S. Secretary of the Interior's Professional Qualifications Standards for Archeology, shall be immediately informed of the discovery. The qualified archaeologist shall inspect the discovery and notify the lead agency of their initial assessment. If the qualified archaeologist determines that the resource is or is potentially indigenous in origin, the lead agency shall consult with culturally affiliated California Native American Tribes to assess the find and determine whether it is potentially a tribal cultural resource.		

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.7 Cultural Resources (cont.)	3.7-2 (cont.)			If the lead agency determines, based on recommendations from the qualified archaeologist and culturally affiliated California Native American Tribes, that the resource is indigenous, that the resource may qualify as a historical resource (per State CEQA Guidelines Section 15064.5), unique archaeological resource (per PRC Section 21083.2), or tribal cultural resource (per PRC Section 21074), then the resource shall be avoided if feasible. If avoidance of an identified indigenous resource is not feasible, the lead agency shall consult with a qualified archaeologist, culturally affiliated California Native American Tribes, and other appropriate interested parties to determine treatment measures to minimize or mitigate any potential impacts on the resource pursuant to PRC Section 21083.2 and State CEQA Guidelines Section 15126.4. If any such resources are on or in the tide and submerged lands of California, this process shall also include coordination with the California State Lands Commission. Once treatment measures have been determined, the lead agency shall prepare and implement an archaeological (and/or tribal cultural) resources management plan that outlines the treatment measures for the resource. Treatment measures typically consist of the following steps: ♦ Determine whether the resource qualifies as a historical resource (per State CEQA Guidelines Section 15064.5), unique archaeological resource (per PRC Section 21083.2), or tribal cultural resource (per PRC Section 21074) through analysis that could include additional historical or ethnographic research, evaluative testing (excavation), or laboratory analysis. ♦ If it qualifies as a historical resource (per State CEQA Guidelines Section 15064.5) and/or unique archaeological resource (per PRC Section 21083.2), implement measures for avoiding or reducing impacts such as the following: ♦ Modify the project to avoid impacts on resources. ♦ Plan parks, green space, or other open space to incorporate resources. ♦ Recover the scientifically consequential information from the archaeological resource before any excavation at the resource's location. This typically consists of (but is not necessarily limited to) sample excavation, artifact collection, site documentation, and historical research, with the aim to target the recovery of important scientific data contained in the portion(s) of the resource to be affected by the project. ♦ Develop and implement interpretive programs or displays. ♦ If it qualifies as a tribal cultural resource (per PRC Section 21074) implement measures for avoiding or reducing impacts such as the following: ♦ Avoid and preserve the resource in place through measures that include but are not limited to the following: • Plan and construct the project to avoid the resource and protect the cultural and natural context.		

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.7 Cultural Resources (cont.)	3.7-2 (cont.)			• Plan greenspace, parks, or other open space to incorporate the resources with culturally appropriate protection and management criteria. ♦ Treat the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, through measures that include but are not limited to the following: • Protect the cultural character and integrity of the resource. • Protect the traditional use of the resource. • Protect the confidentiality of the resource. ♦ Implement permanent conservation easements or other interests in real property, with cultural appropriate management criteria for the purposes of preserving or using the resource or place.		
	3.7-3: Implementing future restoration projects permitted under the Order could disturb any human remains, including those interred outside of dedicated cemeteries.	PS	PS	**Mitigation Measure CUL-4: Implement Measures to Protect Human Remains during Project Construction or Operation** If human remains are encountered during construction or operation and maintenance of any project permitted under the Order, all work shall immediately halt within 100 feet of the find and the lead agency shall contact the appropriate county coroner to evaluate the remains and follow the procedures and protocols set forth in State CEQA Guidelines Section 15064.5(e)(1). If human remains encountered are on or in the tide and submerged lands of California, the lead agency shall also contact the California State Lands Commission. If the coroner determines that the remains are Native American in origin, the appropriate county shall contact the California Native American Heritage Commission, in accordance with California Health and Safety Code Section 7050.5(c) and PRC Section 5097.98. Per PRC Section 5097.98, the project's lead agency shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located is not damaged or disturbed by further development activity until the lead agency has discussed and conferred, as prescribed PRC Section 5097.98, with the most likely descendants and the property owner regarding their recommendations, if applicable, taking into account the possibility of multiple human remains.	SU	SU
3.8 Energy Resources	**3.8-1:** Implementing restoration projects permitted under the Order could result in substantial inefficient, wasteful, or unnecessary long-term consumption of energy resources or changes to hydropower generation.	LTS	LTS	None.	LTS	LTS

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.8 Energy Resources (cont.)	**3.8-2:** Implementing restoration projects permitted under the Order could conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	LTS	LTS	None.	LTS	LTS
3.9 Geology and Soils	**3.9-1:** Implementing future restoration projects permitted under the Order could cause direct or indirect adverse effects on people or structures related to risk of loss, injury, or death due to a fault rupture.	PS	PS	**Mitigation Measure GEO-1: Include Geotechnical Design Recommendations** To minimize potential impacts from seismic events and the presence of adverse soil conditions, lead agencies shall ensure that geotechnical design recommendations are included in the design of facilities and construction specifications. Recommended measures to address adverse conditions shall conform to applicable design codes, guidelines, and standards. **Mitigation Measure GEO-2: Comply with the Alquist-Priolo Act** For construction in an Alquist-Priolo Earthquake Fault Zone, a determination must be made by a licensed practitioner (California Certified Engineering Geologist) that no fault traces are present within structures, such as setback levees. The standard of care for such determinations includes direct examination of potentially affected subsurface materials (soil and/or bedrock) by logging of subsurface trenches. Levee structures may also be required to have heavier reinforcement against strong ground motion, in compliance not only with California regulations but, in many cases, with additional federal regulations.	LTSM	LTSM
	3.9-2: Implementing future restoration projects permitted under the Order could directly or indirectly result in adverse effects on people or structures related to risk of loss, injury, or death due to strong seismic ground shaking.	PS	PS	**Mitigation Measure GEO-3: Conduct Individual Restoration Project Geotechnical Investigation and Report** An individual restoration projects geotechnical investigation shall be performed and a geotechnical report prepared for any restoration project that would result in potentially significant grading activities. The geotechnical report shall include a quantitative analysis to determine whether excavation or fill placement would result in a potential for damage due to soil subsidence during and/or after construction. Project designs shall incorporate measures to reduce the potential damage to a less-than-significant level. Measures shall include but not be limited to: ♦ Removal and recompaction of existing soils susceptible to subsidence ♦ Ground improvement (such as densification by compaction or grouting, soil cementation) ♦ Reinforcement of structural components to resist deformation due to subsidence The assessment of subsidence for specific projects shall analyze the individual restoration projects potential for and severity of cyclic seismic loading. A geotechnical investigation shall also be performed by an appropriately licensed professional engineer and/or geologist to determine the presence and thickness of potentially liquefiable sands that could result in loss of bearing value during seismic shaking events. Project designs shall incorporate	LTSM	LTSM

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.9 Geology and Soils (cont.)	3.9-2 (cont.)			measures to mitigate potential damage to a less-than-significant level. Measures shall include but not be limited to: ♦ Ground improvement (such as grouting or soil cementation) ♦ Surcharge loading by placement of fill, excavation, soil mixing with non-liquefiable finer-grained materials, and replacement of liquefiable materials at shallow depths ♦ Reinforcement of structural components to resist deformation due to liquefaction An analysis of individual restoration projects probable and credible seismic acceleration values, conducted in accordance with current applicable standards of care, shall be performed to provide for a suitable project design. Geotechnical investigations shall be performed and geotechnical reports shall be prepared in the responsible care of California licensed geotechnical professionals including professional civil engineers, certified geotechnical engineers, professional geologists, certified engineering geologists, and certified hydrogeologists, all of whom practice within the current standards of care for such work. **Mitigation Measure GEO-4: Adhere to International Building Code** Constructed facilities shall be required to adhere to the current approved version of the International Building Code (IBC), and to comply with the IBC for critical structures (e.g., levees).		
	3.9-3: Implementing future restoration projects permitted under the Order could directly or indirectly cause adverse effects on people or structures from unstable soil conditions.	PS	PS	**Mitigation Measure GEO-5: Conduct Expansive Clay Investigation** In areas where expansive clays exist, a licensed professional engineer or geologist shall perform a hydrogeological/geotechnical investigation to identify and quantify the potential for expansion, particularly differential expansion of clayey soils caused by leakage and saturation beneath new improvements. Measures could include but are not limited to removing and recompacting problematic expansive soils, stabilizing soils, and/or reinforcing the constructed improvements to resist deformation from expansion of subsurface soils. **Mitigation Measure GEO-6: Implement Measures for Waterway Construction Activities** For projects that involve the engineered subsurface structural components (e.g., of surface impoundments, levees, bridge footings/abutments) project design shall provide for protection from leakage to the subsurface. Measures could include but are not limited to rendering concrete less permeable by specifying concrete additives such as bentonite, designing impermeable liner systems, designing leakage collection and recovery systems, and constructing impermeable subsurface cutoff walls. For restoration projects that could cause subsurface seepage of nuisance water onto adjacent lands, the following measures shall be implemented:	LTSM	LTSM

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.9 Geology and Soils (cont.)	3.9-3 (cont.)			♦ Perform seepage monitoring studies by measuring the level of shallow groundwater in the adjacent soils, to evaluate baseline conditions. Continue monitoring for seepage during and after project implementation. ♦ Develop a seepage monitoring plan if subsurface seepage constitutes nuisance water on the adjacent land. ♦ If adjacent land is not usable, implement seepage control measures, such as installing subsurface agricultural drainage systems to avoid raising water levels into crop root zones. Cutoff walls and pumping wells can also be used to mitigate the occurrence of subsurface nuisance water. **Mitigation Measure GEO-7: Implement Measures for Levee Construction and Other Fill Embankment Designs** For projects that involve the construction of setback levees, surface impoundments, and other fill embankments, the project design shall place fill in accordance with state and local regulations and the prevailing standards of care for such work. Measures could include but are not limited to blending the soils most susceptible to landsliding with soils that have higher cohesion characteristics; installing slope stabilization measures; designing top-of-slope berms or v-ditches, terrace drains, and other surface runoff control measures; and designing slopes at lower inclinations. **Mitigation Measure GEO-8: Assess the Presence of Highly Organic Soils** For projects that would result in a significant or potentially significant risk to structures because of the presence of highly organic soils, the lead agencies shall require a geotechnical evaluation before construction to identify measures to mitigate organic soils. The following measures may be considered: ♦ Over-excavation and import of suitable fill material. ♦ Structural reinforcement of constructed works to resist deformation. ♦ Construction of structural supports below the depth of highly organic soils into materials with suitable bearing strength.		
	3.9-4: Implementing future restoration projects permitted under the Order could result in substantial soil erosion or loss of topsoil.	PS	PS	See Section 3.9.4, *Impacts and Mitigation Measures*, in Section 3.9, Geology and Soils, and Appendix E for applicable general protection measures.	LTSG	LTSG

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.9 Geology and Soils (cont.)	**3.9-5:** Implementing future restoration projects permitted under the Order could directly or indirectly result in the loss of a unique paleontological resource or geological resource.	PS	PS	**Mitigation Measure GEO-9: Conduct a General Project-Level Analysis** Restoration projects implemented by other public proponents under the Order would be required to do a desktop search on whether the project site would be located in a paleontological sensitive unit. If the project site was determined to be located on a paleontological sensitive unit, then Mitigation Measure GEO-9 (and Mitigation Measure GEO-10, below, as applicable) would be implemented. If restoration projects implemented under the Order fall outside a paleontological sensitive unit, GEO-9 (and Mitigation Measure GEO-10, below) would be not required. During project development and project-level analysis, a paleontological resource monitoring and recovery plan shall be developed and implemented for all actions determine by the project proponent to be located on a paleontological sensitive unit. The plan shall include protocols for paleontological resources monitoring in areas where construction-related excavation would affect sediment with moderate to high paleontological sensitivity. The paleontological resource monitoring and recovery plan shall provide guidelines for the establishment of a yearly or biannual monitoring program led by a qualified paleontologist to determine the extent of fossiliferous sediment being exposed and affected by erosion, and determine whether paleontological resources are being lost. If the loss of scientifically significant paleontological resources is documented, then a recovery program should be implemented. **Mitigation Measure GEO-10: Conduct Worker Training** For projects that are determined to have moderate to high paleontological sensitivity, before the start of any ground-disturbing activity (e.g., excavation or clearing), a qualified paleontologist shall prepare paleontological resources sensitivity training materials for use during project worker environmental training or equivalent. This training shall be conducted by a qualified environmental trainer under the supervision of the qualified paleontologist. For restoration projects that involve construction crew phases, additional trainings shall be conducted for new construction personnel. The paleontological resource sensitivity training shall focus on the types of resources that could be encountered within the individual restoration project site and the procedures to follow if they are found. Project proponents and/or project contractors shall retain documentation demonstrating that all construction personnel attended the paleontological resource sensitivity training before the start of work on the site, and shall provide documentation to the project manager upon request.	SU	SU

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.10 Hazards and Hazardous Materials	**3.10-1:** Implementing future restoration projects permitted under the Order could involve the routine transport, use, or disposal of hazardous materials that, if accidentally released, could create a hazard to the public or the environment, or that could be located within one-quarter mile of a school.	PS	LTS	See Section 3.10.4, *Impacts and Mitigation Measures*, in Section 3.9, Hazards and Hazardous Materials, and Appendix E for applicable general protection measures.	LTSG	LTS
	3.10-2: Ground-disturbing activities for construction of future restoration projects permitted under the Order could encounter previously unidentified contaminated soil and/or groundwater, potentially exposing construction workers, the public, and the environment to risks associated with hazardous materials.	PS	LTS	**Mitigation Measure HAZ-1: Prepare and Implement a Health and Safety Plan and Provide Qualified Oversight of Fill Removal Related to Earthmoving Activities** The following measures shall be implemented before and during construction of any restoration project permitted under the Order: ♦ A health and safety plan for the project shall be developed and implemented. This plan shall clearly notify all workers of the potential to encounter hazardous materials during ground-disturbing work and other construction activities. The plan shall identify proper handling and disposal procedures for contaminants expected to be on-site and shall provide maps and phone numbers for local hospitals and other emergency contacts. Construction workers shall comply with all protocols outlined in the health and safety plan throughout project implementation. ♦ Any hazardous materials being stored in the project area and not needed for construction activities shall be removed and disposed of at appropriately permitted locations before construction. A qualified professional (e.g., geologist or engineer) shall oversee fill excavation activities and work in potential project areas that contain abandoned underground storage tanks requiring removal, to properly identify any contaminated soils that may be present. Excavation of underground storage tanks must comply with county ordinances and policies. If contaminated soils are found, Mitigation Measure HAZ-2 shall be implemented. ♦ Removal of underground storage tanks associated with the restoration project shall include measures to ensure their safe transport and disposal. Remediation actions, if necessary, shall be defined in consultation with the local Regional Board and implemented during construction. **Mitigation Measure HAZ-2: Notify Appropriate Federal, State, and Local Agencies If Contaminated Soils Are Identified, and Complete Recommended Remediation Activities** The following measures shall be implemented before construction of any restoration project permitted under the Order if contaminated soils are found on the project site:	LTSM	LTS

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.10 Hazards and Hazardous Materials (cont.)	3.10-2 (cont.)			♦ The appropriate federal, state, and local agencies shall be notified if evidence of previously undiscovered soil or groundwater contamination (e.g., stained soil, odorous groundwater) is encountered during construction activities. Any contaminated areas shall be cleaned up in accordance with the recommendations of the Regional Board, DTSC, or other appropriate federal, state, or local regulatory agencies. ♦ A site plan shall be prepared for the remediation activities appropriate for the proposed land uses, including excavation and removal of on-site contaminated soils, and needed redistributions of clean fill material on the study area. The plan shall include measures to ensure the safe transport, use, and disposal of contaminated soil and building debris removed from the site. If ground-disturbing activities encounter contaminated groundwater, the construction contractor shall report the contamination to the appropriate agencies, dewater the area, and treat the groundwater to remove the contaminants before discharge into the sanitary sewer system. The construction contractor shall comply with the plan and applicable federal, state, and local laws. The plan shall outline specific procedures for handling and reporting of hazardous materials, and for disposing of hazardous materials removed from the site at an appropriate off-site facility. **Mitigation Measure HAZ-3: Notify Appropriate Federal, State, and Local Agencies If Accidental Discharges of Hazardous Materials** Following an accidental discharge of a reportable quantity of a hazardous material or an unknown material, the appropriate federal, state, and local agencies shall be notified. Any contaminated areas shall be cleaned up in accordance with the recommendations of the Regional Board, DTSC, or other appropriate federal, state, or local regulatory agencies.		
	3.10-3: Future restoration projects permitted under the Order could be implemented within 2 miles of an airport, resulting in a safety hazard.	PS	PS	**Mitigation Measure HAZ-4: Establish Airport Operation Area Buffer Zones** Restoration projects permitted under the Order shall avoid creating hazardous wildlife attractants within a distance of 10,000 feet of a designated Airport Operations Area.	SU	SU
	3.10-4: Implementing future restoration projects permitted under the Order could interfere with emergency response access or with an adopted emergency response or evacuation plan.	PS	LTS	**Mitigation Measure HAZ-5: Coordinate with Applicable Federal, State, and Local Agencies and Districts** Before construction, project proponents implementing restoration projects permitted under the Order shall coordinate with the appropriate federal, state, and local government agencies, districts, and emergency response agencies regarding the timing of construction projects that would occur near the project sites. Specific measures to mitigate potentially significant impacts shall be determined during the interagency coordination, and shall include measures to achieve the following performance standards:	LTSM	LTS

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.10 Hazards and Hazardous Materials (cont.)	3.10-4 (cont.)			♦ Reduce potential traffic impacts so that no more than 30 trucks per hour will be added to any road (e.g., by scheduling construction truck trips and designating alternate haul routes to disperse truck trips). ♦ Reduce potential traffic safety impacts (e.g., by employing flaggers to manage traffic flow at conflict locations). ♦ Provide outreach and community noticing (e.g., via the web, utility bill inserts, and other methods) for locations where multiple projects will create construction traffic simultaneously.		
	3.10-5: Implementing future restoration projects permitted under the Order could expose people or structures, either directly or indirectly, to a significant loss, injury, or death due to wildland fires.	PS	PS	**Mitigation Measure FIRE-1: Develop and Implement a Fire Prevention Plan** See Section 3.20.4, *Impacts and Mitigation Measures*, in Section 3.20, Wildfire.	LTSM	LTSM
	3.10-6: Implementing future restoration projects permitted under the Order could create vector habitat that would pose a significant public health hazard.	PS	PS	**Mitigation Measure HAZ-6: Prepare and Implement a Vector Management Plan** The following measures shall be implemented by restoration projects permitted under the Order to prevent public health hazards posed by vector habitat as applicable (e.g. restoration projects that result in standing water and are located near populated areas): ♦ Freshwater habitat management shall include management of water control structures, vegetation management, mosquito predator management, drainage improvements, and other best management practices. The agency implementing the restoration project shall coordinate with the California Department of Fish and Wildlife and local mosquito and vector control agencies regarding these strategies and specific techniques to help minimize mosquito production. ♦ Permanent ponds shall be maintained to increase the diversity of waterfowl yet decrease the introduction of vectors through constant circulation of water, vegetation control, and periodic draining of ponds. ♦ The project shall avoid ponding in tidal marsh habitat or in areas within the waterside of setback levees. Restoration projects shall be designed with methods to reduce mosquito breeding.	LTSM	LTSM

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.11 Hydrology and Water Quality	**3.11-1:** Implementing restoration projects permitted under the Order could result in the release of pollutants into surface water and/or groundwater that could violate water quality standards or waste discharge requirements, substantially degrade water quality, or obstruct implementation of a water quality control plan.	PS	PS	See Section 3.11.4, *Impacts and Mitigation Measures*, in Section 3.11, Hydrology and Water Quality, and Appendix E for applicable general protection measures.	LTSG	LTSG
	3.11-2: Implementing restoration projects permitted under the Order could substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that a project may impede sustainable groundwater management of the basin or obstruct implementation of a sustainable groundwater management plan.	LTS	LTS	None.	LTS	LTS
	3.11-3: Implementing restoration projects permitted under the Order could substantially alter the existing drainage pattern of a site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces in a manner that could substantially increase the rate of runoff; create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems; or impede or redirect flood flows.	LTS	LTS	None.	LTS	LTS

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.12 Land Use and Planning	**3.12-1:** Restoration projects permitted under the Order could conflict with a land use plan, policy, or regulation adopted to avoid or mitigate an environmental effect.	LTS	SU	None.	LTS	SU
	3.12-2: Implementing restoration projects permitted under the Order could physically divide an established community.	LTS	SU	None.	LTS	SU
3.13 Mineral Resources	**3.13-1:** Implementing restoration projects permitted under the Order could result in the loss of availability of a known mineral resource.	PS	PS	**Mitigation Measure MIN-1: Minimize Potential Impacts from Loss of a Known Mineral Resource** The following measures shall be implemented during construction of restoration projects permitted under the Order: ♦ Project proponents shall ensure land use compatibility between existing mineral resource extraction activities and restoration projects. ♦ An adequate buffer (to be determined on an individual project basis in coordination with appropriate regulatory agencies) shall be maintained between future projects and designated MRZ-2 sectors. ♦ Project proponents shall ensure that future land use changes in designated mineral resource extraction areas recognize mineral resource extraction as a compatible use. ♦ The use of construction aggregate shall be limited to local sources with sufficient capacity to meet the needs of both restoration projects and future local development, to the extent possible. ♦ Project construction shall use recycled aggregate where possible, to decrease the demand for new aggregate.	LTSM	LTSM
	3.13-2: Implementing restoration projects permitted under the Order could result in the loss of availability of a locally important mineral resource recovery site.	PS	PS	**Mitigation Measure MIN-2: Minimize Potential Impacts from the Loss of a Locally-Important Mineral Resource Recovery Site** The following measures shall be implemented during and after construction of restoration projects permitted under the Order: ♦ Access to existing, active mineral resource extraction sites that have been identified in local general plans, specific plans, or other land use plans shall be maintained both during and after project construction. ♦ Projects shall implement the most current recommendations identified in the California Department of Conservation (DOC) Geologic Energy Management Division (formerly Division of Oil, Gas, and Geothermal Resources) construction site well review program (DOC 2007), such as:	LTSM	LTSM

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.13 Mineral Resources (cont.)	3.13-2 (cont.)			• Identify all existing natural gas well sites and oil production facilities in or near the project area. • Identify any oil or natural gas well within 100 feet of any navigable body of water or watercourse perennially covered by water or any officially recognized wildlife preserve as a “critical well” (California Code of Regulations Title 14, Chapter 4, Article 2, Sections 1720[a][2][B] and 1720[a][2][C]). DOC requires that “critical wells” include equipment capable of meeting more stringent blowout prevention requirements than noncritical wells, based on pressure testing and ratings. • Identify safety measures to prevent unauthorized access to equipment. • Include safety shutdown devices on oil and natural gas wells and other equipment, as appropriate. • Notify DOC of new oil or natural gas wells or changes in oil or natural gas well operations or physical conditions, receive written approval of the changes from DOC, and receive written notification of DOC’s inspection of new or changed equipment. The approvals will be related primarily to the ability to: - Protect all subsurface hydrocarbons and freshwater. - Protect the environment. - Use adequate blowout prevention equipment. - Use approved drilling and cementing techniques. • If any plugged/abandoned or unrecorded oil and natural gas wells are uncovered during construction, notify DOC, complete remedial well plugging actions, and avoid constructing any structures over the abandoned oil and natural gas wells. • If oil and natural gas wells are under the jurisdiction of or a lease from the State Lands Commission, provide additional plans and environmental documentation as required before modifying the oil or natural gas wells.		
3.14 Noise	**3.14-1:** Implementing future restoration projects permitted under the Order could result in a temporary or permanent increase in ambient noise levels in excess of standards established in applicable plans and ordinances.	PS	LTS	**Mitigation Measure NOISE-1: Minimize Noise Conflicts** The following measures shall be implemented during construction of any restoration project permitted under the Order: ♦ Noise-generating activities shall follow the applicable general plan and/or noise ordinances for the jurisdiction located within the vicinity of the project. ♦ Construction equipment shall be located away from sensitive receptors, to the extent feasible, to reduce noise levels below applicable local standards. ♦ Construction equipment shall be maintained to manufacturers’ recommended specifications, and all construction vehicles and equipment shall be equipped with appropriate mufflers and other approved noise-control devices.	SU	LTSM

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.14 Noise (cont.)	3.14-1 (cont.)			♦ Idling of construction equipment shall be limited to the extent feasible to reduce the time that noise is emitted. ♦ An individual traffic noise analysis of identified haul routes shall be conducted and mitigation, such as reduced speed limits, shall be provided at locations where noise standards cannot be maintained for sensitive receptors. ♦ The project shall incorporate the use of temporary noise barriers, such as acoustical panel systems, between construction activities and sensitive receptors if it is concluded that they would be effective in reducing noise exposure to sensitive receptors. **Mitigation Measure NOISE-2: Minimize Operations and Maintenance Noise Conflicts** The following measures shall be implemented during O&M activities for any restoration project permitted under the Order: ♦ Noise-sensitive receptors in the vicinity of project activities shall be identified and projects shall be designed to minimize exposure of sensitive receptors to long-term, operational noise sources (for example, water pumps) to reduce noise levels below applicable local standards. ♦ The hours of operation at noise generation sources near or adjacent to noise-sensitive areas shall be limited, wherever practicable, to reduce the level of exposure to meet applicable local standards.		
	3.14-2: Implementing future restoration projects permitted under the Order could expose sensitive receptors to excessive groundborne vibration.	PS	PS	Mitigation Measure NOISE-1 and Mitigation Measure NOISE-2.	SU	LTSM
	3.14-3: Implementing future restoration projects permitted under the Order could expose sensitive receptors to excessive groundborne noise levels.	PS	LTS	Mitigation Measure NOISE-1 and Mitigation Measure NOISE-2.	SU	LTSM

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.14 Noise (cont.)	**3.14-4:** Implementing future restoration projects permitted under the Order that are located within the vicinity of a private airstrip, an airport land use plan, or where such a plan has not been adopted, within 2 miles of a public airport or public use airport, could expose people residing or working in the project area to excessive noise levels.	PS	LTS	**Mitigation Measure NOISE-3: Prepare Preconstruction Safety Plans** To reduce potential impacts on people residing or working in the vicinity of a private airstrip, an airport land use plan, or where such a plan has not been adopted within 2 miles of a public airport or public use airport, construction contracts shall include requirements for the contractor to prepare a construction safety plan. The plan shall be developed before construction activities begin, in collaboration with aviation base personnel, to coordinate construction activities including a schedule, coordination of personnel with aviation radios, and notice requirements. Furthermore, the contractor shall coordinate with emergency service personnel.	LTSM	LTS
3.15 Population and Housing	**3.15-1:** Implementing restoration projects permitted under the Order could require relocation by construction and operation crews, resulting in population growth and demand for housing.	LTS	LTS	None.	LTS	LTS
	3.15-2: Implementing restoration projects permitted under the Order may displace substantial numbers of people or housing, necessitating the construction of replacement housing elsewhere.	LTS	LTS	None.	LTS	LTS
3.16 Recreation	**3.16-1:** Implementing future restoration projects permitted under the Order could directly impair, degrade, or eliminate recreational resources, facilities, and opportunities.	LTS	PS	**Mitigation Measure REC-1: Minimize Impairment, Degradation, or Elimination of Recreational Resources** If restoration projects permitted under the Order result in the substantial impairment, degradation, or elimination of recreational facilities, replacement facilities of equal capacity and quality shall be developed and installed.	LTS	LTSM
	3.16-2: Future restoration projects permitted under the Order could alter recreational resources or facilities or require the construction or expansion of recreational facilities that could result in environmental impacts.	PS	PS	Mitigation Measure REC-1 and Mitigation Measure NOISE-2.	LTSM	LTSM

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.16 Recreation (cont.)	**3.16-3:** Implementing future restoration projects permitted under the Order could increase the use of existing recreational resources and facilities such that substantial physical deterioration would occur or be accelerated.	PS	PS	**Mitigation Measure REC-2: Minimize Impacts on Existing Recreational Resources** If a restoration project results in substantial temporary or permanent impairment, degradation, or elimination of recreational facilities that causes users to be directed toward other existing facilities, the project proponent shall coordinate with affected public and private recreation providers to direct the displaced users to underused recreational facilities. The project proponent shall conduct additional operations and maintenance work at existing facilities to prevent them from deteriorating. If possible, temporary replacement facilities shall be provided. If the increase in use is temporary, once use levels have decreased back to existing conditions, the degraded facilities shall be rehabilitated or restored. Where impacts on existing facilities are unavoidable, the project proponent shall compensate for impacts through mitigation, restoration, or preservation off-site or creation of additional permanent new replacement facilities.	LTSM	LTSM
3.17 Transportation	**3.17-1:** Future restoration projects permitted under the Order could conflict with a plan, ordinance, or policy addressing the circulation system including transit, roadways, bicycle, and pedestrian facilities.	PS	LTS	**Mitigation Measure TRA-1: Prepare Construction Traffic Management Plan** Before construction begins, the construction manager shall have a qualified professional prepare a construction traffic management plan. The plan shall provide the appropriate measures to reduce potential traffic obstructions or service level degradation at affected traffic facilities. The scope of the construction traffic management plan will depend on the type, size, and duration of the specific qualifying restoration project under the Order. The plan could include such measures as construction signage, flaggers for lane closures, and construction schedule and/or delivery schedule restrictions. The plan shall be submitted to the local public works department and implemented as appropriate throughout construction. **Mitigation Measure TRA-2: Prepare Waterway Traffic Control Plan** A waterway traffic control plan shall be prepared before project construction begins. The plan shall be followed throughout construction to ensure that vessels can navigate safely and efficiently during construction. The plan shall identify vessel traffic control measures to reduce congestion and navigation hazards to the extent feasible. Construction zones in waterways shall be barricaded or guarded by readily visible barriers or other effective measures to warn boaters of their presence and restricted access. Warning devices and signage shall comply with the California Uniform State Waterway Marking System and shall be operational during nighttime hours and periods of dense fog.	LTSM	LTS

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.17 Transportation (cont.)	3.17-1 (cont.)			**Mitigation Measure TRA-3: Develop Channel Closure Plan for Affected Facilities** Before construction begins in areas where temporary partial waterway closure is necessary, a temporary channel closure plan shall be developed. The plan shall identify alternative detour routes and procedures for notifying boaters of construction activities and partial closures including coordination with the U.S. Coast Guard, local boating organizations, and marinas. The channel closure plan shall be implemented as appropriate throughout construction. **Mitigation Measure TRA-4: Reduce Project Effects on Boat Passage and Transit Facilities** To the extent feasible, the following actions shall be implemented to reduce impacts of project construction on boat passage and transit facilities: ♦ To the extent feasible, ensure that safe boat access to public launch and docking facilities, businesses, and residencies is maintained. ♦ Coordinate with transit system operators, as appropriate, to establish alternative transit system routes to be rerouted during construction. ♦ Provide boat passage as an integral component of operable gate facilities, and design such facilities to provide uninterrupted boat passage when the gates are in the “up” position. Floating docks with mooring bits shall be provided along the shoreline on both sides of the boat passage facilities for boaters to use while waiting. ♦ Before construction begins in areas where bridge closure may be necessary, develop a traffic plan that identifies traffic control measures to reduce congestion and provide alternative routes. **Mitigation Measure TRA-5: Minimize Effects on Trails and Bicycle and Pedestrian Circulation and Identify Alternatives** To minimize potential impacts of project construction on trails and bicycle and pedestrian circulation, the following actions shall be taken when feasible: ♦ Minimize closure of paths. ♦ Provide for temporary or permanent relocation of the trails and bicycle pedestrian circulation locations to the extent feasible. ♦ Consult with the appropriate public works department to determine the most feasible alignment for facility relocation.		

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.17 Transportation (cont.)	**3.17-2:** Future restoration projects permitted under the Order could conflict with or be inconsistent with State CEQA Guidelines Section 15064.3(b).	PS	LTS	**Mitigation Measure TRA-6: Reduce Emissions** To comply with State CEQA Guidelines Section 15064.3(b), the following measures shall be taken to reduce effects associated with increased vehicle miles traveled: ♦ Limit idling time for commercial vehicles, including delivery and construction activities. ♦ Use low- or zero-emissions vehicles, including construction vehicles. ♦ Institute a heavy-duty off-road vehicle plan and a construction vehicle inventory tracking system for construction projects. ♦ Promote ridesharing. ♦ Provide the necessary facilities and infrastructure to encourage the use of low- or zero-carbon emissions vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations). ♦ Increase the cost of driving and parking private vehicles, such as by imposing tolls and parking fees. ♦ Provide a shuttle service to public transit and worksites. ♦ Provide information on all options for individuals and businesses to reduce transportation-related emissions.	SU	LTS
	3.17-3: Implementing future restoration projects permitted under the Order could substantially increase hazards due to a geometric design feature or incompatible uses.	PS	PS	**Mitigation Measure TRA-7: Conduct Routine Inspections** An inspection and operation plan shall be developed and implemented, where applicable. The plan shall include procedures for routine inspections and facility operation to allow safe navigation should the facility become damaged or malfunctions. This plan shall include the following specific components: ♦ Routine inspections and correction procedures to ensure that facility safety features are in good working order. ♦ Routine inspections and correction procedures for navigational hazards around facilities, including floating or submerged debris and the formation of shoals. **Mitigation Measure TRA-8: Repair Damaged Roadways and Trails Following Construction** If damage to roads, sidewalks, trails, and/or medians occur, the construction contractor shall coordinate with the affected project proponents to ensure that any impacts are adequately repaired in accordance with applicable agency standards. Roads and/or driveways disturbed by construction activities or construction vehicles shall be properly restored to ensure long-term protection of road surfaces. Roadside drainage structures and road drainage features (e.g., rolling dips) shall be protected by regrading and reconstructing roads to drain properly. The construction contractor shall work with the applicable agencies to document preconstruction conditions of road features before the start of construction.	LTSM	LTSM

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.18 Tribal Cultural Resources	**3.18-1:** Implementing future restoration projects permitted under the Order could cause a substantial adverse change in the significance of a tribal cultural resource, as defined in PRC Section 21074.	PS	PS	**Mitigation Measure TCR-1: Conduct Inventory and Significance Evaluation of Tribal Cultural Resources with Tribes that are Culturally and Geographically Affiliated with the Project Vicinity** Before implementation of any project permitted under the Order, the following shall be conducted: consultation with California Native American Tribes pursuant to PRC Section 21080.3; a cultural resources records search; a California Native American Heritage Commission (NAHC) Sacred Lands File (SLF) search; and an inventory and significance evaluation of tribal cultural resources identified that could be impacted by the project. These tasks shall be conducted as follows. ♦ Project proponent shall submit an NAHC SLF & Native American Contacts List Request at the initial stages of project development (or as early as practicable) to determine if a project would have an impact on tribal cultural resources. ♦ Project proponent shall coordinate with the approving Water Board or other CEQA lead agency, if applicable, as soon as possible to identify California Native American Tribes that are traditionally and culturally affiliated to a project area. The CEQA lead agency shall then conduct Tribal consultation, pursuant to PRC Section 21080.3, and as soon as practicable during early design, with such Tribes to determine whether any tribal cultural resources could be affected by the project. Consultation will include discussion regarding project design, cultural resources surveys, identification of tribal cultural resources, protocols for construction monitoring, and any other Tribal concerns. Construction of the project will not commence until the approving Water Board or other CEQA lead agency achieves compliance with the California Environmental Protection Agency Tribal Consultation Protocol (April 2018) and consultation pursuant to PRC Section 21080.3 has been concluded. If potential tribal cultural resources that may be impacted by the project are identified through consultation with California Native American Tribes that are traditionally and culturally affiliated to a project area, the following shall be conducted: • Documentation of any tribal cultural resources identified in the project area, which may require additional tasks such as ethnographic research and interviews. If tribal cultural resources are identified in a project area, develop, before project implementation and in coordination California Native American Tribes that are traditionally and culturally affiliated to a project area, an approach for reducing such impacts. If any such tribal cultural resources are on or in the tide and submerged lands of California, this process shall also include coordination with the California State Lands Commission.	SU	SU

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.18 Tribal Cultural Resources (cont.)	3.18-1 (cont.)			**Mitigation Measure TCR-2: Implement Measures to Protect Tribal Cultural Resources during Project Construction or Operation.** These measures include, but are not limited to, those outlined in PRC Section 21084.3. If tribal cultural resources or indigenous archaeological resources that may qualify as tribal cultural resources are encountered during project construction or operation of any project permitted under the Order, all activity within 100 feet of the find shall cease and the find shall be flagged for avoidance. The lead agency, a qualified archaeologist, defined as one meeting the U.S. Secretary of the Interior's Professional Qualifications Standards for Archeology, and California Native American Tribes that are traditionally and culturally affiliated to a project area shall be immediately informed of the discovery. The qualified archaeologist and representatives from the notified Native American Tribes shall inspect the discovery and notify the lead agency of their initial assessment. a. If the lead agency determines, based on recommendations from the qualified archaeologist and California Native American Tribes that are traditionally and culturally affiliated to a project area, that the resource may qualify as a tribal cultural resource (per PRC Section 21074), then the resource shall be avoided if feasible. If avoidance of the resource is not feasible, the lead agency shall consult California Native American Tribes that are traditionally and culturally affiliated to a project area to determine treatment measures to minimize or mitigate any potential impacts on the resource pursuant to PRC Section 21083.2 and State CEQA Guidelines Section 15126.4. If any such resources are on or in the tide and submerged lands of California, this process shall also include coordination with the California State Lands Commission. Once treatment measures have been determined, the lead agency shall prepare and implement a tribal cultural resources management plan that outlines the treatment measures for the resource. Treatment measures typically consist of the following steps: • Determine whether the resource qualifies as a tribal cultural resource (per PRC Section 21074) through analysis that could include additional ethnographic research, archaeological investigations, or laboratory analysis. • If it qualifies as a tribal cultural resource (per PRC Section 21074) implement measures for avoiding or reducing impacts such as the following: - Avoid and preserve the resource in place through measures that include but are not limited to the following: ▪ Plan and construct the project to avoid the resource and protect the cultural and natural context. ▪ Plan greenspace, parks, or other open space to incorporate the resources with culturally appropriate protection and management criteria.		

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.18 Tribal Cultural Resources (cont.)	3.18-1 (cont.)			- Treat the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, through measures that include but are not limited to the following: ▪ Protect the cultural character and integrity of the resource. ▪ Protect the traditional use of the resource. ▪ Protect the confidentiality of the resource. - Implement permanent conservation easements or other interests in real property, with cultural appropriate management criteria for the purposes of preserving or using the resource or place. Mitigation Measure CUL-4.		
3.19 Utilities and Service Systems and Public Services	**3.19-1:** Implementing future restoration projects permitted under the Order could require or result in the construction or relocation of new water or expanded water, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.	PS	LTS	None.	SU	LTS
	3.19-2: Implementing future restoration projects permitted under the Order could result in insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years.	LTS	LTS	None.	LTS	LTS
	3.19-3: Future restoration projects permitted under the Order could be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs and could fail to comply with federal, state, and local statutes and regulations related to solid waste.	LTS	LTS	None.	LTS	LTS

Table ES-2
Summary of Environmental Impacts and Mitigation Measures

Issue Area	Impact Statement	LOS Prior to Mitigation Construction	LOS Prior to Mitigation Constructed Facilities and Operations and Maintenance	Mitigation	LOS After Mitigation Construction	LOS After Mitigation Constructed Facilities and Operations and Maintenance
3.19 Utilities and Service Systems and Public Services (cont.)	**3.19-4:** Implementing future restoration projects permitted under the Order could result in substantial adverse physical impacts associated with construction of new or modified fire protection, police protection, schools, and other public facilities.	LTS	LTS	None.	LTS	LTS
3.20 Wildfire	**3.20-1:** Implementing restoration projects permitted under the Order could exacerbate fire risk.	PS	PS	**Mitigation Measure FIRE-1: Develop and Implement a Fire Prevention Plan** The following measures shall be implemented before and during construction of restoration projects permitted under the Order, where applicable: ♦ For restoration projects in areas designated as Very High or High Fire Hazard Severity Zones, a project-specific fire prevention plan for construction and operation of the project shall be prepared and submitted to the CEQA lead agency for review before the start of construction. ♦ The draft copy of the fire prevention plan shall be provided to each fire agency (e.g., CAL FIRE and county or local municipal fire agencies) before the start of any construction activities in areas designated as Very High or High Fire Hazard Severity Zones.	LTSM	LTSM
	3.20-2: Implementing restoration projects permitted under the Order could result in downslope or downstream risks as a result of runoff, post-fire slope instability, or drainage changes.	PS	PS	Mitigation Measure FIRE-1.	LTSM	LTSM

Notes:
B: Beneficial; LOS: Level of Service; LTS: Less than Significant; LTSM: Less than Significant with Implementation of Mitigation Measures; LTSG: Less than Significant with Implementation of General Protection Measures; PS: Potentially Significant; SU: Significant and Unavoidable

Contents

Chapter **Page**

Acronyms ..... **v**

Executive Summary **ES-1**

Prologue **1-1**

Chapter 1 Introduction **1-1**
1.1 Introduction and Overview of the Order 1-1
1.2 Categories of Eligible Project Types 1-7
1.3 Public Participation and Environmental Review Process 1-8
1.4 Requirements for PEIR Certification and Future Steps in Project Approval 1-10
1.5 Organization and Format of this Document 1-11
1.6 Revisions to the Draft Order and Draft PEIR 1-12

Chapter 2 Background and Description of the Order **4-1**
2.1 Need for a Programmatic Order 2-1
2.2 Purpose and Objectives of the Order 2-1
2.3 Geographic Scope 2-2
2.4 Number and Location of Anticipated Projects 2-5
2.5 Authorizations and/or Permits that May Be Required for Restoration Projects 2-5
2.6 Categories of Restoration Projects in the Order 2-8
2.7 Typical Construction, Operation, and Maintenance Activities and Methods 2-22
2.8 Programmatic Sideboards, General Protection Measures, and Other Requirements 2-27
2.9 Design Guidelines 2-32
2.10 Species Protection Measures 2-32

Chapter 3 Environmental Setting, Impacts, and Mitigation Measures **3-1**
3.1 Introduction to the Environmental Analysis 3.1-1
3.2 Aesthetics 3.2-1
3.3 Agriculture and Forestry Resources 3.3-1
3.4 Air Quality and Greenhouse Gas Emissions 3.4-1
3.5 Biological Resources—Aquatic 3.5-1
3.6 Biological Resources—Terrestrial 3.6-1
3.7 Cultural and Paleontological Resources 3.7-1
3.8 Energy Resources 3.8-1
3.9 Geology, Soils, and Seismicity 3.9-1
3.10 Hazards and Hazardous Materials 3.10-1
3.11 Hydrology and Water Quality 3.11-1
3.12 Land Use and Planning 3.12-1

Page

3.13 Mineral Resources 3.13-1
3.14 Noise 3.14-1
3.15 Population, Employment, and Housing 3.15-1
3.16 Recreation 3.16-1
3.17 Transportation 3.17-1
3.18 Tribal Cultural Resources 3.18-1
3.19 Utilities and Service Systems and Public Services 3.19-1
3.20 Wildfire 3.20-1

Chapter 4 Cumulative Impacts 4-1
4.1 Introduction 4-1
4.2 CEQA Requirements 4-1
4.3 Geographic Scope of the Effects of the Order 4-3
4.4 Cumulative Projects 4-4
4.5 Cumulative Impact Methodology and Analysis 4-6
4.6 Cumulative Impacts 4-7

Chapter 5 Other CEQA Considerations 5-1
5.1 Growth-Inducing Impacts 5-1
5.2 Significant Irreversible Environmental Changes 5-3
5.3 Significant Unavoidable Impacts 5-5

Chapter 6 Alternatives 6-1
6.1 Introduction 6-1
6.2 Objectives 6-2
6.3 Alternatives Considered and Screening Criteria 6-2
6.4 Alternatives to the Order 6-5
6.5 Environmentally Superior Alternative 6-27

Chapter 7 Contributors and Reviewers 7-1

Chapter 8 References 8-1

Figures

Figure ES-1 Restoration Projects Statewide Order Process Flow Chart ES-3
Figure ES-2 Restoration Projects Statewide Order CEQA Process Flow Chart ES-4
Figure ES-3 Study Area ES-6
Figure ES-4 CEQA Flow Chart ES-12
Figure 1-1 Restoration Projects Statewide Order Process Flow Chart 1-4
Figure 1-2 Restoration Projects Statewide Order CEQA Process Flow Chart 1-5
Figure 2-1 Study Area 2-3
Figure 3.5-1 Ecoregions of California and Regional Board Boundaries 3.5-7

Page

Tables

Table ES-1 Comparison of Environmental Impacts of the Alternatives Compared to the Order ES-13
Table ES-2 Summary of Environmental Impacts and Mitigation Measures..... ES-19
Table 2-1 Processes, Permits, and Authorizations that May Be Required for Approval of Restoration Projects..... 2-5
Table 3.1-1 Example Project Types that Could Be Permitted under the Order 3.1-2
Table 3.2-1 Summary of Impact Conclusions—Aesthetics..... 3.2-11
Table 3.3-1 Important Farmland in California, 2016 (Study Area) 3.3-3
Table 3.3-2 Summary of Impact Conclusions—Agriculture and Forestry Resources..... 3.3-8
Table 3.4-1 Air Basins in the Study Area..... 3.4-2
Table 3.4-2 Federal and State Non-attainment Status for Air Basins in the Study Area 3.4-6
Table 3.4-3 California Statewide Greenhouse Gas Emissions Inventory (2000–2017)..... 3.4-9
Table 3.4-4 Summary of Ambient Air Quality Standards 3.4-10
Table 3.4-5 Summary of Impact Conclusions—Air Quality and Greenhouse Gas Emissions 3.4-19
Table 3.5-1 Summary of Impact Conclusions—Biological Resources–Terrestrial..... 3.5-29
Table 3.6-1 Summary of Impact Conclusions—Biological Resources–Aquatic.. 3.6-18
Table 3.7-1 Summary of Impact Conclusions—Cultural Resources..... 3.7-14
Table 3.8-1 Energy Consumption in California, 2017 ..... 3.8-2
Table 3.8-2 Summary of Impact Conclusions—Energy Resources..... 3.8-8
Table 3.9-1 Summary of Impact Conclusions—Geology and Soils 3.9-18
Table 3.10-1 Summary of Impact Conclusions—Hazards and Hazardous Materials 3.10-11
Table 3.11-1 Summary of Impact Conclusions—Hydrology and Water Quality . 3.11-29
Table 3.12-1 Existing Land Uses in the Study Area 3.12-1
Table 3.12-2 Summary of Impact Conclusions—Land Use and Planning 3.12-5
Table 3.13-1 Summary of Impact Conclusions—Mineral Resources 3.13-5
Table 3.14-1 Acoustics Terms..... 3.14-2
Table 3.14-2 Typical Sound Levels Measured in the Environment and Industry.. 3.14-3
Table 3.14-3 Human Response to Different Levels of Groundborne Noise and Vibration..... 3.14-5

Page

Table 3.14-4 California Department of Transportation Recommendations regarding Vibration Levels 3.14-8
Table 3.14-5 Summary of Impact Conclusions—Noise 3.14-10
Table 3.15-1 The 10 Largest Counties in California, 2019 ..... 3.15-2
Table 3.15-2 Summary of Impact Conclusions—Population and Housing 3.15-4
Table 3.16-1 Summary of Impact Conclusions—Recreation 3.16-9
Table 3.17-1 2018 Maintained Miles, Lane Miles, and Annual Vehicle Miles of Travel by Functional Classification in California 3.17-3
Table 3.17-2 Wildlife Strike Summary for California's Largest International Airports in 2019 ..... 3.17-6
Table 3.17-3 Summary of Impact Conclusions—Transportation 3.17-9
Table 3.18-1 Summary of Impact Conclusions—Tribal Cultural Resources 3.18-11
Table 3.19-1 Summary of Impact Conclusions—Utilities and Service Systems and Public Services 3.19-13
Table 3.20-1 Summary of Impact Conclusions—Wildfire 3.20-6
Table 4-1 Geographic Context for the Cumulative Impact Analysis 4-3
Table 4-2 Sample of Programs and Projects Included in the Cumulative Impact Assessment for the Order 4-4
Table 6-1 Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order 6-28

Appendices

Appendix A Draft Order
Appendix B Notice of Preparation and Notice of Preparation Comments
Appendix C Existing Programmatic Permits and Processes for Restoration Activities
Appendix D National Marine Fisheries Service Programmatic Biological Opinions
Appendix E Order Description and Eligibility: Categories of Eligible Project Types Geographic Scope, and Programmatic Sideboards, General Protection Measures, Design Guidelines, and Other Requirements
Appendix F Species Protection Measures
Appendix G California Natural Diversity Database
Appendix H Responses to Comments
Appendix I Findings of Fact and Statement of Overriding Considerations
Appendix J Mitigation Monitoring and Reporting Program

Acronyms, Other Abbreviations, and Definitions

Acronym or Abbreviation	Definition
AB	Assembly Bill
AIRFA	American Indian Religious Freedom Act
APCD	Air Pollution Control District
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
BAAQMD	Bay Area Air Quality Management District
basin plan	water quality control plan
BCDC	San Francisco Bay Conservation and Development Commission
BLM	U.S. Bureau of Land Management
BMP	best management practice
BO	biological opinion
CAA	Clean Air Act
CAAQS	California ambient air quality standards
CAL FIRE	California Department of Forestry and Fire Protection
Cal OES	Office of Emergency Services
Caltrans	California Department of Transportation
CAP	criteria air pollutant
CARB	California Air Resources Board
CBC	California Building Code
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFC	California Fire Code
CFR	Code of Federal Regulations
CGS	California Geological Survey
CH_4	methane
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CPUC	California Public Utilities Commission

Acronym or Abbreviation	Definition
CRPR	California Rare Plant Rank
CSZ	Cascadia subduction zone
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DDW	Division of Drinking Water
DoD	U.S. Department of Defense
DOF	California Department of Finance
DPM	diesel particulate matter
DWR	California Department of Water Resources
EHRA	Earthquake Hazards Reduction Act
EIR	environmental impact report
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FESA	federal Endangered Species Act
FOBs	Field Office Operations Branches
Order	certification order
GHG	greenhouse gas
GWP	global warming potential
H_2S	hydrogen sulfide
HAP	hazardous air pollutant
HCP	habitat conservation plan
HFC	hydrofluorocarbon
IBC	International Building Code
IPCC	Intergovernmental Panel on Climate Change
MAF	million acre-feet
MBTA	Migratory Bird Treaty Act
MMT CO_2e	million metric tons of carbon dioxide equivalent
mph	miles per hour
MPO	Metropolitan Planning Organization
MRZ	Mineral Resource Zone
MT	metric ton
N_2O	nitrous oxide
NAAQS	national ambient air quality standards

Acronym or Abbreviation	Definition
NAGPRA	Native American Graves Protection and Repatriation Act
NCCP	natural community conservation plan
NEHRP	National Earthquake Hazards Reduction Program
NEHRPA	National Earthquake Hazards Reduction Program Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
NOAA RC	National Oceanic and Atmospheric Administration Fisheries Restoration Center
NOP	notice of preparation
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
O&M OEHHA	operations and maintenance
PBOs	California Office of Environmental Health Hazard Assessment
PEIR	programmatic Biological Opinions
PFC	program environmental impact report
PM_{10}	perfluorocarbon
$PM_{2.5}$	particulate matter (10 microns in diameter or less)
ppm	particulate matter (2.5 microns in diameter or less)
PRC	parts per million
PRMRP	Public Resources Code
PSD	Paleontological Resource Monitoring and Recovery Plan
Reclamation	Prevention of Significant Deterioration
Regional Board	U.S. Bureau of Reclamation
RMP	Regional Water Quality Control Board
ROG	resource management plan
RPA	reactive organic gases
RSP	Reasonable and Prudent Alternative
SB	rock slope protection
SBFFP	Senate Bill
SCS	State Board of Forestry and Fire Protection
SFHA	Sustainable Communities Strategy
	Special Flood Hazard Area

Acronym or Abbreviation	Definition
Small Habitat Restoration Projects	Order for Small Habitat Restoration Projects
SIP	state implementation plan
SMARA	State Mining and Reclamation Act of 1975
SMGB	California State Mining and Geology Board
SO_2	sulfur dioxide
State Water Board	State Water Resources Control Board
Statewide multi-agency program	Statewide multi-agency program to facilitate implementation of restoration projects
SWP	State Water Project
SWPPP	storm water pollution prevention plan
TAC	toxic air contaminant
TMDL	total maximum daily load
TRPA	Tahoe Regional Planning Agency
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VHFHSZ	Very High Fire Hazard Severity Zone
VOC	volatile organic compound
WDR	Waste Discharge Requirement
WY	water year

Definition of Terms

Design guidelines: Design guidelines (Appendix E) have been developed to help project proponents ensure that projects are designed, during the development of their individual projects, in a manner that is appropriate and sustainable, minimizes adverse effects on aquatic habitats, maximizes the ecological benefits of the restoration, and is consistent with multiple permitting agency regulatory practices (e.g., CDFW, NMFS, USFWS).

Protection measures (Appendix E) are the best management practices developed to support avoidance and/or minimization of effects to all covered species and their habitats and other resource areas (e.g., air quality, hazards and hazardous materials, geology and soils). These measures are designed to be applied, as appropriate, based upon the type of restoration project being undertaken and the specific tools being used to accomplish the restoration project.

Restoration project: An eligible project type that would result in a net increase in aquatic or riparian resource functions and/or services through implementation of relevant protection measures listed in Section 2.6, *Categories of Restoration Projects in the Order*, and Section 2.8, *Programmatic Sideboards, General Protection Measures, and Other Requirements*. The project must also be included in the list of eligible project types (Section 1.2, *Categories of Eligible Project Types*). A restoration project permitted by the Order may include multiple benefits, such as groundwater recharge, recreation, flood management, water quality improvement, and/or adaptation to climate change. Restoration projects permitted by the Order may also contribute to the protection of existing and potential beneficial uses identified in each of the nine Regional Boards water quality control plans (basin plans).[1]

Species protection measures (Appendix F) are avoidance and/or minimization measures developed specifically to address individual covered species or covered species guilds, based upon unique life history and habitat requirements. Applicable species protection measures are to be implemented in addition to applicable general protection measures, described above, when suitable habitat exists within the currently occupied range of the species and/or a species is determined to be present.

[1] The State Water Board and the nine Regional Boards administer the Porter-Cologne Water Quality Control Act (Water Code Section 13000 et seq.) (Porter-Cologne Act) to achieve an effective water quality control program for the state and are responsible for the regulation of activities and factors that may affect the quality of the waters of the state. (Water Code Sections 13000 and 13001.)
The State Water Board is authorized to adopt basin plans in accordance with the provisions of Water Code Sections 13240 through 13244, insofar as they are applicable. (Water Code Section 13170.)
A basin plan consists of: (1) beneficial uses to be protected; (2) water quality objectives for the reasonable protection of beneficial uses; and (3) a program of implementation for achieving the water quality objectives.
Beneficial uses identified in basin plans include: Municipal and Domestic Supply, Industrial Service Supply, Industrial Process Supply, Agricultural Supply, Ground Water Recharge, Navigation, Water Contact Recreation, Non-Contact Water Recreation, Shellfish Harvesting, Commercial and Sport Fishing, Warm Freshwater Habitat, Cold Freshwater Habitat (COLD), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development, Estuarine Habitat, Wildlife Habitat, Rare, Threatened, or Endangered Species, Native American Cultural (CUL), and Subsistence Fish (FISH).

Prologue

This document is the Consolidated Final Program Environmental Impact Report (Consolidated Final PEIR) for the State Water Resources Control Board (State Water Board) Order for Clean Water Act Section 401 Water Quality Certification and Waste Discharge Requirements for Restoration Projects Statewide (Order). The term "Consolidated" refers to the combining of the Draft PEIR and Final PEIR into a single document that incorporates changes and corrections and includes responses to comments (provided on the Draft PEIR) instead of developing a separate standalone Final PEIR. This organizational structure is intended to facilitate easier use of the document by maintaining all relevant text (Draft and Final) in continuous succession.

Chapter 1 Introduction[1]

1.1 Introduction and Overview of the Order

The State Water Resources Control Board (State Water Board) has developed a General Order for Clean Water Act Section 401 Water Quality Certification and Waste Discharge Requirements for Restoration Projects Statewide (Order) to improve the efficiency of regulatory reviews for projects throughout the state that would restore aquatic or riparian resource functions and/or services. The Order (Appendix A) establishes an authorization process (Figure 1-1) for environmentally beneficial restoration projects (Section 1.2, *Categories of Eligible Project Types*) and associated measures to protect species and the environment (Section 2.8 *Programmatic Sideboards, General Protection Measures, and Other Requirements*).

The State Water Board and nine Regional Water Quality Control Boards (Regional Boards), which exercise rulemaking and regulatory activities by basins, have authority to regulate discharges of waste that threaten or cause impairment of designated beneficial uses or cause nuisance to waters of the state, including discharges related to restoration activities through issuance of waste discharge requirements (WDRs) pursuant to the Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.).

The State Water Board and Regional Boards also have regulatory authority under Clean Water Act (CWA) Section 401 (water quality certification) for projects that must be authorized by the U.S. Army Corps of Engineers (USACE)[2] under CWA Section 404 and

[1] The entirety of Chapter 1 in this Consolidated Final has been updated and changed from the Draft PEIR.

[2] All three USACE districts that cover California are participating in the statewide multi-agency program to Facilitate Implementation of Restoration Projects, described later in Section 1.1. USACE's Sacramento District is the lead for California; the San Francisco and Los Angeles Districts are also participating.

Sections 10 and 14 of the Rivers and Harbors Act of 1899 (U.S. Code Title 33, Section 408). The Order provides WDRs as well as CWA Section 401 Water Quality Certification.

The Order authorizes projects that may discharge directly or indirectly to "waters of the state,"[3] including "waters of the United States" under USACE jurisdiction.

The State Water Board has previously adopted a programmatic authorization for restoration projects less than 5 acres and a cumulative total of 500 linear feet of stream bank or coastline, and that qualify under the California Environmental Quality Act (CEQA) categorical exemption under California Code of Regulations title 14, section 15333, "Small Habitat Restoration Projects" (General Order Number SB12006GN). The Order discussed in this PEIR provides authorization for eligible restoration projects that do not qualify for the Order for Small Habitat Restoration Projects and is intended as a companion to, not a replacement for, the General Order for Small Habitat Restoration Projects.

The Order may include but is not limited to projects that originate from programs and/or initiatives that guide restoration throughout the state, such as:

- Proposition 1 and Proposition 68 funds administered by local conservancies and state agencies
- California Department of Fish and Wildlife (CDFW) Fisheries Restoration Grant Program
- State Water Board Comprehensive Response to Climate Change (Resolution No. 2017-0012)
- State Water Board Non-point Source (Section 319h) grant program for restoration activities
- California EcoRestore
- Water Quality Control Plans
- Central Valley Flood Protection Plan—Conservation Strategy, San Joaquin River Restoration Program
- San Francisco Bay Restoration Authority (Measure AA)
- Projects that are part of other restoration plans, agreements, or funding sources that otherwise meet the terms and conditions of the Order

A restoration project permitted by the Order may include multiple benefits, such as groundwater recharge, recreation, flood management, water quality improvement, and/or adaptation to climate change. Restoration projects permitted by the Order may

[3] All "waters of the United States" (also known as "federal waters") within the borders of California are also "waters of the state," but the converse is not true. "Waters of the United States" is a subset of "waters of the state," which includes waters outside of federal jurisdiction. Thus, the Order would apply to projects within both state and federal jurisdictions.

also contribute to the protection of existing and potential beneficial uses identified in each of the nine Regional Boards water quality control plans (basin plans).[4]

Many types of restoration projects would be permitted under the Order (Section 2.6, *Categories of Restoration Projects in the Order*). The individual restoration projects could be constructed, operated, and maintained in many different ways to meet regulatory requirements and guidelines. For this reason, a range of potential effects could result from implementation of these general types of restoration projects. However, specific project details, such as project sizes, configurations, locations, and operations are not known at this time. For this reason, the potential effects that could result from individual restoration projects permitted under the Order are discussed to the extent feasible in a level of detail to facilitate meaningful review and informed public decision making in the broader context of the Order.

General administration of the Order will be conducted by the State Water Board. The State Water Board and Regional Boards will be responsible for enrolling individual restoration projects under the Order, as applicable, within their respective jurisdictional boundaries (Section 2.3). Order and CEQA process flow charts (Figures 1-1 and 1-2) provide general step-by-step guides to assist a project proponent through the project eligibility and notification process.

As described in the Order, all authorized projects must meet the definition of a restoration project as defined below and comply with all applicable water quality control plans and state policy for water quality control. A "restoration project" is defined as one that would result in a net increase in aquatic or riparian resource area, functions and/or services through implementation of the eligible project types (Section 1.2, *Categories of Eligible Project Types* and Section 2.6, *Categories of Restoration Projects in the Order*), relevant protection measures, and design guidelines (Section 2.8, *Programmatic*

[4] The State Water Board and the nine Regional Boards administer the Porter-Cologne Water Quality Control Act (Water Code Section 13000 et seq.) (Porter-Cologne Act) to achieve an effective water quality control program for the state and are responsible for the regulation of activities and factors that may affect the quality of the waters of the state. (Water Code Sections 13000 and 13001.)
The State Water Board is authorized to adopt basin plans in accordance with the provisions of Water Code Sections 13240 through 13244, insofar as they are applicable. (Water Code Section 13170.).
A basin plan consists of: (1) beneficial uses to be protected; (2) water quality objectives for the reasonable protection of beneficial uses; and (3) a program of implementation for achieving the water quality objectives.
Beneficial uses identified in basin plans include: Municipal and Domestic Supply, Industrial Service Supply, Industrial Process Supply, Agricultural Supply, Ground Water Recharge, Navigation, Water Contact Recreation, Non-Contact Water Recreation, Shellfish Harvesting, Commercial and Sport Fishing, Warm Freshwater Habitat, Cold Freshwater Habitat (COLD), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development, Estuarine Habitat, Wildlife Habitat, Rare, Threatened, or Endangered Species, Native American Cultural (CUL), and Subsistence Fishing (FISH).

Figure 1-1 Restoration Projects Statewide Order Process Flow Chart
Source: ESA 2020

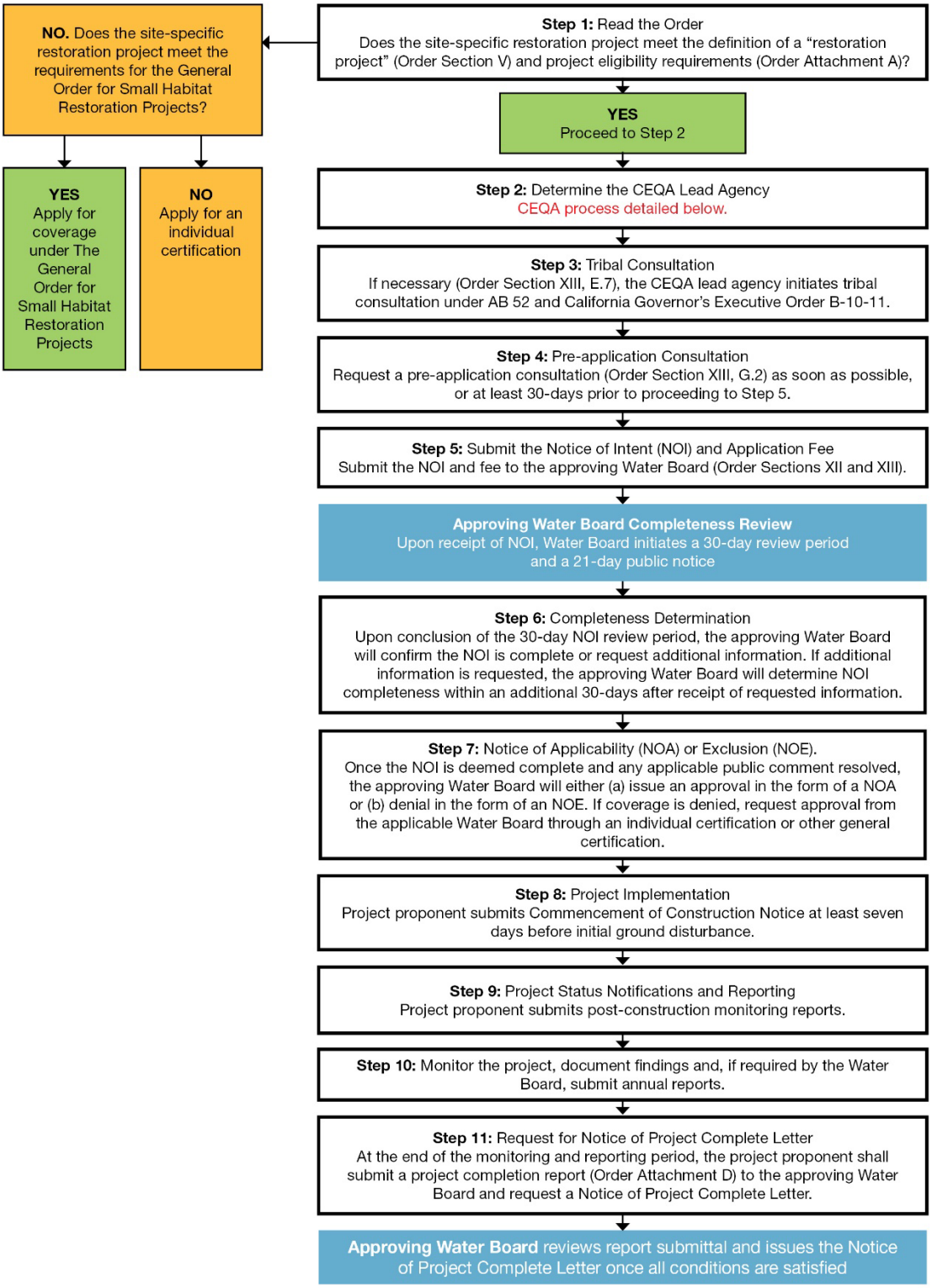
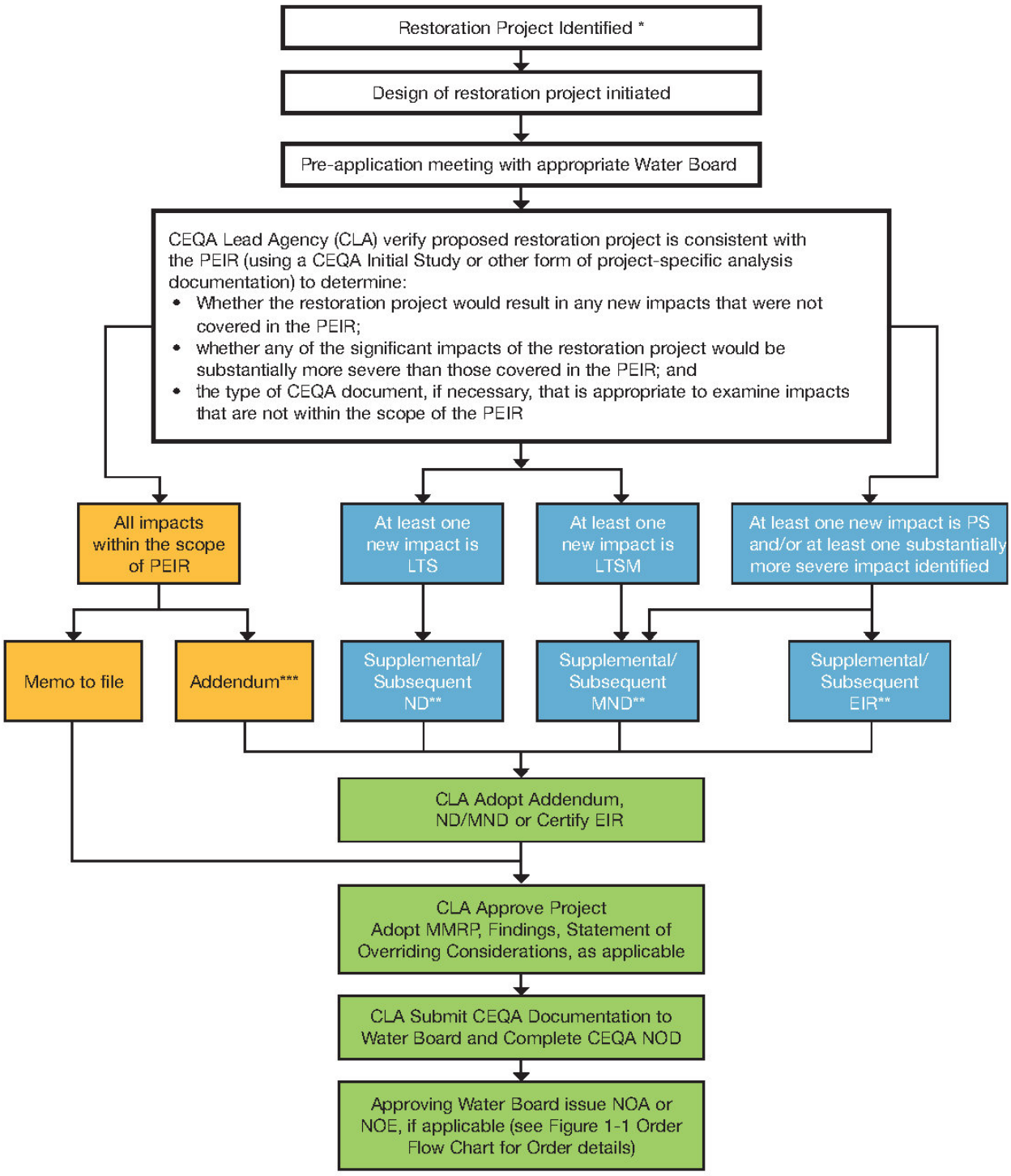


Figure 1-2 Restoration Projects Statewide Order CEQA Process Flow Chart
Source: ESA 2020



* Meets the definition of a restoration project and conditions outlined in the Restoration Projects Statewide Order and PEIR and does not meet the requirements for the General Order for Small Habitat Restoration Projects
** Pursuant to CEQA Guidelines Sections 15162 (e.g. major revisions to PEIR) and 15163 (e.g. minor revisions to PEIR and doesn't meet the requirements of Section 15163)
*** Pursuant to CEQA Guidelines Section 15164 (e.g. minor additions or changes to PEIR and doesn't meet the requirements of Sections 15162 or 15163)
EIR = Environmental Impact Report; LTS = Less than significant; LTSM = less than significant with mitigation; ND = Negative Declaration;
MND = Mitigated Negative Declaration; NOA = Notice of Availability; NOD = Notice of Determination; NOE = Notice of Exemption; PS = Potentially Significant, PP = Project Proponent
Note: This figure represents the process to implement restoration projects under the PEIR. Please refer to the CEQA Statute and Guidelines for additional information

Sideboards, General Protection Measures, and Other Requirements). The approving Water Board determines if a proposed project meets the definition of a restoration project and is eligible for authorization under the Order.

1.1.1 CEQA Lead Agency and Project Proponent

A party implementing an individual restoration project subject to the Order may be a public agency, as defined by State CEQA Guidelines Section 15379, or a private party. If the party implementing the restoration project is a public agency, that agency would typically be a CEQA lead agency for the project or, in some circumstances, a responsible agency (State CEQA Guidelines Sections 15367 and 15381). If the party implementing the individual restoration project is a private entity, that party would coordinate with the public agency with principal responsibility to approve the project, as described in State CEQA Guidelines Section 15050 and 15051. Such public agencies with permitting or other approval authority related to the individual restoration project may include a Regional Board, CDFW, or a county or city, among other public agencies.

Therefore, as used in this PEIR, the term “project proponent” is defined as a public agency or private party that meets the following criteria:

- A public agency that would provide funding in whole or in part for an individual restoration project permitted under the Order.
- A public agency that proposes to carry out or otherwise approve all or some portion of an individual restoration project permitted under the Order.
- A private party that completes, carries out, or funds an individual restoration project. The private party would coordinate with the public agency with principal responsibility to approve the project, as described in State CEQA Guidelines Sections 15050 and 15051.

Any public agency proposing to carry out or approve all or some portion of an individual restoration project subject to the Order must exercise its independent judgment to determine CEQA compliance. Given this PEIR and the statewide scope of the Order, the exercise of discretion by a lead agency for an individual restoration project will be guided by State CEQA Guidelines Section 15168. Possible scenarios are described below.

Scenario 1: No New Significant or Substantially More Severe Impacts Identified

If the CEQA lead agency determines, under State CEQA Guidelines Section 15162, that the individual restoration project would result in no new significant effects and/or require no new mitigation measures, the activity could be approved as being within the scope of the Order analyzed by this PEIR. In such a case, the project would not require a new or additional environmental review (e.g., EIR, negative declaration, or mitigated negative declaration). At this point, the CEQA lead agency would use this PEIR for the later project’s CEQA compliance and would file a notice of determination when the project is approved.

Under this CEQA compliance approach, the CEQA lead agency must incorporate all project requirements identified in the Order and all feasible and appropriate mitigation

measures from the PEIR into the individual restoration project, as needed, to address significant or potentially significant impacts on the environment.

Scenario 2: Potentially Significant or Substantially More Severe Impact

If an individual restoration project or associated later activity would have impacts that were not fully described or new impacts not examined in this PEIR, the CEQA lead agency would need to prepare an initial study to determine the appropriate environmental document. Should a separate environmental document be needed—whether that document is a notice of exemption, an addendum or supplemental document to this PEIR, or a document that tiers from or incorporates by reference this PEIR (i.e., negative declaration, mitigated negative declaration, or EIR)—the PEIR could be used to simplify the task of preparing the later environmental document (State CEQA Guidelines Section 15168[d]).

The environmental document for the individual restoration project may incorporate any applicable elements of this PEIR by reference including, but not limited to, direct and indirect impacts, mitigation measures, cumulative impacts, alternatives, or a statement of overriding considerations. As a result, the later environmental document could focus solely on the new effects that were not previously considered. Individual restoration projects would proceed based on independent judgment for the individual project CEQA lead agency, subject to supporting substantial evidence.

The CEQA lead agency could also tier from this PEIR such that the CEQA document for the individual restoration project only focuses on the new effects that were not considered in this PEIR.

1.2 Categories of Eligible Project Types

The categories of restoration project types eligible for enrollment under the Order are listed below. These eligible project types are described in detail in Section 2.6, *Categories of Restoration Projects in the Order*. An individual permitted project may incorporate one or more of these project types. Projects may conduct restoration activities such as establishment, reestablishment, rehabilitation, and/or enhancement for any of these project types:

- **Improvements to Stream Crossings and Fish Passage**—for upstream and downstream movement by fish and other species, and to improve functions of streams.
- **Removal of Small Dams, Tide Gates, Flood Gates, and Legacy Structures**—to improve fish and wildlife migration, tidal and freshwater circulation and flow, and water quality.
- **Bioengineered Bank Stabilization**—to reduce input of fine sediment, enhance aquatic and riparian habitat, and improve water quality.
- **Restoration and Enhancement of Off-Channel and Side-Channel Habitat**—to improve aquatic and riparian habitat for fish and wildlife; to restore the hydrologic, hydraulic, and biogeochemical functions and processes of streams; or both.

- **Water Conservation Projects**—to reduce low-flow stream diversions, through installation of features such as off-stream storage tanks and ponds and necessary off-channel infrastructure.
- **Floodplain Restoration**—to improve ecosystem function by creating hydrologic connections between streams and floodplains, through such measures as breaching and removal of levees, breaching and removal of berm and dike setbacks, and hydraulic reconnection and revegetation.
- **Removal or Remediation of Pilings and Other In-Water Structures**—to improve water quality and aquatic habitat for fish and wildlife.
- **Removal of Nonnative Invasive Species and Revegetation with Native Plants**—to improve watershed functions, such as aquatic and riparian habitat for fish and wildlife.
- **Establishment, Restoration, and Enhancement of Tidal, Subtidal, and Freshwater Wetlands**—to create or improve wetland ecological functions.
- **Establishment, Restoration, and Enhancement of Stream and Riparian Habitat and Upslope Watershed Sites**—to create or restore the functions of streams and riparian areas, including upslope watershed sites that could contribute sediment to streams or disrupt floodplain and riparian functions.

1.3 Public Participation and Environmental Review Process

The preparation of an EIR involves multiple steps. The public is provided the opportunity to review and comment on the scope of the analysis, the content of the EIR, results and conclusions presented, and the overall adequacy of the document to meet the substantive requirements of CEQA. This section describes the steps in the environmental review process for the Order.

The State Water Board issued a notice of preparation (NOP) on October 11, 2019, to satisfy the requirements of CEQA and the State CEQA Guidelines. The purpose of the NOP is twofold: (1) to notify the public, responsible agencies, trustee agencies, the Governor's Office of Planning and Research, potentially affected public agencies, involved federal agencies, and tribes regarding the State Water Board's intent to prepare a PEIR for the Order; and (2) to solicit input from the public and those agencies as to the scope and content of the environmental information to be included in the PEIR.

In accordance with PRC Section 21080.4(a) and State CEQA Guidelines Section 15082(b), each responsible agency, trustee agency, and involved federal agency was requested to provide, in writing, the scope and content of the environmental information that is germane to the agency's statutory responsibilities. The NOP was also sent to public agencies, organizations, and individuals that requested receipt of the State Water Board's public notices, to invite them to provide input.

The issuance of the NOP began a 43-day[5] public comment period, which closed at noon on November 22, 2019, and provided notification of a public scoping meeting conducted by the State Water Board.

1.3.1 Public Scoping Meeting

A public scoping meeting was held during the 43-day public NOP comment period on Thursday, October 22, 2019, at 1 p.m., at the Byron Sher Auditorium, 1001 I Street, Sacramento, CA 95814.

The purpose of the scoping meeting was to solicit public comment and to provide information to the public, including a description of the Order. The scoping meeting presentation explained the public comment process, disclosed the schedule for the CEQA environmental review process, and specified how to submit oral and written comments. The scoping meeting was also webcast live via the State Water Board's website. Ten people signed into the scoping meeting, and three people provided oral comments at the scoping meeting.

1.3.2 Comments during the 43-Day Comment Period

Written comments were accepted throughout the 43-day public NOP comment period and at the scoping meeting; oral comments were recorded at the scoping meeting. Written comments were accepted via both U.S. Mail and email.

See Appendix B, *Notice of Preparation*, which includes the NOP, scoping meeting presentation, and materials and scoping comments.

1.3.3 Assembly Bill 52 Notifications

Assembly Bill (AB) 52 (Chapter 532, Statutes of 2014) amended CEQA to create a separate resource category called "Tribal Cultural Resources" (PRC Section 21074) and to provide that a substantial adverse change in a tribal cultural resource may be a significant effect on the environment (PRC Section 21084.2). Appendix G of the State CEQA Guidelines was subsequently amended to address tribal cultural resources.

AB 52 requires lead agencies to notify California Native American tribes that are traditionally and culturally affiliated with the geographic area of an individual restoration project, if they have requested notice of projects proposed in that area. Upon receipt of the notice, the tribe has 30 days to request consultation. Consultation may involve discussing the type of environmental review necessary, the significance of tribal cultural resources, the significance of the project's impacts on the tribal cultural resources, and alternatives and mitigation measures recommended by the tribe. The parties must consult in good faith. Consultation is considered concluded either when the parties agree to measures to mitigate or avoid a significant effect on a tribal cultural resource

[5] Per State CEQA Guidelines Section 15082(b), within 30 days of the NOP, responsible or trustee agencies shall provide comments on the scope and content of the environmental information related to the responsible or trustee's agency's area of statutory responsibility. The State Water Board elected to provide a 43-day comment period (30 days after the public scoping meeting).

(if such a significant effect exists) or when a party concludes that mutual agreement cannot be reached.

The State Water Board sent a notification to contacts from 171 tribes (certified mail to 25 AB 52–designated and standard mail to 146 Executive Order B-10-11–designated tribes) on July 19, 2019. The State Water Board consulted with the 10 tribes who responded to the project notification letter sent. The tribes requested and the State Water Board continued to provide the tribes with public updates on development of the Order and continued to take the tribes' input and comments as the PEIR and Order were drafted. In addition, the tribes asked that the State Water Board include Tribal Cultural Resource measures in the Order that would:

- Require tribal notification of projects within their territories (especially projects with ground-disturbing activities) as early as possible in the project development phase so tribes have an opportunity to comment on location, design, survey, and monitoring plans
- Include project information such as name, description, location, engineering plans, location, and extent of ground-disturbing activities

Written comments from the public and public agencies were accepted throughout the public comment period. At the end of the public comment period for the Draft PEIR, a total of 79 comment letters and e-mails were received.

1.4 Requirements for PEIR Certification and Future Steps in Project Approval

Per CEQA Guidelines section 15090(a) the State Water Board certifies that the PEIR has been completed in compliance with CEQA, that the State Water Board has reviewed and considered the information in the PEIR, and that the PEIR reflects the independent judgment and analysis of the State Water Board.

A Notice of Determination (NOD) is filed with the State Clearinghouse and appropriate findings (Appendix I) are adopted as set forth in CEQA Guidelines section 15091. Pursuant to CEQA Guidelines section 15092, a lead agency may only approve or carry out a project for which an EIR has been prepared that identifies one or more significant environmental effects if it makes one or more of the following findings (CEQA Guidelines section 15091(a)):

(1) Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effects as identified in the final EIR.

(2) Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency.

(3) Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the final EIR.

1.5 Organization and Format of this Document

The consolidated Final PEIR is organized as follows:

- The ***Executive Summary*** introduces the Order, including its history and background; describes the Order and its geographic scope; discusses the areas of known controversy associated with the Order; describes the alternatives to the Order; summarizes environmental impacts and compares the environmental impacts of the Order to those of the alternatives to the Order; and describes the requirements for certification of the Consolidated Final PEIR.
- **Chapter 1, *Prologue and Introduction*,** states the purpose and use of this Final PEIR and provides an overview of the environmental review process for the Order and PEIR.
- **Chapter 2, *Background and Description of the Order*,** describes the background, study area, and underlying purpose and objectives of the Order. Chapter 2 also describes the restoration categories and typical construction and operations and maintenance activities and methods likely to be used as part of the restoration activities to be permitted under the Order.
- **Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*,** describes the environmental resources that could be affected by implementing the restoration projects permitted under the Order. Chapter 3 addresses the environmental setting, regulatory setting, environmental impacts, and mitigation measures. This chapter also identifies the significant and unavoidable impacts of the Order.
- **Chapter 4, *Cumulative Impacts*,** provides an analysis of the effects of the Order in combination with the effects of other past, present, and reasonably foreseeable future projects.
- **Chapter 5, *Other CEQA Considerations*,** describes the significant and unavoidable impacts, significant and irreversible environmental changes, and the growth-inducing impacts of the Order.
- **Chapter 6, *Alternatives*,** describes the No Project Alternative and a range of reasonable alternatives to the Order; describes the alternatives screening process; compares the alternatives to the Order; and identifies the environmentally superior alternative.
- **Chapter 7, *List of Preparers*,** lists the individuals who helped to prepare this Consolidated Final PEIR and identifies the qualifications and affiliations of those individuals.
- **Chapter 8, *References*,** provides a bibliography of the sources cited in this Consolidated Final PEIR.
- **Appendices** contain background information that supports the analysis presented in this Consolidated Final PEIR. Appendices also include the full text of comment letters submitted on the Draft PEIR and responses to those comments.

1.6 Revisions to the Draft Order and Draft PEIR

This Consolidated Final PEIR presents revisions to the Draft PEIR, including those that have been made in response to comments (Appendix H) and/or State Water Board staff-initiated changes. This document also incorporates edits made to the Order. No significant new information was added to the Order or Draft PEIR as a result of the public comment process. The Consolidated Final PEIR responds to comments, and clarifies, amplifies, and makes insignificant modifications to the Order and the Draft PEIR. The final document does not identify any new significant effects on the environment or a substantial increase in the severity of an environmental impact requiring major revisions from the Draft PEIR.

Text revisions that revise Draft PEIR content are included in the following sections of the Consolidated Final PEIR:

- Executive Summary
- Chapter 1, Prologue and Introduction
- Chapter 2, Background and Description of the Order
- Chapter 3, Environmental Setting, Impacts, and Mitigation Measures
  - 3.1 – Approach to Environmental Analysis
  - 3.3 – Agriculture and Forestry Resources
  - 3.5 – Biological Resources Terrestrial
  - 3.6 – Biological Resources Aquatic
  - 3.7 – Cultural Resources
  - 3.9 – Geology and Soils
  - 3.11 – Hydrology and Hazardous Materials
  - 3.18 – Tribal Cultural Resources
- Chapter 5, Other CEQA Considerations
- Chapter 6, Alternatives
- Chapter 7, Contributors and Reviewers
- Appendix A, Order
- Appendix E, Order Description and Eligibility
- Appendix H, Response to Comments (new for the Final PEIR)
- Appendix I, Findings of Fact and Statement of Overriding Considerations (new for the Final PEIR)
- Appendix J, Mitigation Monitoring and Reporting Program (new for the Final PEIR)

The remaining sections of the Consolidated Final PEIR include only editorial revisions.

Chapter 2 Background and Description of the Order

2.1 Need for a Programmatic Order

The California floristic province has been ranked as one of 25 biodiversity hotspots of global importance (Myers et al. 2000). Aquatic, riparian, floodplain, and wetland habitats are critical components, supporting the most diverse and species-rich ecosystems in the province and throughout the arid and semiarid portions of North America. Over the last century, the ecosystem services provided by aquatic riparian, floodplain, and wetland habitats have been affected by environmental degradation, land use conversions, and water management. As a result, California has more than 300 threatened and endangered species and more federally protected animals than any other state, and ranks second only to Hawaii in the number of protected plants (USFWS 2013).

Efforts to enhance and restore habitats and ecological functions and processes throughout the state are ongoing. A wide variety of California state laws, mandates, plans, mitigation requirements, and initiatives—many of which are the result of decades-long debates and reports based on scientific research—call for restoration of aquatic, riparian, and floodplain habitats.

To ensure that funding is used efficiently and that restoration projects are implemented in a timely manner, agencies have already developed programmatic processes that would permit qualifying restoration projects. Examples of these existing permits and processes are included in **Appendix D**.

The State Water Resources Control Board (State Water Board) currently has a General Order for restoration projects that qualify for the California Environmental Quality Act (CEQA) Class 33 categorical exemption (CEQA Guidelines Section 15333); a key qualification for this exemption is that habitat restoration projects are "*not to exceed five acres in size*." This authorization is the General Order for Small Habitat Restoration Projects. Restoration projects that fall outside the limited scope of this General Order for Small Habitat Restoration Projects must obtain an Individual Water Quality Certification and/or waste discharge requirements from the State Water Board and/or the appropriate Regional Board, which can require greater time and expense for restoration project proponents.

2.2 Purpose and Objectives of the Order

2.2.1 Purpose

The State Water Board developed a statewide Order to improve the efficiency of regulatory review for projects that restore aquatic and riparian habitat and improve water quality. The Order establishes a permitting process for a set of environmentally beneficial restoration project types (listed in Section 2.6, *Categories of Restoration Projects in the Order*) and associated measures to protect species and the environment.

2.2.2 Objectives

The objective of the Order is to help expedite statewide implementation of restoration projects to improve the environment and make the regulatory process efficient by interpreting state standards in a uniform manner to ensure that applicable projects are consistent with federal and state water quality laws.

2.3 Geographic Scope

The Order considers a variety of types of aquatic, riparian, wetland, and floodplain restoration projects that may take place throughout California. The State Water Board protects water quality by setting statewide policy and coordinating and supporting the Regional Boards' efforts. Nine Regional Boards conduct rulemaking and regulatory activities by basin and issue water quality control plans (basin plans). Because the Order is administered and used primarily by the Regional Boards, the study area is defined as the nine water quality control regions (**Figure 2-1**).

2.3.1 Region 1—North Coast

The North Coast Regional Board's jurisdiction encompasses watersheds draining to the Pacific Ocean from California's northern border to the southerly boundaries of the Estero de San Antonio and Stemple Creek watersheds. This region includes all of Del Norte, Humboldt, Trinity, and Mendocino Counties, and portions of Siskiyou, Modoc, Glenn, Lake, Sonoma, and Marin Counties. Major bodies of water in this region include the Smith, Klamath, Trinity, Eel, Mattole, and Russian Rivers, and Humboldt Bay.

2.3.2 Region 2—San Francisco

The San Francisco Bay Regional Board's jurisdiction encompasses watersheds draining to the Pacific Ocean from Tomales Bay in the north to Pescadero Creek in the south, excluding watersheds that drain to either the Sacramento River or the San Joaquin River. This region includes all of San Francisco County and portions of Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo, and Santa Cruz Counties. The dominant feature of this region is the San Francisco Bay estuary, which conveys the waters of the Sacramento and San Joaquin Rivers into the Pacific Ocean. Other major tributaries to the San Francisco Bay estuary include the following watersheds: Alameda, Contra Costa, Marin, Napa, San Mateo, Santa Clara Basin, Solano, and Sonoma. This region also includes coastal portions of Marin and San Mateo Counties.

2.3.3 Region 3—Central Coast

The Central Coast Regional Board's jurisdiction encompasses watersheds draining to the Pacific Ocean from Pescadero Creek south to the southeasterly boundary of the Rincon Creek watershed. This region includes all of Santa Cruz and Monterey Counties and portions of San Mateo, Santa Clara, San Benito, San Luis Obispo, Santa Barbara, Kern, and Ventura Counties. Major bodies of water in this region include the Pajaro and Salinas Rivers, and Morro and Monterey Bays.

Figure 2-1 Study Area

2.3.4 Region 4—Los Angeles

The Los Angeles Regional Board's jurisdiction encompasses watersheds draining to the Pacific Ocean from the Ventura River watershed south to the San Gabriel River watershed. This region includes portions of Ventura County, Los Angeles County, and Orange, Kern, and Santa Barbara Counties. Major bodies of water in this region include the Santa Clara, Los Angeles, and San Gabriel Rivers; Santa Monica Bay; and the drainages of five coastal islands (Anacapa, San Nicolas, Santa Barbara, Santa Catalina, and San Clemente).

2.3.5 Region 5—Central Valley

The Central Valley Regional Board's jurisdiction encompasses all watersheds that drain to the Sacramento and San Joaquin Rivers. This region includes Tehama, Butte, Plumas, Colusa, Sutter, Yuba, Sacramento, San Joaquin, Stanislaus, Merced, Fresno, Kings, Tulare, Kern, Madera, Mariposa, Tuolumne, Calaveras, and Amador Counties. It also includes portions of Modoc, Lassen, Sierra, Nevada, Placer, El Dorado, and Alpine Counties to the east, and portions of San Benito, Santa Clara, Alameda, Contra Costa, Solano, Napa, Lake, Glenn, and Siskiyou Counties to the west. Major rivers in this region include the Sacramento, Pit, Feather, Yuba, Bear, American, San Joaquin, Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno Rivers. Major reservoirs and lakes in this region include Shasta, Oroville, Folsom, Clear, Pardee, New Hogan, Millerton, McClure, Don Pedro, and New Melones Lakes.

2.3.6 Region 6—Lahontan

The Lahontan Regional Board's jurisdiction encompasses all watersheds within the boundaries of California that drain to the Great Basin. Jurisdiction extends from California's northern border to the northern Mojave Desert and includes all of California's eastern border east of the Sierra Nevada crest. This region includes Inyo and Mono Counties and portions of Los Angeles, Kern, San Bernardino, Alpine, El Dorado, Placer, Nevada, Sierra, Plumas, Lassen, and Modoc Counties. Major bodies of water in this region include Lake Tahoe; Eagle, Honey, Owens, and Mono Lakes; and the Susan, Truckee, Carson, Walker, Owens, and Mojave Rivers.

2.3.7 Region 7—Colorado River

The Colorado River Regional Board's jurisdiction encompasses all watersheds within the boundaries of California that drain to the Colorado River. This region includes Imperial County and portions of San Bernardino, Riverside, and San Diego Counties. Major bodies of water in this region include the Salton Sea, the Southern Mojave and Lower Colorado Rivers, the Imperial Reservoir, and Havasu and Mohave Lakes.

2.3.8 Region 8—Santa Ana

The Santa Ana Regional Board's jurisdiction encompasses the Santa Ana River watershed, which drains to the Pacific Ocean. This region includes portions of Los Angeles, San Bernardino, Riverside, and Orange Counties. Major bodies of water in this region include Anaheim and Newport Bays, the Santa Ana and Jacinto Rivers, and Lake Elsinore.

2.3.9 Region 9—San Diego

The San Diego Regional Board's jurisdiction encompasses all watersheds that drain to the Pacific Ocean from the southern border of the Santa Ana Regional Board's jurisdictional limits to the southern border of California. This region includes portions of San Diego, Riverside, and Orange Counties. Major water bodies in this region include the San Juan, Santa Margarita, San Luis Rey, Carlsbad, San Dieguito, Peñasquitos, San Diego, Pueblo San Diego, Sweet Water, Otay, and Tijuana Rivers and San Diego and Oceanside Harbor bays.

2.4 Number and Location of Anticipated Projects

The number of restoration projects that would be implemented each year under the Order is influenced by factors such as available funding, project proponents' interest in and capacity to submit qualified project applications, project permitting, and construction scheduling. Numerous potential funding sources exist for projects that could use the Order.

The Order could be used by proponents that agree to carry out their projects in conformance with the project-appropriate standards specified later in this chapter and in the associated appendices (Section 2.8, *Programmatic Sideboards, General Protection Measures, and Other Requirements*).

2.5 Authorizations and/or Permits that May Be Required for Restoration Projects

Participants must obtain any other necessary permits or authorizations from appropriate agencies before the start of a project. Any revisions made to a project as part of a permit or authorization process after submittal of a Notice of Intent (NOI) under the Order would be reviewed by the State Water Board or the applicable Regional Board before final approval. Table 2-1 summarizes other permits and authorizations that may be required.

Table 2-1
Processes, Permits, and Authorizations that May Be Required for Approval of Restoration Projects

Resource	Applicable Laws/Regulations/Permits	Regulating Agency
Multiple	CEQA and NEPA	Public and federal agencies
Wetlands and other waters	Section 404 of the Clean Water Act—individual or general permit	USACE
	Section 10 of the Rivers and Harbors Act—individual or general permit	USACE
	Section 402 of the Clean Water Act—National Pollutant Discharge Elimination System permit(s)	State Water Board and Regional Board

Table 2-1
Processes, Permits, and Authorizations that May Be Required for Approval of Restoration Projects

Resource	Applicable Laws/Regulations/Permits	Regulating Agency
Wetlands and other waters (cont.)	Section 401 of the Clean Water Act—water quality certification (waters of the United States) and waste discharge requirements under the Porter-Cologne Act (all waters of the state, including federal waters)	State Water Board and Regional Board
	Sections 1600–1607 of the California Fish and Game Code—lake and streambed alteration agreement Habitat Restoration and Enhancement Act	CDFW
Federally listed species	Section 7 of the federal Endangered Species Act—Section 7 consultation Section 10 of the federal Endangered Species Act—habitat conservation plan	USFWS, NMFS, and NOAA RC
Essential Fish Habitat	Magnuson-Stevens Fishery Conservation and Management Act	NMFS
Fish and wildlife resources	Fish and Wildlife Coordination Act report	USFWS
Cultural resources	Section 106 of the National Historic Preservation Act—consultation	SHPO
State-listed species/ state special-status species	Section 2081 of the California Endangered Species Act—incidental take permit/consistency determination Natural Community Conservation Planning Act Habitat Restoration and Enhancement Act	CDFW
	California Safe Harbor Agreement Program Act	CDFW
	California Native Plant Protection Act	CDFW
Alterations of federal flood protection projects	CFR Title 33, Sections 2018.10 and 408; encroachment permit (CCR Title 23); and Central Valley Flood Protection Board encroachment permit	CVFPB and USACE
	Agreements	Local levee districts

Table 2-1
Processes, Permits, and Authorizations that May Be Required for Approval of Restoration Projects

Resource	Applicable Laws/Regulations/Permits	Regulating Agency
Floodplains designated as Special Flood Hazard Area (SFHA)	Permit for Floodplain Development is required before construction or development begins within any SFHA	Federal Emergency Management Agency or local county/city jurisdiction
Sacramento–San Joaquin Delta and Suisun Marsh	Delta Reform Act of 2009	Delta Stewardship Council
Restoration projects are required to demonstrate consistency with the Delta Plan and its mitigation measures when carrying out, approving, or funding a 'covered action' defined by the Delta Plan	Delta Plan Certification of Consistency (Water Code Sections 85057.5 and 85225)	Delta Stewardship Council
San Francisco Bay, its shoreline, and Suisun Marsh	Coastal Zone Management Act, McAteer-Petris Act, San Francisco Bay Plan, and other local plans	San Francisco Bay Conservation and Development Commission
Coastal Zone	Federal Coastal Zone Management Act	California Coastal Commission
	California Coastal Act	
State lands	Land use lease	State Lands Commission
Transportation infrastructure and utilities	Encroachment permit	Caltrans, various utility companies, railroads, local and county roads, etc.
Other	Local grading, building, land use, and other permits	City and county departments

SOURCE: Data compiled by Environmental Science Associates in 2019

Table 2-1
Processes, Permits, and Authorizations that May Be Required for Approval of Restoration Projects

NOTES: Caltrans = California Department of Transportation; CCR = California Code of Regulations; CDFW = California Department of Fish and Wildlife; CEQA = California Environmental Quality Act; CFR = Code of Federal Regulations; CVFPB = Central Valley Flood Protection Board; NEPA = National Environmental Policy Act; NMFS = National Marine Fisheries Service; NOAA RC = National Oceanic and Atmospheric Administration Fisheries Restoration Center; Porter-Cologne Act = Porter-Cologne Water Quality Control Act; Regional Board = Regional Water Quality Control Board; SHPO = State Historic Preservation Officer; State Water Board = State Water Resources Control Board; USACE = U.S. Army Corps of Engineers; USFWS = U.S. Fish and Wildlife Service

2.6 Categories of Restoration Projects in the Order

The Order addresses restoration practices that require Section 401 water quality certification and/or waste discharge requirements. Sections 2.6.1 through 2.6.10 below present detailed descriptions of the categories of restoration project types eligible for enrollment under the Order. Each project category discussion briefly summarizes the project purpose, describes different activities and/or subproject types, and summarizes typical construction activities associated with projects falling into that category. Section 2.7 describes typical construction activities and methods in greater detail.

During the Order enrollment process, the approving Water Boards will determine whether an individual restoration project is eligible for enrollment under the Order. (Section 1.1, *Introduction and Overview of the Order*, for the Order's definition of a restoration project.) All projects permitted under the Order must also incorporate applicable general protection measures into their project design to ensure avoidance and minimization of impacts on sensitive resources.

Species protection measures have been included in this PEIR which include avoidance and/or minimization measures developed specifically to address individual covered species or covered species guilds, based upon unique life history and habitat requirements. Further, design guidelines have been developed to help project proponents ensure that projects are designed, during the development of their individual projects, in a manner that is appropriate and sustainable, minimizes adverse effects on aquatic habitats, maximizes the ecological benefits of the restoration, and is consistent with multiple permitting agency regulatory practices (e.g., CDFW, NMFS, USFWS). A list of general protection measures can be found in Section 2.8.2, *General Protection Measures,* and Appendix E. A list of species protection measures can be found in Section 2.10, *Species Protection Measures*, and Appendix F. See Appendix E for a detailed description of design guidelines.

2.6.1 Improvements to Stream Crossings and Fish Passage

Improvements to stream crossings and fish passage, including fish screens, provide a number of ecological benefits. For example, they provide safe passage for migratory

and nonmigratory species, beneficial transport of sediment and debris, and improved hydrology and hydraulics. Stream crossing and fish passage improvements must be consistent with NMFS and CDFW fish passage criteria.

Stream Crossings, Culverts, and Bridges

Stream crossing, culvert, and bridge projects generally involve removing, replacing, modifying, retrofitting, installing, or resetting existing culverts, fords, bridges, and other stream crossings and water control structures of any size. This includes projects that are developed to upgrade undersized, deteriorated, or misaligned culverts.

Projects to replace culverts or bridges are ineligible for coverage under the Order if they will not increase aquatic or riparian resource functions and/or services. Bridges and culverts should be designed to adequately convey flow and materials (e.g., the 100-year flood) in addition to allowing fish passage. Any new or replacement crossing, culvert, or bridge that intersects potential habitat for listed salmonid species, also must meet CDFW and/or NMFS fish passage criteria, as applicable. If a bridge or culvert is designed to convey less than the 100-year design flow, the project should demonstrate that a smaller culvert will not result in excessive flooding, erosion/sedimentation, headcutting,[1] or habitat impacts.

Constructing or installing a stream crossing, culvert, or bridge may include site excavation, formation and pouring of a concrete foundation and walls/abutments, and installation of the crossing structure as well as placement of bioengineered and/or rock slope protection (RSP) to protect abutments, piers, and walls. Where RSP is deemed necessary, use natural stream material to fill and cover exposed rock and/or use bioengineered techniques, listed below, where appropriate.

Fish Screens

Projects in this category involve installing, operating, and maintaining fish screens on water intakes.

Constructing or installing a fish screen usually includes site excavation, formation and pouring of a concrete foundation and walls, and installation of the fish screen structure. Typically, if the fish screen is placed in or near flood-prone areas, rock or other armoring is installed to protect the screen. Fish screen types include self-cleaning screens (including flat plate, rotary drum screens, cone screens, and other designs with a variety of cleaning mechanisms) and non-self-cleaning screens (including tubular, box, and other designs).

All fish screens must be consistent with NMFS fish screening criteria.

Fishways

This project type involves removing, relocating, constructing, repairing, operating, or maintaining fishways. This project type may include riffle-pool complexes (e.g., rock/

[1] Headcut, in stream geomorphology, is an erosional feature of some intermittent and perennial streams with an abrupt vertical drop, also known as a knickpoint, in the stream bed.

boulder ramps) or installation of fishways that bypass passage barriers. Engineered fish ladder structures should be avoided unless there are no other viable alternatives.

Constructing and/or installing fishways usually includes site excavation, formation and pouring of a concrete foundation and walls, pile driving, excavation and installation of an entry and exit channel, and installation of the fishway structure. Heavy equipment is typically used for excavation and preparation of the fishway site.

Headcut Stabilization

Stabilizing headcuts is often required to stabilize the bed of a stream and promote structural sustainability over time. This improvement is also used to stop stream incision, increase connection to the adjacent floodplain, and enhance floodplain inundation.

Construction of these project types typically includes site excavation and may include installation of a control structure (e.g., boulders, earthen fill). Heavy equipment is typically used for excavation.

2.6.2 Removal of Small Dams, Tide Gates, Flood Gates, and Legacy Structures

These projects are designed to reconnect stream corridors, floodplains, and estuaries; establish wetlands; improve passage by aquatic organisms; and restore more natural channel and flow conditions. They also help to restore fisheries access to historic habitat for spawning and rearing and improve the long-term quality of aquatic habitat and stream geomorphology. All projects must be designed with seasonal construction considerations to minimize potential adverse effects on water quality and/or aquatic species.

This project type involves removing small dams, tide gates, flood gates, and legacy structures to improve fish and wildlife migration, tidal and freshwater circulation and flow, and water quality. This project type may also include separation of streams from artificial impoundments (e.g., ponds or lakes) by realigning and/or rerouting channels around these artificial water bodies and/or through the use of vertical concrete or sheet-pile walls.

Removal of Small Dams

Small dams are removed to restore fisheries access to historic habitat for spawning and rearing and to improve long-term habitat quality and natural stream geomorphology. Types of eligible small dams include permanent, flashboard, debris basin, earthen, and seasonal dams that have the characteristics listed below.

Consistent with the NMFS programmatic restoration *Biological Opinion to Facilitate Implementation of Restoration Projects in the Central Valley* (NMFS 2018), small dams included in the Order are those defined by the California Division of Dam Safety as dams of non-jurisdictional size. Those dams are smaller in height or impounding capacity than dams as defined by California Water Code Section 2002 (Division 3, Part 1, Chapter 1, 6002), where “dam” means:

> *Any artificial barrier, together with appurtenant works, which does or may impound or divert water, and which either (a) is or will be 25 feet or more in height from the natural bed of the stream or watercourse at the*

> *downstream toe of the barrier, as determined by the department, or from the lowest elevation of the outside limit of the barrier, as determined by the department, if it is not across a stream channel or watercourse, to the maximum possible water storage elevation or (b) has or will have an impounding capacity of 50 acre-feet or more.*

In addition to the Order prohibitions related to water rights, dams under Federal Energy Regulatory Commission (FERC) jurisdiction are also generally not eligible for removal under the Order because they are generally much greater in size than the proposed size criteria found in Water Code Section 6002.

Implementing small dam removal projects may require the use of heavy equipment (e.g., self-propelled logging yarders, mechanical excavators, backhoes). Some small dams can be removed using hand tools such as jackhammers. Any use of explosives for removal of a small dam must be justified by individual restoration project conditions including equipment access difficulties. The use of explosives must occur in dry or dewatered conditions and potential harm to salmon, steelhead, and other aquatic species from the explosives blast and pressure waves must be analyzed. Using explosives is an eligible activity; however, this approach would also require additional review and approval by appropriate regulatory agencies.

Projects meeting any of the following conditions are ineligible for coverage under the Order:

- Projects involving dams licensed under FERC that have not received authorization from the Director of the State Water Board Division of Water Rights;
- Sediments stored behind the dam have a reasonable potential to contain environmental contaminants (dioxins, chlorinated pesticides, polychlorinated biphenyls [i.e., PCBs], or mercury) beyond the freshwater probable effect levels summarized in the National Oceanic and Atmospheric Administration Screening Quick Reference Table guidelines (NOAA 2008); OR
- Projects that require more detailed analysis based on the risk of significant loss or degradation of downstream spawning or rearing areas by sediment deposition.

Sites are considered to have a reasonable potential to contain contaminants of concern if they are downstream of historical contamination sources such as lumber or paper mills, industrial sites, mining sites, or intensive agricultural production going back several decades (i.e., since chlorinated pesticides were legal to purchase and use). Therefore, preliminary sediment sampling is advisable in these areas to determine whether a project is eligible for coverage under the Order.

Conversely, small dams that do not have historical contamination sources in the upstream watershed are considered to have low potential to contain contaminants; therefore, they could be considered low risk with reduced sediment sampling and evaluation.

The Order will only include dam removal that will restore natural contours upstream, naturally or with excavation, to minimize negative effects on downstream habitat. Dam

removal projects will (1) have a volume of sediment available for release that is small relative to the size of the stream channel, and that when released by storm flows, will have minimal effects on downstream habitat as verified by a qualified and appropriate scientist and engineer, and reviewed by either CDFW or NMFS engineers, or (2) are designed to remove sediment trapped by the dam down to the elevation of the target thalweg including design channel and floodplain dimensions.

Removal of Tide Gates and Flood Gates

Removal of or upgrades to existing tide and flood gates involve modifying gate components and mechanisms in tidal stream systems where full tidal exchange is incompatible with the current land use (e.g., where high-tide backwater effects are of concern). Tide/flood gate replacement or retrofitting may include such activities as installation of temporary cofferdams and dewatering pumps, and excavation of existing channels, adjacent floodplains, flood channels, and wetlands, and may include structural elements such as streambank restoration and hydraulic roughness.

The placement of new gates where they did not previously exist is not eligible for coverage under the Order. The replacement of tide gates is eligible only if project proponents can demonstrate that such a replacement would increase or enhance ecological processes. Tide and flood gates may be plugged by removing the culvert and backfilling the berm or levee to prevent fish from accessing unsuitable habitat.

Excavators, cranes, boats, barges, pumps, dump trucks, and similar equipment are typically used to implement the projects in this category.

Removal of Legacy Structures

This activity includes the removal of nonfunctioning in-channel and floodplain legacy habitat structures (e.g., grade control structures, and defunct boulder weirs) to improve water quality and channel geomorphology.

Removal of legacy structures may require the use of excavators, cranes, dump trucks, vibratory pile drivers, and similar equipment.

2.6.3 Bioengineered Bank Stabilization

Bioengineered bank stabilization projects improve riparian and stream habitat by increasing stream shade to lower stream temperatures, production of invertebrates, future recruitment of large woody material, and bank stability. Riparian habitat restoration projects increase the number of plants and plant groupings, and include natural regeneration, exclusion fencing for livestock, bioengineering, and revegetation.

To improve aquatic and riparian habitats and reduce soil erosion and sedimentation of streams and wetlands, bioengineered bank stabilization integrates living woody and herbaceous materials with earthwork and recontouring of streambanks. Both organic and inorganic materials are put into place to stabilize and improve the structure of the soil where site constraints limit opportunities for natural channel meander. Bank stabilization structures that use bioengineering techniques minimize many of the impacts on aquatic resources commonly caused by traditional or conventional engineered bank

structures. Examples of bioengineering project types include revetment[2] consisting of trees, native plant materials, or willow walls, and willow siltation baffles, brush mattresses, brush check dams, and brush bundles. Bioengineered project types may also include the placement of buried riprap[3] with soil and vegetation plantings on top.

Bioengineered bank stabilization techniques use a minimal amount of hard materials (e.g., rock) and are not intended to include traditional hard engineering techniques, which would not be permitted under the Order. Part XI, *Riparian Habitat Restoration,* of the CDFW *California Salmonid Stream Habitat Restoration Manual (Flosi et al. 2010: Vol. II)* identifies examples of techniques that would be permitted under the Order.

Bioengineered bank stabilization structures are suitable for many low-order, low-gradient stream segments where the channel is not aggrading[4] or degrading[5] rapidly, and where sufficient space is available to reshape the eroding bank to an appropriate slope. The Order would not cover projects that merely protect property from bank erosion; however, many restoration project types, including multi-benefit projects that include bioengineered bank stabilization, would be eligible for coverage under the Order.

The use of boulders should be limited in scope and quantity to the minimum necessary to stabilize the slope and protect it from expected streamflows during storms. Boulder structures should be part of a larger restoration design with the primary purpose of improving habitat, and should include a riparian revegetation element. Bridge abutments and other structural improvements installed as part of the restoration design of fish passage projects may require additional stabilization with boulder and rock banks.

Guidelines for streambank stabilization techniques are described in Part VII, *Project Implementation,* of the CDFW *Riparian Habitat Restoration Manual* (Flosi et al. 2010: Vol. I or subsequent updates).

Projects in this category may require the use of heavy equipment (e.g., self-propelled logging yarders, excavators, backhoes, and/or dump trucks).

2.6.4 Restoration and Enhancement of Off-Channel and Side-Channel Habitat

Restoring and enhancing off-channel and side-channel habitat features helps to improve aquatic and riparian habitat for fish and wildlife. Restoration project types in this category have the following benefits:

- Increase habitat diversity and complexity
- Improve heterogeneity (e.g., nonuniform character) of flows
- Provide long-term nutrient storage and substrate for aquatic macroinvertebrates
- Moderate flow disturbances

[2] Revetments are sloping structures placed on banks or cliffs in such a way as to absorb the energy of incoming water.
[3] Riprap is placed rock or other material used to armor shorelines and streambeds against scour and water, wave erosion.
[4] A stream becoming increasingly shallow as a result of sediment deposition.
[5] A stream actively deepening its channel and capable of transporting more sediment load than is presently provided.

- Increase retention of leaf litter
- Provide refuge for fish during high flows

Projects proposed for side-channel or off-channel habitat also typically improve hydrologic connections between main channels and their floodplains.

This project category typically involves reconnecting and creating side-channel, alcove, oxbow, pond, off-channel, floodplain, and other habitats, and potentially removing off-channel fill and plugs. New side channels and alcoves may be constructed in geomorphic settings that accommodate such features. This activity category typically applies to areas where side channels, alcoves, and other backwater habitats have been filled or blocked from the main channel, disconnecting them from most if not all flow events.

Work may involve removing or breaching levees, berms, and dikes; excavating channels; constructing wooden or rock tailwater[6] control structures; and constructing large wood habitat features.

The use of logs or boulders as stationary water-level control structures is an eligible project element under the Order. With the exception of offstream storage projects to reduce low-flow stream diversions, projects involving the permanent installation of a flashboard dam, head gate, or other mechanical structure are not eligible for coverage under the Order.

Excavators, bulldozers, dump trucks, front-end loaders, and similar equipment may be used to implement projects.

2.6.5 Water Conservation

Creation, operation, and maintenance of water conservation projects, including offstream storage tanks and ponds and associated off-channel infrastructure, reduce low-flow stream diversions and enhance streamflows, particularly base flows for fish and wildlife habitat during the dry season. These projects typically require placing infrastructure (e.g., pumps, piping, screens, and headgates) in or adjacent to the stream to provide alternative water intake facilities. Exclusion fencing may be constructed to manage grazing in aquatic and riparian habitat as described in Section 2.6.10, *Establishment, Restoration, and Enhancement of Stream and Riparian Habitat and Upslope Watershed Sites*.

Other projects in this category include piping ditches to create a more efficient use of water where the water saved will be dedicated to fish and wildlife under the terms of California Water Code Section 1707 or forbearance agreements. These projects are designed to improve streamflow and riparian habitat for fish and wildlife. Excavators and other heavy equipment may be used to implement the projects.

[6] Water body located downstream of a dam or other barrier.

2.6.6 Floodplain Restoration

Project types in this category improve the diversity and complexity of aquatic, meadow, and riparian habitat, as well as ecosystem function, because they have the following effects:

- Provide opportunities for sediment to deposit on the floodplain seasonally, which enhances meadow vegetation, use by birds and mammals, and fish rearing and spawning; and also provide refuge from predators and physical stressors.
- Create intermittent hydrologic connections between streams and floodplains.
- Increase floodway capacity and the frequency and duration of floodway inundation.
- Improve ecosystem functions for aquatic and terrestrial species and also improve water quality.
- Reconnect stream channels to floodplains, thus improving the fluvial dynamics of the watershed system; for example, by allowing normal patterns of sediment deposition and transport, as well as channel migration.
- Reduce or eliminate areas that strand native fish or provide habitat for nonnative predatory fish, or both.
- Provide high-flow and thermal refuges for native fish and other aquatic species.

Floodplains should mimic natural flooding patterns and remain flooded/inundated long enough to activate food webs. Floodplain restoration can involve rock placement, specifically as engineered stream material, riffle ramps, weirs, and other strategies to aggrade the channel and enable connectivity to floodplains.

Floodplain restoration projects may be implemented through various strategies. Some involve setback, breaching, and removal of levees, berms, and dikes, and excavation and/or fill for hydraulic reconnection (including restoration to stage zero[7]) and revegetation.

Levee setback projects involve constructing new levees to facilitate removal or breaching of existing levees and creation of aquatic or riparian habitat. This project type may also include filling and/or reshaping of on- and off-channel gravel pits. Levees may be adjusted or a low levee bench may be created to allow for tidal inundation or channel margin habitat.

Floodplain projects may also reconnect historical stream and river channels and freshwater deltas with floodplains, and reconnecting historical estuaries to tidal influence, through levee removal, setback, and breaching or construction of floodplain surfaces that connect at base flow. Floodplain restoration projects may be planned where floodplains and estuaries have been disconnected from adjacent streams and rivers.

[7] Streams that are fully connected with their floodplains; typically multi-thread.

Meadow and floodplain restoration may involve reconnecting down-cut channels to their floodplains to restore hydrologic processes and meadow health; filling incised, entrenched channels; creating new stream channels; regrading floodplains; or realigning channels or installing stabilization structures. Incised channels should only be filled if the watershed conditions that triggered incision have been considered and would not result in continued incision (project failure) and/or can be mitigated by the project. These restoration actions may rely on watershed processes to complete work over time to restore a channel network and floodplain that supports wetlands or grasslands.

Project proposals to create off-channel or side-channel habitats, floodplain restoration will include as appropriate information regarding considerations for water supply (channel flow, overland flow, and groundwater), water quality, and reliability; risks of channel changes; and channel and hydraulic grade.

Excavators, bulldozers, dump trucks, front-end loaders, and similar equipment may be used to implement these projects.

2.6.7 Removal or Remediation of Pilings and Other In-Water Structures

Untreated and chemically treated wood pilings, piers, vessels, boat docks, derelict seawalls (within embayments), derelict fishing gear, and similar structures built using plastic, concrete, and other materials, may be removed and/or remediated to improve water quality and habitat for fish and wildlife. These projects are designed to remove contaminant sources and hazards from stream, river, lake, and estuary habitats.

Boats, barges, excavators, dump trucks, front-end loaders, and similar equipment may be used to implement these projects.

2.6.8 Removal of Nonnative Terrestrial and Aquatic Invasive Species and Revegetation with Native Plants

Removing nonnative terrestrial and aquatic invasive species and/or revegetating with native plants improves aquatic, riparian, and wetland habitat for fish and wildlife in a variety of ways. These projects are designed to improve or provide the following benefits:

- Composition, structure, and abundance of native biological communities important for bank stability
- Stream shading, riparian canopy, and understory establishment and diversity
- Input of large wood and other organic material into streams
- Nesting and roosting habitat
- Reduction of soil erosion
- Water quality improvement
- Greater dune stability and habitat complexity
- Improved soil health
- Other ecological benefits, all of which are important elements of species habitat and water quality

Removal of Nonnative Terrestrial and Aquatic Invasive Species

Manual, mechanical, biological, and chemical methods can be used independently or in combination to remove invasive nonnative species from aquatic and riparian areas. Sites with a variety of invasive species may receive several different types of treatments. If chemical methods are used, the treatment will need to comply with labeling, application by qualified individuals (when required), as well as any required buffers from aquatic areas, and/or additional authorizations, such as a National Pollutant Discharge Elimination System (NPDES) permit, as applicable.

This project type also includes removal and/or management of nonnative predatory fish and other nonnative fish and wildlife, as long as the activity is associated with a restoration project.

Revegetation with Native Plants

Revegetation with native plants should mimic the area's naturally occurring riparian and aquatic habitats and use seed or plant stock from the local watershed. Activities may include:

- Planting and seeding native trees, shrubs, and herbaceous plants
- Placing sedges, rushes, grasses, succulents, forbs, and other native vegetation
- Gathering and installing willow cuttings, stakes, mats, and fences
- Temporary irrigation
- Coordination with upstream operators to control dam releases or instream flow levels to provide water during plant establishment

2.6.9 Establishment, Restoration, and Enhancement of Tidal, Subtidal, and Freshwater Wetlands

Establishing, restoring, and enhancing tidal, subtidal, and freshwater wetlands results in more wetland area, increased primary and secondary ecological productivity, and more diversity of habitat.

This project type generally involves grading (e.g., creating depressions, berms, and drainage features), installing related infrastructure (e.g., water control structures, siphons, sills, etc.), and/or breaching (e.g., excavating breaks in levees, dikes, and/or berms), or both, to create topography, improve water management capabilities, and/or improve hydrology that:

- Facilitates water delivery and conveyance to benefit aquatic species, wildlife, or wetland vegetative response
- Supports native wetland plants (planted or recruited naturally)
- Provides habitat elements for target species
- Provides other targeted wetland functions
- Allows fish and other aquatic species to use channel networks and marsh plains with hydrologic variability (seasonally or tidally)
- Provides hydrologic connectivity to local, low-lying subwatershed areas

These projects also establish, maintain, restore, or enhance off-channel and vernal pools to support habitat for amphibians or vernal pools, which support plants and animals.

Project types in this category also create ecotones (transitional zones between two habitat or community types [aquatic/upland interface]) and/or “living shorelines” that could use fill and excavation with native vegetation (submerged and/or emergent), alone or in combination with offshore sills (e.g., artificial reefs), to stabilize the shoreline.

Creation of ecotones could require extensive beneficial fill and have the potential to affect adjacent existing wetlands; however, these projects are necessary to allow tidal wetlands to respond to sea level rise, and they provide refuge for native wildlife and buffer wetlands from adjacent municipal and industrial land uses.

Living shorelines can provide a natural alternative to “hard” shoreline stabilization methods like stone sills or bulkheads; they provide numerous ecological benefits including water quality improvements, habitat for fish and invertebrates, and buffering of the shoreline from waves and storms.

Living shoreline projects use a suite of habitat restoration techniques to reinforce the shoreline, minimize coastal erosion, and maintain coastal processes while protecting, restoring, enhancing, and creating natural habitat for fish and aquatic plants and wildlife (e.g., wetlands, dunes, beaches, seaweed beds, rocky intertidal areas). The term “living shorelines” was coined because the approach provides living space for estuarine and coastal organisms. Strategic placement of native vegetation and natural materials or shells for native shellfish settlement enhances habitat values by creating new living space. The techniques also increase the connectivity of wetlands and deeper intertidal and subtidal lands while providing a measure of shoreline protection.

Living shoreline design strategies can use rock armoring, rock sill, groin, or breakwater installations only if the use of such design strategies is integral to the restoration basis of the design.

Project types in this category include excavation, removal, and/or placement of fill materials to restore or approximate pre-disturbance site conditions; contouring wetlands to establish more natural topography, hydrology, and/or hydraulics; and setting back, modifying, or breaching existing dikes, berms, and levees.

This project category may also include:

- Constructing transitional tidal marsh habitat (i.e., “horizontal levees,” setback berms, or ecotones slopes, including revegetation and enhancement work in the associated upland transition, intertidal, and subtidal habitat zones)
- Thin-layer sediment augmentation for tidal marshes and nearshore habitat adaptation to rising sea levels (e.g., USFWS Salt Marsh Sediment Augmentation Project – Seal Beach)

- Biological enhancements to pilings, piers, and docks (e.g., wrapping pilings, and attaching tiles and ledges to increase surface area for intertidal and subtidal species)
- Biological enhancements to estuarine and coastal shoreline stabilization structures and other nature-based solutions
- Backfilling artificial channels
- Removing existing drainage structures, such as drain tiles
- Filling, blocking, or reshaping drainage ditches to restore wetland hydrology
- Establishing tidal/fluvial channels and wetlands in tidal waters where those wetlands previously existed, or have migrated or will migrate as a result of sea level rise
- Installing structures or fill necessary to establish wetland or stream hydrology
- Constructing nesting/planting islands
- Beach renourishment
- Constructing open water areas
- Constructing noncommercial, native oyster habitat (e.g., reefs) over an unvegetated bottom in tidal waters
- Conducting noncommercial, native shellfish seeding
- Establishing submerged aquatic vegetation (e.g., eelgrass beds) in areas where those plant communities previously existed (e.g., San Francisco Bay Eelgrass Restoration)

Activities needed to establish vegetation, including plowing or disking for preparation of seed beds and planting appropriate wetland species, may also be included.

Project activities that plan for climate change, including sea level rise, should be considered in tidally influenced locations. California's Climate Adaptation Strategy recommends using ecotones and living shorelines as a potential adaptation method to reduce the need for engineered "hard" shoreline protection devices and to provide valuable, functional coastal habitat (CNRA 2018). The California State Coastal Conservancy's Climate Change Policy also supports the use of living shorelines for their ability to improve the resiliency of estuarine habitat to future sea level rise and other related effects of climate change (SCC 2011). More information about the benefits of these projects for climate change resilience can be found in sources such as the: San Francisco Bay Subtidal Habitat Goals Report, Baylands Habitat Goals Science Update, USFWS Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California, Wetlands on the Edge: the Future of Southern California's Wetlands [Southern California Wetlands Recovery Project Regional Strategy Update 2018], San Francisco Estuary Adaptation Atlas, San Francisco Estuary Blueprint, San Francisco Estuary Institute & The Aquatic Science Center New Life for Eroding Shorelines Report).

Ecotone habitat levees should be used when new exterior levees are required to protect adjacent landowners from the return of tidal inundation. The project side of the levee should be constructed with areas of longer gentle slopes to accommodate upland refugia for sensitive salt marsh and brackish marsh species during higher tides associated with phenomena such as storm surges and king tide events. In addition, sidecast material should be used during the excavation of new channels to recontour pond bottoms to achieve the desired hydrology. This would include creating islands disconnected from uplands to provide future upland refugia and nesting areas in larger marshes.

Excavators, graders, bulldozers, dump trucks, front-end loaders, boats, barges, and similar equipment may be used to implement these projects.

2.6.10 Establishment, Restoration, and Enhancement of Stream and Riparian Habitat and Upslope Watershed Sites

Stream and Riparian Habitats

Establishing, restoring, and enhancing stream and riparian habitats provides the following benefits:

- Habitat complexity, diversity, and cover for fish and other aquatic species
- Increased spawning and rearing habitat
- Improved migration corridors
- Improved pool habitat and pool-to-riffle ratios
- Restoration of sinuosity
- Improved water quality
- Reconnection of the channel to the floodplain and associated functions

These projects may typically include the following activities:

- Placing large woody material and boulders
- Constructing engineered logjams
- Constructing porous boulder structures and vanes
- Installing small wood structures or beaver dam analogues
- Enhancing vegetation
- Conducting bank stabilization and erosion control work
- Stabilizing headcuts
- Augmenting and placing gravel
- Removing and replacing concrete-lined channels with natural materials

Project activities may also include excavating, sorting, placing, and contouring existing on-site materials (e.g., historic mine tailings) on perched floodplains and in channels to reconnect those habitats and improve spawning and rearing conditions.

Project types in this category typically occur in areas where channel structure is lacking because of past stream cleaning (removal of large woody material), riparian timber harvest, historic grazing and meadow dewatering practices, hydromodification, or urbanization, and in areas where natural gravel supplies are low as a result of human-caused disruptions. These projects occur in stream channels and adjacent floodplains to increase channel stability, rearing habitat, pool formation, deposition of spawning

gravel, channel complexity, hiding cover, low-velocity areas, and floodplain function. Helicopters, excavators, dump trucks, front-end loaders, full-suspension yarders, and similar equipment may be used to implement these projects.

Engineered logjams are large wood structures that include an anchoring system, such as rebar pinning, ballast rock, or vertical posts. These structures are designed to redirect flows and change scour and deposition patterns. To the extent practical, they are patterned after stable natural logjams and can be anchored in place using rebar, rock, or piles (driven into a dewatered area or the streambank, but not in water). Engineered logjams create a hydraulic shadow (low-velocity zone downstream) that allows sediment to settle. Scour holes develop adjacent to the engineered logjam. While providing valuable fish and wildlife habitat, they also redirect flow and can stabilize a streambank or downstream gravel bar.

Large woody material may be installed using either anchored or unanchored logs, or both, depending on site conditions and wood availability. Wood loading methods may include but are not limited to direct felling, whole-tree tipping and placement, use of helicopters, use of excavators, and grip hoisting.

Establishment, restoration, and enhancement of stream habitats may also include the following activities:

- Removing revetment and other streambank armoring materials
- Installing grade control structures using native/natural materials to improve general habitat and water quality, thus allowing establishment of native vegetation for birds, fish, and other species
- Improving stream morphology and channel dynamics; restoring sediment input and retention balance; and improving water quality
- Placing boulder structures (e.g., roughened channels, boulder ramps/riffle ramps, boulder weirs, vortex boulder weirs, boulder clusters, and single and opposing boulder wing deflectors)
- Placing imported spawning gravel

In addition, infrastructure located along streams and in riparian areas may be removed or relocated. The primary purpose of infrastructure removal is to eliminate or reduce impacts on riparian areas and vegetation, improve bank stability, reduce erosion, reduce sedimentation into adjacent streams, and provide for native revegetation or natural native plant recruitment. Among the types of infrastructure that could be removed or relocated are boat docks, boat haul-out locations, campgrounds and campsites, day-use sites, roads/trails, off-highway/off-road vehicle routes, and legacy railroad grades that affect aquatic resources or riparian habitat. See Section 2.6.7, *Removal or Remediation of Pilings and Other In-Water Structures*, for further detail on removal of in-water structures.

Upslope Watershed Sites

Sites in upslope watershed areas may be restored to reduce the delivery of sediment to streams, promote natural hydrologic processes, and restore habitats for birds,

amphibians, fish, and other species. This project type also includes road- and trail-related restoration including decommissioning, upgrading, and storm-proofing of roads and trails. The following are some of the specific techniques that may be used:

- Removing, installing, or upgrading culverts
- Constructing water bars[8] and dips
- Deep-ripping decommissioned roadbeds
- Reshaping road prisms to improve watershed functions
- Vegetating fill, cut slopes, and roadbeds
- Removing and stabilizing sidecast materials
- Grading or resurfacing roads and trails that have been improved for aquatic restoration, using gravel, bark chips, or other permeable materials
- Shaping the contours of the road or trail base
- Removing road fill to native soils
- Installing new culverts under trails or roads to reduce ditch length
- Stabilizing the soil and tilling compacted soils to establish native vegetation

These actions target priority roads and trails that contribute sediment to streams or disrupt floodplain and riparian functions.

This project type may also include installing exclusion fencing to manage or prevent grazing access to stream and riparian areas to facilitate the establishment of native riparian and stream habitat and the improvement of water quality. This project type includes controlled access to walkways that livestock use to cross streams and adjacent riparian areas. At stream crossings, gravel may be placed above the ordinary high-water mark within the fenced corridor to reduce trail erosion and delivery of sediment to the stream. Upland watering facilities (that do not involve water rights concerns) may be installed to reduce livestock use in riparian areas and stream channels. Planting native plants such as trees, shrubs, forbs, and graminoids may be necessary to manage invasive species and establish a healthy riparian corridor. Such projects reduce impacts of livestock on riparian soils and vegetation, streambanks, channel substrates, and water quality.

Equipment such as excavators, bulldozers, dump trucks, and front-end loaders may be used to implement these projects, which promote water quality and habitat improvement.

2.7 Typical Construction, Operation, and Maintenance Activities and Methods

The Order does not promote construction or operation and maintenance of specific facilities or other specific physical actions by the State Water Board. The State Water Board also does not propose to construct, operate, or undertake specific physical actions. Rather, the Order is designed to permit the actions of project proponents that

[8] A water bar or interceptor dike is a road construction feature that is used to prevent erosion on sloping roads, cleared paths through woodland (for utility companies such as electricity pylons), or other accessways by reducing flow length.

propose to construct habitat restoration projects in accordance with the sideboards, general protection measures, and other requirements of the Order (described in Section 2.8, *Programmatic Sideboards, General Protection Measures, and Other Requirements*).

The precise locations and detailed characteristics of potential future individual restoration projects that may be permitted under the Order are yet to be determined. Therefore, this PEIR focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis. This PEIR assumes that the Order is implemented and achieves the desired outcomes. Accordingly, this PEIR evaluates the potential impacts of the types of restoration projects that the Order would encourage and promote in the study area. Once proposals for individual restoration projects consistent with the Order are developed, the lead agencies for the individual restoration projects will evaluate whether the impacts are adequately described in this PEIR, or if necessary, will be evaluated in project-level CEQA documents.

2.7.1 Construction Activities and Methods

Most restoration projects would involve construction activities. These construction activities, in turn, would result in most of the environmental impacts evaluated in this PEIR. The construction activities would be specific to each type of activity, the location of the activity, and numerous other variables related to the unique characteristics of a project.

The magnitude and characteristics of construction activities vary widely, but construction activities for restoration projects share many common features. For that reason, to help support the environmental analysis, this section includes the following basic discussion of commonly encountered construction activities that can be anticipated to take place on many if not most projects permitted under the Order.

Construction Timing

The amount of time needed to construct restoration projects varies from as short as a few days in the case of minor projects to as long as several years in the case of major projects, with activities generally limited to certain months. Major construction activities are typically concentrated during the dry season (May through October), with some mobilization occurring as early as April, aside from some areas such as the upper Sacramento River where the most restrictive in-water work window occurs during the wet season. In-water work activities are typically limited to in-water work windows (Section 2.8.2, *General Protection Measures*). Construction usually occurs only during daylight hours, but in rare cases, some activities may require continuous daytime and nighttime work (e.g., expedited projects, projects where the construction schedule is nearing the flood season).

Depending on weather and river conditions, construction can extend well into November. If a construction phase will extend into the following year’s construction season, the site is secured and “winterized” before the start of the flood season (typically November 15).

Various factors and regulations may influence construction timing. For example, work in floodways may be permitted only during the non-flood season (April 15 to November 15). In addition, work windows may be limited to the “dry season” as part of other regulatory approvals. Construction timing may also be restricted to avoid and minimize effects on federally listed and state listed threatened and endangered species. All construction for projects included in the Order would comply with applicable timing restrictions.

Construction Materials

The volume of soil borrow needed for earthen facilities can vary considerably depending on the project type. Soil borrow available at commercial sites can often be located many miles from the construction site, whereas borrow sites developed specifically for a project can often be near or adjacent to a construction site. In addition, other project construction materials (e.g., gravel, large woody debris) may be located various distances from the construction site.

Equipment Types

Depending on the type and size of the restoration project, the following are some of the types of equipment that may be used:

- Excavators
- Scrapers
- Bulldozers
- Graders
- Dredgers
- Crawlers/wheeled tractors
- Chippers/grinders (to process woody vegetation removed during site preparation)
- Sheepsfoot or tramping-foot rollers (for soil compaction)
- Roller compactors
- Smooth drum compactors
- Water trucks
- Soil and geotechnical bores
- Haul trucks (typically off-highway vehicles)
- Dump trucks
- Front-end loaders
- Cranes
- Barges
- Lubricating and fueling trucks (supporting operation of construction equipment)
- Integrated tool carriers (supporting operation of construction equipment)
- Pickup trucks
- Generators
- Backhoes
- Truck-mounted augers
- Hydroseeding trucks
- Pile drivers and vibratory hammers
- Helicopters

Less complex restoration projects may use only a small number of a few of the types of equipment listed above, whereas more complex restoration projects may use a dozen or more of many of these types of equipment.

Construction Activities

Mobilization

Construction activities begin with a mobilization phase. This phase may involve installing temporary construction offices, setting up staging areas, and transporting equipment and materials to the work site.

Staging Areas

One or more staging areas are typically required for storage and distribution of construction materials and equipment. Staging areas are usually located on or near active construction sites and may be relocated as construction progresses, especially for long, linear restoration projects. Staging areas typically include previously disturbed areas that provide parking for construction workers and may involve acquiring temporary easements from landowners.

Access and Haul Routes

Access and haul routes are designated for hauling materials to and from borrow sites, staging areas, and construction sites. Access routes are also used for employee commuting. These routes typically consist of existing public roads near construction sites; however, new off-road haul routes may also be constructed between borrow sites, staging areas, and construction sites. A minor restoration project may involve only a few trips per day for employee commuting and hauling of equipment and materials. A major restoration project that requires substantial movement of materials (such as levee setbacks to expand floodplains) can require many trips per day to haul material from borrow sites to construction sites. Projects involving construction near the water may use barges to transport personnel as well as equipment and materials, using waterways for access.

Site Preparation

Site preparation typically involves clearing the ground of structures, woody and herbaceous vegetation, and any debris using heavy equipment such as backhoes, excavators, bulldozers, mowers, and dump trucks. Structures to be cleared may consist of residences, agricultural outbuildings, irrigation facilities (distribution boxes, wells, standpipes, and pipes), power poles, utility lines, and piping. The clearing operation may be followed by grubbing operations to remove trees and other vegetation, stumps, root balls, and belowground infrastructure. Soil and geotechnical bores may be conducted to evaluate and/or verify underlying conditions. In addition, earthen material may be stripped from the ground as part of site preparation.

Debris generated during clearing and grubbing operations can be disposed of via various means, depending on the type of material and local conditions. These materials may be hauled off-site to landfills (e.g., building demolition waste), delivered to recycling facilities (e.g., concrete), or sold (e.g., organic material to cogeneration facilities). Excess earthen materials, such as organic soils, vegetation, and excavated material may be temporarily stockpiled before being re-spread at the project site or used to reclaim borrow sites (description below). No excess materials generated during site preparation or other project activities would be disposed of by open burning.

Preparation of Borrow Sites

Borrow sites are areas from which earthen materials would be removed for use in construction. Sites nearest to the construction areas are usually preferred. Using borrow sites near construction areas reduces the potential costs and environmental effects (air pollutant emissions and traffic) of hauling materials to the construction site from

greater distances. In addition, when the borrow site is within approximately one mile of the point of use, scrapers may be used instead of trucks to move soil material from a borrow site to the construction area, thereby reducing the amount of material that must be handled, the associated construction costs, and air pollutant emissions.

Borrow sites are prepared similarly to construction sites and soil samples would be obtained prior to construction to test for contamination of the borrow site, as applicable. After structures and woody vegetation are cleared from the surface, stumps, root balls, and infrastructure are removed from below ground. Typically, the borrow area is then disked to chop any remaining surface vegetation and mixed with the near-surface organic soils. Next, the top layer of earthen material is stripped from the borrow excavation area, and this soil is stockpiled at the borrow site. These soils are typically re-spread on the surface of the borrow site after the borrow has been excavated and the site has been graded to support reclamation. Debris generated during clearing and grubbing that is unsuitable for inclusion in the stockpiled soil is disposed of as appropriate via the various means described above (e.g., hauled off-site to landfills, recycled, or sold for commercial use).

Excavation depths for borrow sites typically range in depth, depending on volume requirements, the quality and extent of material available, and the method of reclaiming the borrow site.

Site Restoration and Demobilization

When construction activities are complete, any material stripped from the soil surface during site preparation is placed on appropriate facilities (e.g., levees) and in any temporarily disturbed areas where topsoil was removed. Temporarily disturbed areas are stabilized, which may include activities such as de-compaction and seeding with appropriate herbaceous native seed mixes (as appropriate). Any remaining construction debris is hauled to an appropriate waste facility. Equipment and materials are removed from the site, and staging areas and any temporary access roads are restored to pre-project conditions (e.g., de-compacted, stabilized with an herbaceous seed mix, planted for restoration to native habitat, and returned to agricultural production). Demobilization is likely to occur in various locations as construction proceeds through larger or linear restoration project areas.

Noncommercial borrow sites are restored or reclaimed by replacing topsoil that has been set aside and regraded to allow for continued uses such as farming, or the sites may be converted to other uses such as other restoration sites.

Disposal of Excess Materials

Excess organic materials consist of woody vegetation, grasses, and roots from borrow areas in restoration construction sites; excavated material that does not meet levee embankment criteria; and soil not used or unsuitable for the earthen structure under construction. Organic materials are typically used to reclaim borrow areas and temporarily disturbed sites, or are provided to local farmers for incorporation into their land to improve soil quality.

2.7.2 Constructed Facilities (Natural and Artificial Infrastructure) and Operations and Maintenance of those Facilities

Construction of the project types permitted under the Order would disturb natural conditions or infrastructure. The following maintenance and monitoring activities may be necessary to support successful establishment of natural conditions:

- Mechanical and chemical weed control
- Control of invasive and other nonnative species, including predatory (e.g., nonnative bass) and nuisance species (e.g., nutria)
- Replanting and reseeding
- Installation of fencing and signage
- Adjustments to grading or soils composition
- Installation and operation of monitoring equipment, including fish counters, flow gauges, depth gauges, cameras, stakes, and similar equipment
- Maintenance and repair of instream structures installed to improve or manage habitat or hydrologic function (e.g., grade control structures, beaver dam analogs, boulder clusters)

Operations and maintenance necessary to support the functionality of constructed infrastructure may include maintenance and cleaning of fish screens, removal of debris and sediment from stream crossings, and maintenance and operation of fishways.

2.8 Programmatic Sideboards, General Protection Measures, and Other Requirements

To qualify for coverage under the Order, projects must meet the appropriate programmatic sideboards, general protection measures, and other conditions described in Sections 2.8.1 through 2.8.4. Section 2.8.5 identifies activities that are prohibited under the Order. Section 2.9 identifies design guidelines that have been developed to help project proponents ensure that the projects are designed in a manner that is appropriate and sustainable, minimizes adverse effects on aquatic resources, maximizes the ecological benefits of the restoration and is consistent with multiple permitting agency regulatory practices (e.g., CDFW, NMFS, USFWS).

2.8.1 Programmatic Sideboards

Individual restoration projects authorized through the Order should be designed, planned, and implemented in a manner that is consistent with the techniques and minimization measures presented in the following guidance documents or manuals, as appropriate to project type:

- CDFW's *California Salmonid Stream Habitat Restoration Manual*, Fourth Edition, Volume II (Flosi et al. 2010), which consists of the following four chapters:
  - Part IX, *Fish Passage Evaluation at Stream Crossings*

  - Part X, *Upslope Assessment and Restoration Practices*
  - Part XI, *Riparian Habitat Restoration*
  - Part XII, *Fish Passage Design and Implementation*

- *CDFW Fisheries Restoration Grant Program guidance documents (http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=183423)*
- *NMFS Guidelines for Salmonid Passage at Stream Crossings* (NMFS 2001)
- *NMFS Fish Screening Criteria for Anadromous Salmonids* (NMFS 1997)
- NMFS Science based tools for evaluating stream engineering, management, and restoration proposals (Skidmore et al. 2011)
- Stream Habitat Restoration Guidelines (Cramer 2012)
- Any relevant future updates, guidance, and/or agency requirements, where appropriate

Actions not guided by the above guidance documents or manuals that may be eligible for permitting under the Order include newer, innovative approaches to restoration design that are not yet in the guidance documents or manuals but have demonstrated success. Examples include fishway operation and maintenance, and permanent removal of summer dams and other types of small dams.

The Order requires that all projects implement appropriate general protection measures to reduce the potential for ancillary effects on sensitive resources, including effects on water quality, sensitive habitats, special-status species, and other riparian and aquatic species. These required measures are described in Section 2.8.2, *General Protection Measures*. Project activities (or project types) and related project-specific protection measures are described below.

General administration of the Order will be conducted by the State Water Board. The State Water Board and Regional Boards will be responsible for enrolling individual restoration projects under the Order, as applicable, within their respective jurisdictional boundaries as outlined above. The approving Water Board will have the authority to issue a Notice of Applicability (NOA).

2.8.2 General Protection Measures

All projects permitted under the Order must incorporate *applicable* general protection measures, identified below, to ensure avoidance and minimization of impacts to aquatic/ riparian resources from construction activities. See Appendix E for full descriptions of these general protection measures and design guidelines.

General Protection Measures

- GPM-1: Receipt and Copies of All Permits and Authorizations
- GPM-2: Construction Work Windows
- GPM-3: Construction Hours
- GPM-4: Environmental Awareness Training

- GPM-5: Environmental Monitoring
- GPM-6: Work Area and Speed Limits
- GPM-7: Environmentally Sensitive Areas
- GPM-8: Prevent Spread of Invasive Exotic Plants
- GPM-9: Practices to Prevent Pathogen Contamination
- GPM-10: Equipment Maintenance and Materials Storage
- GPM-11: Material Disposal
- GPM-12: Fugitive Dust Reduction
- GPM-13: Trash Removed Daily
- GPM-14: Project Cleanup after Completion
- GPM-15: Revegetate Disturbed Areas

Water Quality and Hazardous Materials

- WQHM-1: Staging Areas and Stockpiling of Materials and Equipment
- WQHM-2: Storm Water Pollution Prevention Plan
- WQHM-3: Erosion Control Plans
- WQHM-4: Hazardous Materials Management and Spill Response Plan
- WQHM-5: In-Water Concrete Use
- WQHM-6: Accidental Discharge of Hazardous Materials

In-Water Measures

- IWW-1: Appropriate In-Water Materials
- IWW-2: In-Water Vehicle Selection and Work Access
- IWW-3: In-Water Placement of Materials, Structures, and Operation of Equipment
- IWW-4: In-Water Staging Areas and Use of Barges
- IWW-5: Cofferdam Construction
- IWW-6: Dewatering/Diversion
- IWW-7: Fish and Aquatic Species Exclusion while Installing Diversion Structures
- IWW-8: Removal of Diversion and Barriers to Flow
- IWW-9: In-Water Pile Driving Plan for Sound Exposure
- IWW-10: In-Water Pile Driving Methods
- IWW-11: Sediment Containment during In-Water Pile Driving
- IWW-12: Pile-Driving Monitoring
- IWW-13: Dredging Operations and Dredging Materials Reuse Plan

Vegetation/Habitat Disturbance and Revegetation, and Herbicide Use

- VHDR-1: Avoidance of Vegetation Disturbance
- VHDR-2: Native and Invasive Vegetation Removal Materials and Methods
- VHDR-3: Revegetation Materials and Methods
- VHDR-4: Revegetation Erosion Control Materials and Methods
- VHDR-5: Revegetation Monitoring and Reporting
- VHDR-6: Herbicide Use
- VHDR-7: Herbicide Application Planning
- VHDR-8: Herbicide Application Reporting

2.8.3 Pre-Application Consultation

The project proponent shall contact the approving Water Board to submit available project information and request a pre-application consultation meeting prior to submittal of the NOI. The approving Water Board may waive pre-application meeting requirement on a case-by-case basis.

Restoration projects can be complex and often benefit from pre-application consultation with the approving Water Board during the early stages of planning and design. During the pre-application consultation meeting, the approving Water Board will review project materials and provide project-specific guidance for navigating the approval process. A site visit may also be conducted at the discretion and request of the approving Water Board. Whether or not a waiver is granted, and/or the extent of the pre-application consultation, will depend on project complexity and development of design and planning.

2.8.4 Projects Requiring Oversight by Other Agencies

The following project types may require additional design review and oversight by other regulatory agency staff and agency engineers, including but not limited to:

- NMFS—for projects where anadromous and/or marine fish considered federal special-status species[9] are present
- USFWS—for projects where freshwater fish and wildlife considered federal special-status species[9] are present
- CDFW—for projects where fish and wildlife considered state special-status species[9] are present

The aforementioned regulatory agencies may impose specific requirements, including but not limited to the following, for certain project types:

- For stream crossing projects, allow passage of the life stages and covered salmonid species historically passing there.
- For retrofit culverts, meet the fish passage criteria for the passage needs of the special-status species and life stages that historically passed through the site before the existence of the road crossing according to NMFS Crossing Guidelines and CDFW stream crossing criteria (Part XII, *Fish Passage Design and Implementation*, of the CDFW *California Salmonid Stream Habitat Restoration Manual* [Flosi et al. 2010:Vol. II]).
- Designs for fishways and culvert replacement or modification projects planned in fish–bearing waterways, reviewed and authorized by a NMFS (or CDFW) fish passage specialist before the start of work.

[9] Special-status species are species that are legally protected or otherwise considered sensitive by federal or state resource agencies (federal Endangered Species Act [FESA], California Endangered Species Act [CESA], or Species of Special Concern) or by local resource agencies.

- Designs for fishways and culvert replacement or modification designs, designed and stamped by a State of California–registered Engineer.
- Designs for fishways, consistent with the fishway design guidelines presented in NMFS's *Anadromous Salmonid Passage Facility Design* (NMFS 2011).
- New fishways, constructed to provide passage conditions suitable for year-round, bidirectional movement by adult and juvenile salmonids.
- New fishways, have a maximum vertical jump of six inches, unless NMFS guidelines are changed.
- Flow patterns in new fishways, be stable, with no water surges.
- Energy dissipation in new fishways, be complete in a step-and-pool fishway, with no carryover from pool to pool.
- Sediment composition and quantity, and effects of sediment transport, evaluated by a qualified geomorphologist for all summer dam removal projects.

2.8.5 Activities Prohibited under the Order

The following activities are not within the scope of the Order, are not analyzed in this PEIR, and will require separate permitting decisions with the State Water Board and/or Regional Boards:

- Use of gabion baskets, boxes, or cages.
- Use of cylindrical riprap (e.g., Aqualogs).
- Use of undersized riprap (e.g., will not remain in place during a 100-year flow event).
- Construction of permanent dams (does not apply to beaver dam analogs) or concrete-lined channels of any sort.
- Use of chemically treated timbers used for grade or channel stabilization structures, bulkheads, or other instream structures.
- Activities that result in long-term, substantial disruption of the movement of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the project areas (Appendix E includes additional discussion/measures on maintaining passage).
- Elimination of a riffle, pool, or riffle/pool complex that is not replaced/enhanced elsewhere by the project. (Note: In some instances, a restoration project may affect or modify a riffle/pool complex depending on project-specific conditions and design objectives. For example, a culvert removal may affect an existing pool. These types of projects would be allowed under the Order.)

- Water diversions, except to temporarily dewater the construction site of a restoration project. Some water conservation projects would be covered; Section 2.6.5*, Water Conservation*, includes further information.
- With the exception of storage projects to reduce low-flow stream diversions (Section 2.6.5), off-channel/side-channel habitat projects that require the installation of a flashboard dam, head gate, or other mechanical structures.
- Creation or potential creation of a barrier to anadromous fish passage as determined by the NMFS fish passage guidelines (including any associated maintenance activities, or lack thereof).
- Use of riprap bank protection, beyond the minimum amount needed to achieve the project goals as determined by the approving Water Board.
- Installation of infiltration galleries (i.e., subsurface structure, typically including perforated conduits in gravel, to expedite transfer of water to or from a soil).
- Managed surrogate floodplain and managed returned flows that do not allow for volitional movement (ingress and egress) of fish to the main channel (up and/or downstream).

2.9 Design Guidelines

Project type–specific design guidelines have been developed with assistance from multiple regulatory agencies (e.g., CDFW, NMFS, USFWS) to help project proponents during the design development of their individual projects, in a manner that is appropriate and sustainable, minimizes adverse effects on aquatic habitats, and maximizes the ecological benefits of the restoration (Appendix E). For example, these guidelines include designing restored streams in ways that provide fish passage and withstand probable flooding events. The project proponent may modify design approaches that do not conform with the specific guidelines, based on site-specific conditions or technological constraints or advances, or regionally accepted guidance documents.

2.10 Species Protection Measures

For purposes of this CEQA analysis, this PEIR has included a suite of species protection measures that shall be implemented by project proponents, as applicable. Applicable species protection measures are to be implemented in addition to applicable general protection measures, described above (Appendix E), when suitable habitat exists within the currently occupied range of the species and/or a species is determined to be present. Alternative measures, conditions, or technological advances to accommodate individual restoration projects may be proposed by enrollees for regulatory agency approval (NMFS, USFWS, and/or CDFW) approval. See Appendix F for full descriptions of the species protection measures.

Protection measures for special-status species are listed as follows:

- Species protection measures (i.e., measures that generally can apply to all or multiple guilds).

- Species guild protection measures (i.e., subsets of measures that generally can be applied to all species within a given guild; included below).
- All measures, including those for a specific guild, are programmatic; project-specific measures for single or smaller groups of species shall be further developed and evaluated by project proponents based on project-specific conditions with permitting agencies based on individual project-specific conditions.
- The protection measures described for species guilds are generally listed in chronological order of project implementation activities for ease of implementation (e.g., design, surveys, avoidance, work windows, work restrictions, implementation monitoring, and revegetation monitoring).
- Protection measures for plants primarily consist of avoidance measures. When complete avoidance of special-status plant species is not possible, additional protection measures have been included.

2.10.1 Species Protection Measures

- SPM-1: Preconstruction Surveys
- SPM-2: Environmentally Sensitive Areas and/or Wildlife Exclusion
- SPM-3: Species Protection Construction Work Windows
- SPM-4: Species Capture, Handling and Translocation
- SPM-5: Sensitive Species Entrapment Prevention
- SPM-6: Airborne Noise Reduction

2.10.2 Amphibian Species Protection Measures

- AMP-1: Wildlife Passage Design
- AMP-2: Rain Event Limitations
- AMP-3: Pre-Construction Survey
- AMP-4: Disease Prevention and Decontamination
- AMP-5: Lighting
- AMP-6: Clearing and Grubbing Vegetation
- AMP-7: Pump Screens
- AMP-8: Removal of Non-native Species
- AMP-9: Placement of Suitable Erosion Control Material
- AMP-10: Encounters with Species
- AMP-11: Species Observations and Handling Protocol

2.10.3 Reptile Species Protection Measures

- REP-1: Pre-Construction Survey
- REP-2: Environmentally Sensitive Area Fencing
- REP-3: Clearing and Grubbing Vegetation
- REP-4: Prohibited Use of Rodenticides
- REP-5: Species Observations and Encounters
- REP-6: Species Handling and Relocation

2.10.4 Bird Species Protection Measures

- BIRD-1: Habitat Assessment
- BIRD-2: Nest Protection Work Window
- BIRD-3: Work Area Limits
- BIRD-4: Site Access Restrictions
- BIRD-5: Monitoring

2.10.5 Mammal Species Protection Measures

- MAM-1: Conduct Habitat Assessment
- MAM-2: Exclusion Areas
- MAM-3: Use of Handheld Tools
- MAM-4: Species Trapping and Relocating
- MAM-5: Reporting Requirements

2.10.6 Invertebrate Species Protection Measures

- INVERT-1: Implement California Freshwater Shrimp Measures
- INVERT-2: Implement Vernal Pool Branchiopods Measures
- INVERT-3: Implement Valley Elderberry Longhorn Beetle Protocol
- INVERT-4: Implement Delta Green Ground Beetle Protection Measures
- INVERT-5: Implement Butterfly Protection Measures

2.10.7 Fish Species Protection Measures

- FISH-1: Habitat Disturbance Avoidance and Minimization
- FISH-2: Habitat Assessment and Surveys
- FISH-3: Fish Capture and Relocation
- FISH-4: Reporting

2.10.8 Plant Species Protection Measures

- PLANT-1: Habitat Assessment and Surveys
- PLANT-2: Avoidance of Vernal Pool and Other Annual and Perennial Species
- PLANT-3: Exclusion Buffer Establishment
- PLANT-4: Work Restrictions in the Exclusion Buffer
- PLANT-5: Biological Monitoring
- PLANT-6: Herbicide Application, Clearing, and Ground Disturbance
- PLANT-7[10]: Measures for When Effects Cannot Be Avoided

[10] Staff Note: The PEIR listed Plant-7 in error. There is not a Plant-7 protection measure.

Chapter 3 Environmental Setting, Impacts, and Mitigation Measures

3.1 Approach to the Environmental Analysis

As discussed in Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*, the Order for Clean Water Act Section 401 Water Quality Certification and Waste Discharge Requirements for Restoration Projects Statewide (Order) does not promote construction or operation of specific facilities or other specific physical actions by the State Water Resources Control Board (State Water Board). The State Water Board also does not propose to construct, operate, or undertake specific physical actions following adoption of the Order. Rather, the Order is designed to permit the actions of other federal, state, and local agencies and organizations that want to construct, operate, and maintain restoration projects in accordance with the sideboards, general protection measures, and other conditions of the Order.

The extent to which the Order would result in any particular action from authorization of individual restoration projects is yet to be determined, and as such, impacts are considered at a programmatic level with a reasonable forecasting of effects. This PEIR assumes that the Order is implemented and that restoration projects would be permitted under the Order. Accordingly, this PEIR evaluates the potential impacts of the types of restoration projects that the Order would encourage and promote in the study area. See Section 1.1, *Introduction and Overview of the Order*, for more information on the use of the PEIR and the CEQA process.

3.1.1 Scope and Assumptions of the PEIR Analysis

Using the approach discussed above, this chapter of the PEIR presents the environmental setting; regulatory setting; significant effects on the environment (impacts); and general protection measures, species protection measures, and mitigation measures, as applicable, for each of the following resource topics, listed in the order in which they are analyzed in this PEIR:

3.2 Aesthetics
3.3 Agriculture and Forestry Resources
3.4 Air Quality and Greenhouse Gas Emissions
3.5 Biological Resources—Terrestrial
3.6 Biological Resources—Aquatic
3.7 Cultural Resources
3.8 Energy Resources
3.9 Geology and Soils
3.10 Hazards and Hazardous Materials
3.11 Hydrology and Water Quality
3.12 Land Use and Planning
3.13 Mineral Resources
3.14 Noise
3.15 Population and Housing

3.16 Recreation
3.17 Transportation
3.18 Tribal Cultural Resources
3.19 Utilities and Service Systems and Public Services
3.20 Wildfire

For definitions of general protection measures, species protection measures, and mitigation measures, see Section 3.1.4, *Terminology*.

The cumulative impacts for each resource topic are analyzed in Chapter 4, *Cumulative Impacts*.

Many types of restoration projects would be permitted under the Order. Specific project details, such as project sizes, configurations, locations, and operations, are not known at this time. Therefore, each resource section addresses the potential range of impacts of the types of restoration projects that could be permitted under the Order.

The impact analysis assumes that the restoration projects or actions would be constructed, maintained, and operated in compliance with the Order and other relevant federal, state, and regional and local regulations and ordinances. (Section 3.1.3, *Impacts and Mitigation Measures.*)

In addition, the individual restoration projects could be constructed, operated, and maintained in many different ways to meet regulatory requirements and guidelines. For this reason, each resource section evaluates a range of potential effects that could result from implementation of these general types of restoration projects.

The following is a partial list of example projects that represent the types of restoration projects that could be permitted under the Order (Table 3.1-1). This list is not exhaustive. Rather, the list is intended to illustrate the types of projects that were considered during development of the impact evaluation, along with the typical types of activities and construction, operations, and maintenance methods that could result from implementation of the restoration projects.

Table 3.1-1
Example Project Types that Could Be Permitted under the Order

Project Name	Region	Project Type
Alameda Creek Fish Passage Projects	Region 2—San Francisco	Fish passage
Alamitos Bay Oyster Restoration Project	Region 4—Los Angeles	Tidal wetlands habitat
Aliso Creek Estuary Restoration Project	Region 9—San Diego	Tidal wetlands habitat
American River Gravel Augmentation Projects	Region 5—Central Valley	Stream and side channel habitat

Table 3.1-1
Example Project Types that Could Be Permitted under the Order

Project Name	Region	Project Type
American River Sunrise Side Channel Restoration Project	Region 5—Central Valley	Side channel habitat
Arroyo Hondo Creek Steelhead Passage Enhancement	Region 3—Central Coast	Fish passage and stream habitat
Ballona Wetlands Restoration Project	Region 4—Los Angeles	Tidal wetlands habitat
Blackwood Creek Restoration Project	Region 6—Lahontan	Stream habitat
Bouquet Canyon Creek Restoration Project	Region 4—Los Angeles	Stream and riparian habitat
Colorado Lagoon Restoration Project	Region 4—Los Angeles	Tidal lagoon habitat
Devereux Slough Restoration Project	Region 3—Central Coast	Tidal wetlands habitat
Dry Creek Restoration Project	Region 1—North Coast	Stream and riparian habitat
Dutch Slough Tidal Restoration Project	Region 5—Central Valley	Tidal wetlands habitat
Feather and Bear Rivers Levee Setback Project	Region 5—Central Valley	Floodplain habitat
Grizzly Slough Floodplain Restoration Project	Region 5—Central Valley	Floodplain habitat
Hamilton/Bel Marin Keys Wetlands Restoration Projects	Region 2—San Francisco	Tidal wetlands habitat
Napa Creek Restoration Flood Control Improvement Project	Region 2—San Francisco	Stream and riparian habitat
Napa River Restoration Projects (multiple)	Region 2—San Francisco	Stream habitat
Salton Sea Restoration Project	Region 7—Colorado River	Habitat restoration
Santa Ana River Restoration Project	Region 8—Santa Ana	Invasive species removal and riparian habitat
San Francisco Bay Living Shorelines Project	Region 2—San Francisco	Tidal wetlands habitat

Table 3.1-1
Example Project Types that Could Be Permitted under the Order

Project Name	Region	Project Type
Shasta River Conservation Habitat Enhancement Restoration Project	Region 1—North Coast	Stream habitat and water conservation
Trabuco Creek Fish Passage Project	Region 9—San Diego	Fish passage
Upper Truckee River and Marsh Restoration Project	Region 6—Lahontan	Stream and freshwater marsh habitat
Yuba River Canyon Salmon Habitat Restoration Project	Region 5—Central Valley	Spawning habitat

3.1.2 Section Format

Each PEIR section contains the following elements:

- Introduction to the analysis contained in the section (including a summary of the nature of comments received in response to the notice of preparation)
- Environmental setting
- Regulatory setting
- Methods of analysis
- Thresholds of significance used to evaluate the significance of impacts of the types of projects that would be permitted under the Order
- Impacts not evaluated further (where applicable)
- Impacts and mitigation measures

The environmental setting and regulatory setting descriptions provide a point of reference for assessing the environmental impacts of the types of projects that would be permitted under the Order.

The study area for the Order is statewide, spanning all nine Regional Water Quality Control Boards (Regional Boards). Specific locations of restoration projects that would be permitted under the Order will be determined on an individual project basis. For this reason, each resource section provides a general discussion of the environmental setting.

The manner in which the environmental setting is described varies by resource area. For example:

- Section 3.14.2, *Environmental Setting*, for the Noise analysis discusses acoustic fundamentals, the effects of noise on humans, and noise-sensitive land uses.

However, the section does not provide information about individual restoration projects or their locations relative to sensitive receptors (e.g., residences, library and schools, hospitals) because these sensitive receptors are not known at this time.

- Section 3.5.2, *Environmental Setting*, and Section 3.6.2, *Environmental Setting*, for the Biological Resources—Aquatic and Biological Resources—Terrestrial analyses, respectively, discuss the environmental setting by ecoregions in the study area. The ecoregions encompass geographic areas with similar patterns of physical and biological characteristics, resulting in similar expected impact mechanisms for restoration projects permitted under the Order.

The environmental setting discussion is followed by a discussion of impacts and mitigation measures. Preceding each impact/mitigation measure discussion is a summary table that lists the impacts identified and the significance conclusions with implementation of general protection measures, and species protection measures.

3.1.3 Impacts and Mitigation Measures

Each impact discussion includes the following elements:

- An impact statement
- An explanation of the impact
- An analysis of the significance of the impact before implementation of general protection measures, species protection measures, and identification of feasible mitigation measures, if appropriate
- An evaluation of whether the identified general protection measures, species protection measures, and/or mitigation measures would reduce the identified impact to a less-than-significant level

Cumulative impacts are discussed in Chapter 4 of this PEIR. Chapter 6, *Alternatives*, discusses a range of reasonable alternatives to the Order.

The Order would improve the efficiency of the State and/or Regional Board regulatory reviews of restoration projects throughout the state that would restore aquatic and riparian habitat and improve water quality. This PEIR may also provide efficiencies for other agencies that can choose to utilize it during individual projects' CEQA analyses. (For descriptions of the restoration projects, see Section 2.6, *Categories of Restoration Projects in the Order.*)

The impact analysis for resource areas involved reviewing existing information about similar actions and activities to allow the evaluation of a range of "big-picture effects" of multiple projects, consistent with the level of detail appropriate for a program-level analysis. Given the programmatic nature of the Order, individual project details are yet to be determined; impacts and assumptions are identified at a programmatic level, with the reasonable forecasting of construction and operation effects of projects permitted under the Order. For example, conducting detailed modeling (e.g., for noise, traffic, or

hydrology and water quality) would lead to an inaccurate sense of precision and imply that such details are known, when in fact they are not.

The number of projects that may be implemented, project times and locations, and design and operation will be determined on an individual project basis. Some assumptions could be adopted from existing studies and environmental documents. In most cases, however, these assumptions are not available, and defining them would be speculative and would not reasonably forecast potential impacts. Further, an effort to simulate multiple integrated projects would entail testing and iteratively modifying many of these assumptions, which would compound the difficulty and subjectivity of the modeling effort. Therefore, this PEIR does not include individual restoration projects modeling or quantitative analysis when evaluating impacts.

The impact analysis for each resource area has determined the nature and significance of each impact before incorporation of appropriate general protection measures and species protection measures. As described in Section 2.8.2, *General Protection Measures*, all restoration projects permitted under the Order would incorporate applicable general protection measures (Appendix E) and species protection measures as described in Section 2.10, *Species Protection Measures*, and in Appendix F to ensure avoidance and minimization of impacts on sensitive resources. However, review of project plans by State Water Board or Regional Board staff will ensure that the project proponent (as defined in Section 1.1, *Introduction and Overview of the Order*) has incorporated all necessary and appropriate general protection measures and species protection measures relevant to the individual restoration project before permitting of the project under the Order. For the purposes of this PEIR, general protection measures and species protection measures are intended to be implemented and enforced in the same way as mitigation measures consistent with Section 15126.4 of the State CEQA Guidelines. In addition, as stated above, the impact analysis assumes that the proposed restoration projects would be constructed and operated in compliance with relevant federal, state, and local regulations and ordinances.

If the analysis has determined that incorporating one or more general protection measures and/or species protection measures into the restoration project would reasonably mitigate an impact, then the impact conclusion is less than significant.

If the analysis has determined that an impact would remain significant after the incorporation of appropriate general protection measures and species protection measures, then the impact conclusion is significant, and mitigation measures have been recommended to further reduce the magnitude of the impact. It is possible that implementing additional mitigation measures could reduce a significant impact to less than significant; however, the individual locations, scale, and timing of possible future restoration projects are not known at this time, nor is it known what specific resources might be present within a future restoration project’s footprint. The factors necessary to identify specific impacts include the project’s design and footprint, and the type and precise locations of the proposed construction activities. Therefore, it is not possible to conclude that every potentially significant adverse impact would be avoided or reduced to a less-than-significant level with implementation of mitigation measures. Some impacts would remain significant and unavoidable.

As part of the State Water Board or Regional Board's issuance of a Notice of Applicability (NOA) for a restoration project under the Order, compliance with the general protection measures, species protection measures, and mitigation measures listed in the impact section for each resource area would be required when applicable to a given project. The applicability of the general protection measures, species protection measures, and mitigation measures would depend on the restoration activities, project location, and the potentially significant impacts of the individual restoration project. For example, mitigation measures would not be required for impacts determined by the lead agency to be less than significant for an individual restoration project. The project proponent (as defined in Section 1.1, *Introduction and Overview of the Order*) for each restoration project would be responsible for implementing the general protection measures, species protection measures, and mitigation measures pursuant to Section 15097 of the State CEQA Guidelines.

For some restoration projects, the impact conclusion presented in this PEIR may be conservative. Project proponents that propose restoration projects for coverage under the Order have a legal duty under CEQA to mitigate impacts to the extent feasible. In addition, many of the mitigation measures identified in this PEIR are standard types of mitigation, are considered generally feasible for most projects, and would reduce impacts to a less-than-significant level in many cases.

Impact Discussion Format

Each impact discussion includes an impact statement (in bold text) and is assigned a number based on the resource section and the order in which it appears (for example, 3.2-1, 3.2-2, etc.).

The impact discussions are organized as follows:

1. Each discussion begins with an impact statement and analysis for two types of impacts:
    a. Construction-related impacts: These are impacts of preconstruction (e.g., site preparation) and site development activities for restoration projects. Construction-related impacts are often temporary.
    b. Effects of constructed facilities (natural or artificial infrastructure) and operations and maintenance (O&M) of those facilities impacts: These are impacts of the project itself, once completed, and include O&M activities (e.g., monitoring). These impacts are generally considered permanent or ongoing. Routine O&M activities may be of short duration but are usually reoccurring.
2. The discussion identifies an impact conclusion before the implementation of general protection measures and species protection measures.
3. Appropriate general protection measures and species protection measures are identified and presented along with their effectiveness to reduce the magnitude of the impact.
4. Mitigation measures are proposed, as applicable, to reduce impacts.

5. The mitigation measures are discussed and a significance conclusion is provided.

3.1.4 Terminology

This PEIR uses the following terminology:

- **Thresholds of Significance:** The set of criteria used by the State Water Board to determine the level or "threshold" at which an impact would be considered significant. The thresholds of significance used in this PEIR fall into the following categories:
  - Discussed in Appendix G of the State CEQA Guidelines
  - Based on factual or scientific information
  - Based on regulatory standards of federal, state, and local agencies
  - Adopted by the State Water Board

  In determining the level of significance, the analysis assumes that the restoration projects permitted under the Order would comply with relevant federal, state, and local regulations and ordinances.

- **Less-than-Significant Impact:** An impact is considered less than significant when it does not reach the threshold of significance and would therefore cause no substantial adverse change in the physical environment. No mitigation is required for less-than-significant impacts. However, this determination may include implementation of applicable general protection measures and/or species protection measures.

- **Significant Impact:** An impact is considered significant if it would result in a substantial adverse change in the physical conditions of the environment. Significant impacts are identified by evaluating the effects of the project (in this case, the restoration projects permitted under the Order) in the context of specified thresholds of significance. Mitigation measures and/or project alternatives are identified to reduce these effects on the environment where feasible.

- **Significant and Unavoidable Impact:** An impact is considered significant and unavoidable if it would result in a substantial adverse change in the environment that cannot be feasibly avoided or mitigated to a less-than-significant level. A statement of overriding considerations must be adopted if impacts cannot be mitigated to a less-than-significant level.

- **General protection measures** (Appendix E) are the best management practices developed to support avoidance and/or minimization of effects on all covered species and their habitats and other resource areas (e.g., air quality, hazards and hazardous materials, geology and soils). These measures are designed to be applied, as appropriate, based upon the type of restoration project being undertaken and the specific tools being used to accomplish the restoration project.

- **Species protection measures** (Appendix F) are avoidance and/or minimization measures developed specifically to address individual covered species or covered species guilds, based upon unique life history and habitat requirements. Applicable species protection measures are to be implemented in addition to

applicable general protection measures, described above, when suitable habitat exists within the currently occupied range of the species and/or a species is determined to be present.

- **Mitigation Measures:** The State CEQA Guidelines (Section 15370) define mitigation as all of the following:
  - Avoiding the impact altogether by not taking a certain action or parts of an action.
  - Minimizing impacts by limiting the degree or magnitude of the action and its implementation (Section 15370[b]).
  - Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
  - Reducing or eliminating the impact over time by conducting preservation and maintenance operations during the life of the action.
  - Compensating for the impact by replacing or providing substitute resources or environments, including through permanent protection of resources in the form of conservation easements.

3.2 Aesthetics

3.2.1 Introduction

This section discusses the visual resources in and characteristics of the study area and evaluates the potential impacts of the types of restoration projects that would be permitted under the Order. (Section 2.6, *Categories of Restoration Projects in the Order.)* As discussed below, potential impacts include a change in a scenic vista, damage to scenic resources, degradation of visual character, and creation of a new source of light or glare.

The environmental setting and evaluation of impacts on aesthetic resources is based on a review of existing published documents, including city and county general plans; information regarding example projects similar to those permitted under the Order that may be implemented by other agencies; and other information sources listed in Chapter 8, *References*.

No comments specifically addressing aesthetics were received in response to the notice of preparation (NOP). See Appendix B for NOP comment letters.

3.2.2 Environmental Setting

Visual resources include physical features that make up the visible landscape, including land, water, vegetation, geologic features, and built structures (e.g., buildings, roadways, bridges, levees). This section also addresses visual resources in the surrounding landscape that contribute to the visual character of the study area.

Sensitive Viewers

Viewer sensitivity is one factor in assessing aesthetic impacts. It is a function of several influences:

- Visibility of the landscape
- Proximity of viewers to the visual resources
- Frequency and duration of views
- Number of viewers
- Types of individuals and groups of viewers
- Viewers' expectations, as influenced by their values, awareness, and activity

The viewer's distance from landscape elements plays an important role in determining an area's visual quality. Landscape elements are considered higher or lower in visual importance based on their proximity to the viewer. Generally, the closer a visual resource is to the viewer, the more dominant and thus the more visually important it is to the viewer. To account for this, visual quality assessment methods typically separate landscapes into foreground, middleground, and background views. Generally, the foreground is characterized by clear details (within 0.25 or 0.5 mile from the viewer); the middleground is characterized by the loss of clear texture in a landscape, which creates a uniform appearance (foreground to 3–5 miles in the distance); and the background extends from the middleground to the limit of human sight (USFS 1974:7).

Residents

Communities in the study area vary in terms of their population, density, and character. Larger cities in the study area include Los Angeles, San Diego, San Jose, San Francisco, Fresno, and Sacramento. Examples of midsized cities include Stockton, Irvine, Fremont, Corona, and Vacaville. Smaller cities include Chico, Redding, Napa, Hollister, and Eureka. Small cities or towns include Isleton, Calistoga, Corning, Truckee, and Yucca Valley. A small portion of the residents of the study area reside in rural communities dispersed throughout the state.

Residents of these communities are potential viewers of visual resources in the study area. Views are among many factors that influence residential location choice. Residents tend to have high visual sensitivity. People who live in the larger cities with higher population densities tend to have views consisting of greater built environments. Residents of smaller cities and towns tend to have more views of waterways and rural viewscapes. Other visual resources in the study area include areas with vistas of the Pacific Ocean, waterways, and major mountain ranges. Residents living farther from given visual resources view these resources less frequently, and potentially from greater distances, which can reduce the visual importance of those resources to those people.

Workers and Commuters

Workers and commuters using roadways and railways in the study area are potential viewers of visual resources. Most job opportunities in the rural portions of the study area are related to agriculture. Commuter towns or bedroom communities are residential suburbs inhabited largely by people who commute to a nearby city for work. These workers routinely view the natural environment, built environment, and other aspects of the study area that contribute to its visual character. Commuters using roadways and railways may view these resources for less time, at greater speeds, and from greater distances than residents, workers, visitors to recreational areas, and other sensitive viewers. Workers and commuters generally have low visual sensitivity, because their activities tend not to focus on visual surroundings. Larger cities and urban areas of the study area contains less agricultural land and more built-out urban land.

Recreation Visitors, Travelers, and Tourists

The study area features diverse recreational opportunities that derive from varied resources and facilities. Outdoor recreation varies based on the landscape and surrounding resources. For instance, activities such as boating, fishing, and swimming could occur in lakes, reservoirs, beaches, and rivers, and land-based activities such as hiking, biking, and camping could occur in areas not directly connected with waterways. In public areas—national, state, and local parks and National Forest lands—the visual character tends to be of high quality, particularly where the parks provide access to scenic destinations such as smooth rolling hills, patterns of mountaintop and tree-lined skylines, prominent ridgelines, sharp rocky outcroppings, dense and dark forests, and visually captivating waterfalls. Recreation in urban areas could include activities such as the use of city parks, walkways, and museums, events, tourist destinations, and picnicking. The study area contains a wide variety of recreation resources and opportunities because of its size and range of landscapes and water features.

Working Landscapes

Working landscapes are lands on which resource management and/or cultivation activities occur in large areas, mostly without buildings or structures, such as agricultural, timber, or grazing lands. Working landscapes may contain natural contours, waterways, and other features or may alter these while maintaining a primarily unbuilt visual context. A variety of features may define the visual character of a working landscape. The preservation, transformation, and general purpose or function of prominent features that are most noticeable in the landscape can affect the human perception of a working landscape. Working landscapes in the study area are generally associated with agricultural and timber production. Facilities may include renewable and energy facilities, such as wind turbines.

The agricultural landscape, consisting of orchards, row crops, and pasturelands, is dominant aesthetically and defines rural areas of the study area, most notably the Central Valley. Orchards and row crops are found on large plots and consist of long, horizontal lines that dominate the visual field, creating a uniform form and texture.

Urban Environments

The larger cities and more urban environments include cities such as Los Angeles, San Diego, San Jose, Fresno, and Sacramento. These urban areas contain large built environments and proportionally less natural habitat or open space. The scenic qualities of these urban areas are lower than those of more rural areas because the existing built environment detracts from views of the natural landscape.

Region Descriptions

Regional Board Region 1—North Coast

The North Coast Region encompasses approximately 19,400 square miles, and includes 340 miles of coastline and remote wilderness areas, as well as urbanized and agricultural areas. The North Coast Region covers all of Del Norte, Humboldt, Trinity, and Mendocino Counties; major portions of Siskiyou and Sonoma Counties; and small portions of Glenn, Lake, Modoc, and Marin Counties. Scenic highways in the North Coast Region include State Routes (SRs) 12 and 116 and U.S. Highway (U.S.) 101.

Regional Board Region 2—San Francisco Bay

The San Francisco Bay Region is 4,603 square miles, roughly the size of the state of Connecticut, and is characterized by its dominant feature, 1,100 square miles of the 1,600-square-mile San Francisco Bay estuary, the largest estuary on the West Coast of the United States, where freshwater from California’s Central Valley mixes with the saline waters of the Pacific Ocean.

The San Francisco Bay estuary conveys the waters of the Sacramento and San Joaquin Rivers into the Pacific Ocean. The bay marks the natural topographic separation between the northern and southern coastal mountain ranges. The San Francisco Bay Region’s waterways, wetlands, and bays form the centerpiece of the United States' fourth-largest metropolitan region, including all or major portions of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties. The region also includes coastal portions of Marin and San Mateo

Counties, from Tomales Bay in the north to Pescadero and Butano Creeks in the south. Scenic highways in the San Francisco Bay Region include SRs 9, 24, 35, and 84, and Interstates 280, 580, and 680, as well as the iconic coastal SR 1 and U.S. 101.

Regional Board Region 3—Central Coast

The Central Coast Regional Board has jurisdiction over a 300-mile-long by 40-mile-wide section of the state's central coast. Its geographic area encompasses all of Santa Cruz, San Benito, Monterey, San Luis Obispo, and Santa Barbara Counties as well as the southern third of Santa Clara County, and small portions of San Mateo, Kern, and Ventura Counties. Included in the region are urban areas such as the Monterey Peninsula and the Santa Barbara coastal plain; prime agricultural lands as the Salinas, Santa Maria, and Lompoc Valleys; National Forest lands; extremely wet areas like the Santa Cruz Mountains; and arid areas like the Carrizo Plain. Scenic highways in the Central Coast Region include SRs 1, 33, 68, and 156 and U.S. 101.

Regional Board Region 4—Los Angeles

The Los Angeles Region encompasses all coastal watersheds and drainages flowing to the Pacific Ocean between Rincon Point (on the coast of western Ventura County) and the eastern Los Angeles County line, as well as the drainages of five coastal islands: Anacapa, San Nicolas, Santa Barbara, Santa Catalina, and San Clemente. In addition, the Los Angeles Region includes all coastal waters within 3 nautical miles off the continental and island coastlines. Major mountain ranges in the Los Angeles Region include the San Gabriel Mountains, Santa Monica Mountains, Santa Susana Mountains, Simi Hills, and Santa Ynez Mountains. The San Gabriel Mountains are the most prominent range in this group.

Land uses in the region vary considerably. In Ventura County, land uses are changing from agriculture and open space to urban residential and commercial. In southern Los Angeles County, predominant land uses include urban residential, commercial, and industrial. In northern Los Angeles County, open space is rapidly being transformed into residential communities.

Regional Board Region 5—Central Valley

The Central Valley Region is bounded by the crests of the Sierra Nevada on the east and the Coast Ranges and Klamath Mountains on the west. This region extends some 400 miles from the California/Oregon border southward to the headwaters of the San Joaquin River. The Sacramento River and San Joaquin River Basins cover about one-fourth of the total area of California and more than 30 percent of the state’s irrigable land. The Sacramento–San Joaquin Delta is a maze of river channels and diked islands covering roughly 1,150 square miles, including 78 square miles of water area. Scenic highways in the Central Valley Region include Interstate 5, U.S. 50, and SRs 4, 20, 33, 88, 89, 151, 152, and 180.

Regional Board Region 6—Lahontan

The Lahontan Region has historically been divided into the North and South Lahontan Basins at the boundary between the Mono Lake and East Walker River watersheds. The region is about 570 miles long and has a total area of 39,210 square miles. The

Lahontan Region includes the highest point (Mount Whitney) and lowest point (Death Valley) in the contiguous United States, and the topography of the remainder of the region is diverse. The region includes the eastern slopes of the Warner Mountains and the Sierra Nevada; the northern slopes of the San Bernardino and San Gabriel Mountains; the southern slopes of the Tehachapi Mountains; and all or part of other ranges including the White, Providence, and Granite Mountains and the western slopes of the New York and Ivanpah Mountains. Topographic depressions include the Madeline Plains and the Surprise, Honey Lake, Bridgeport, Owens, Antelope, and Victor Valleys.

Much of the Lahontan Region is in public ownership, with land use controlled by agencies such as the U.S. Forest Service (USFS), National Park Service, and U.S. Bureau of Land Management; various branches of the military; the California Department of Parks and Recreation; and the City of Los Angeles Department of Water and Power.

While the permanent resident population of the Lahontan Region (about 800,000 in 1995) is lower than that of more urbanized regions, it is mostly concentrated in high-density communities in the South Lahontan Basin. In addition, millions of visitors use the Lahontan Region for recreation each year. Scenic highways in the Lahontan Region include SRs 89, 168, and 190, and U.S. 395.

Regional Board Region 7—Colorado River Basin

The Colorado River Basin Region covers approximately 13 million acres (20,000 square miles) in southeastern California. It includes all of Imperial County and portions of San Bernardino, Riverside, and San Diego Counties. The region is bounded for 40 miles on the northeast by the state of Nevada; on the north by the New York, Providence, Granite, Old Dad, Bristol, Rodman, and Ord Mountain ranges; on the west by the San Bernardino, San Jacinto, and Laguna Mountain ranges; on the south by Mexico; and on the east by the Colorado River and state of Arizona.

A significant geographical feature of the Colorado River Region is the Salton Trough, which contains the Salton Sea and the Coachella and Imperial Valleys. Much of the region’s agricultural economy and industry is located in the Salton Trough. Scenic highways in the Colorado River Region include SRs 62 and 74.

Regional Board Region 8—Santa Ana

The Santa Ana Region is the smallest of the nine regions in the state (2,800 square miles) and is located in Southern California, roughly between Los Angeles and San Diego. Although the region is small, its four million residents (1993 estimate) make the Santa Ana Region one of the most densely populated regions. Scenic highways in the Santa Ana Region include SRs 38, 91, and 243.

Regional Board Region 9—San Diego

The San Diego Region forms the southwest corner of California and occupies approximately 3,900 square miles of surface area. The San Diego Region encompasses most of San Diego County, parts of southwestern Riverside County, and southwestern Orange County. The western boundary of the region consists of the Pacific Ocean coastline, which extends approximately 85 miles north from the United

States/Mexico border. The northern boundary of the San Diego Region is formed by the hydrologic divide that starts near Laguna Beach and extends inland through El Toro and easterly along the ridge of the Elsinore Mountains into the Cleveland National Forest. The eastern boundary of the region is formed by the Laguna Mountains and other lesser-known mountains located in the Cleveland National Forest. The region's southern boundary is formed by the United States/Mexico border. Scenic highways in the San Diego Region include SRs 52, 75, 78, 125, and 163.

Light and Glare

For the purposes of the analysis in this PEIR, *light* refers to unnatural nighttime lighting, which may intrude into sky darkness when added to an area that currently contains little or no artificial lighting (also known as "light pollution"). *Glare* refers to unnatural light or reflected natural light that can be annoying or distracting.

Lighting and glare levels tend to be much lower in undeveloped areas, particularly when these areas occur farther from developed areas. Urban areas contain varied light sources, such as streetlights and car headlights, and in more urbanized areas, skyglow may be present. (Skyglow is an areawide illumination of the night sky from human-made light sources.)

3.2.3 Regulatory Setting

This section discusses federal, state, and regional and local plans, policies, regulations, and laws, and ordinances pertaining to visual resources.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location.

Federal

Coastal Zone Management Act

The California Coastal Management Program, approved by the National Oceanic and Atmospheric Administration in 1978, is administered by three state agencies: the California Coastal Commission, the San Francisco Bay Conservation and Development Commission, and the California Coastal Conservancy. The California Coastal Commission manages development along the California coast except San Francisco Bay, where the San Francisco Bay Conservation and Development Commission oversees development. The California Coastal Conservancy purchases, protects, restores, and enhances coastal resources, and provides access to the shore.

Sierra Resource Management Plan

In 2008, the U.S. Bureau of Land Management approved the Sierra Resource Management Plan, which outlines a management strategy for 2,035 acres of the Cosumnes River Preserve. The plan, prepared to comply with the Federal Land Policy and Management Act, identifies goals, objectives, and management actions addressing 19 resource areas, including visual resources. The visual resources goal is to "protect and enhance the scenic qualities and visual integrity of the characteristic landscapes in the planning area." The plan designates the Cosumnes River Preserve as an Area of

Critical Environmental Concern, requiring special management to protect important natural or cultural resource values (BLM 2008).

U.S. Forest Service Scenery Management System

USFS's Scenery Management System provides a framework for the inventory, analysis, and management of scenery on National Forest lands. The Scenery Management System includes landscape character descriptions and scenic integrity objectives that can be used to help assess the compatibility of a proposed project with the surrounding landscape. The Scenery Management System is described in detail in USFS's 1996 handbook, *Landscape Aesthetics: A Handbook for Scenery Management*.

Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act of 1968, as amended (Public Law 90-542; U.S. Code Title 16, Sections 12371–1287), established the National Wild and Scenic Rivers System. The system identifies distinguished rivers of the nation that possess remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. The Wild and Scenic Rivers Act preserves the free-flowing condition of rivers that are designated and protects their local environments. Section 5(d)(1) of the act requires that all federal agencies, when planning for the use and development of water and related land resources, consider potential national wild, scenic, and recreational river areas, which are defined as follows (National Wild and Scenic Rivers System 2020):

- **"Wild" river areas**—Those rivers or sections of rivers that are free of impoundments and are generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
- **"Scenic" river areas**—Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
- **"Recreational" river areas**—Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past. Scenic qualities are a major consideration in the designation of rivers as wild (pristine), scenic (largely undeveloped), or recreational (mostly developed), although river segments in any of the three categories typically maintain high scenic qualities.

Lake Tahoe Regional Plan

The Tahoe Regional Planning Agency (TRPA) implements its authority to regulate growth and development in the Lake Tahoe Region through the Lake Tahoe Regional Plan, which was updated in 2012. The Lake Tahoe Regional Plan includes Resolution 82-11, the Environmental Threshold Carrying Capacities (threshold standards), Goals and Policies, Code of Ordinances, Area Plans, Community Plans, Plan Area Statements, the Scenic Quality Improvement Plan/Environmental Improvement Program, and other guidance documents. Chapter 36, "Design Standards," and Chapter 66, "Scenic Quality," of the TRPA Code contain standards

pertaining to scenic quality. These chapters establish a process for analyzing the impacts of a project on scenic quality and define the circumstances that require preparation of a scenic assessment and/or other documents.

Visual Resource Management

The Bureau of Land Management (BLM) is responsible for managing public land for multiple uses, including protection of scenic values within public lands through Visual Resource Management (VRM) in accordance with Section 102(a)(8) of the Federal Land Policy and Management Act of 1976 (FLPMA). Visual resource classes are assigned through the inventory processes and serve two purposes: (1) an inventory tool that portrays the relative value of the visual resources and (2) a management tool that portrays the visual management objects (BLM 2020).

The VRM has four classes (I, II, III, and IV). These classes are assigned through resource management plans (RMPs) and are ultimately based on the management decisions made in RMPs. These classes also include the level of visual change in the landscape character that would be allowed as a result of the proposed management activities and are described below:

- **VRM I Objective**: The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristics should be very low and must not attract attention.
- **VRM II Objective**: The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
- **VRM III Objective**: The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
- **VRM IV Objective:** The objective of this class is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristics landscape can be high. These management activities should be made to minimize the impacts of these activities through careful location, minimal disturbance, and repeating the basic elements.
- **Rehabilitation Areas:** Areas defined by VRM that are in need of rehabilitation from a visual standpoint and should be flagged during the inventory process. The level of rehabilitation will be determined through the RMP proves by assigning the VRM class approved for that particular area.

State

California State Scenic Highway Program

The California Department of Transportation manages the California Scenic Highway Program to preserve and protect scenic highway corridors from changes that would affect the aesthetic value of the land adjacent to the highways. Designation as a scenic highway is determined by views of the natural landscape, scenic quality, and the extent of visual intrusion. A city or county must nominate an eligible scenic highway for official designation and adopt a corridor protection program that includes zoning and planning policies to preserve its scenic quality. These policies are discussed below in the context of county and city general plans.

California Coastal Act

Section 30251 of the California Coastal Act sets forth the act's aesthetic requirements. Under Section 30251, the development process must consider and protect the scenic qualities of coastal areas. Permitted development must be located and designed to protect the scenic and visual qualities of coastal areas. This includes protecting views to and along the ocean and scenic coastal areas, matching the visual character of surrounding areas, and where feasible, restoring and enhancing visual quality in visually degraded areas.

Under the California Coastal Act, cities and counties within the Coastal Zone must develop local coastal plans, which, at a minimum, must be as protective as and otherwise consistent with the Coastal Act's standards. Portions of the treatable landscape lie within the Coastal Zone, and treatment activities in these areas may be subject to requirements of the California Coastal Act or local coastal plan.

Regional and Local

The study area encompasses multiple counties with multiple cities throughout California. Each county and city has local regulations and a general plan containing aesthetics goals and policies that promote preservation and enhancement of the area's visual character and areas of identified high scenic value: its natural features, view corridors, scenic routes, and/or prominent ridgelines considered "gateway" sections of scenic routes that may serve as entrances to a county or city.

3.2.4 Impacts and Mitigation Measures

Methods of Analysis

Aesthetic impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could impact existing visual resources. However, the precise locations and detailed characteristics of potential future individual restoration projects are yet to be determined. Therefore, this visual analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis. In

determining the extent and implications of potential visual changes, consideration has been given to the following:

- Potential changes in the visual composition, character, and specifically valued qualities of the affected environment
- The visual context of the affected environment
- The extent to which the affected environment contains places or features that have been designated in plans and policies for protection or special consideration
- The number of viewers, their activities, and the extent to which these activities are related to the aesthetic qualities affected by project changes
- Viewer sensitivity, which is based on the visibility of the landscape, proximity of viewers, frequency and duration of views, number and types of viewers, and viewers' expectations as influenced by their activity (e.g., driving, boating, hiking)

Permanent impacts are considered those that would continue through the life of a project as a result of the environmental conditions caused by restoration projects permitted under the Order (e.g., new infrastructure such as fish screens that would be visible and used indefinitely in a specific location). Temporary impacts are considered those that would be temporary in nature (e.g., construction-related activities).

The approach to assessing visual impacts was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of Restoration Projects in the Order*, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an impact related to visual resources is considered significant if the types of projects that would be permitted under the Order would do any of the following:

- Have a substantial adverse effect on a scenic vista
- Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway
- Substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from publicly accessible vantage point), or, if the project is in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area

Impacts and Mitigation Measures

Table 3.2-1 summarizes the impact conclusions presented in this section for easy reference.

Table 3.2-1
Summary of Impact Conclusions—Aesthetics

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.2-1: Implementing future restoration projects permitted under the Order could result in substantial degradation of visual qualities.	LTS	LTS
3.2-2: Implementing future restoration projects permitted under the Order could result in substantial adverse effects on scenic vistas and scenic resources.	LTS	LTS
3.2-3: Implementing future restoration projects permitted under the Order could result in new sources of substantial light or glare.	LTSM	LTS

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2020
NOTES: LTS = less than significant; LTSM = less than significant with mitigation

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Impact 3.2-1: Implementing future restoration projects permitted under the Order could result in substantial degradation of visual qualities.

Effects of Project Construction Activities

Restoration projects permitted under the Order (e.g., culverts, bridges, fish screens, ladders, or pilings; removal of dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; installation of cofferdams during construction) could include the following construction activities:

- Mobilization of equipment and materials
- Preparation of staging areas
- Installation of temporary construction offices

- Staging and storage of equipment and materials
- Vehicle parking
- Use of designated access and haul routes
- Clearing of vegetation and structures
- Preparation of borrow sites
- Site restoration and site demobilization
- Removal of excess materials

Projects could also require forming and pouring of concrete, pile driving, excavation, installation of fish bypass pipes or fish screens, dam removal using hand tools or jackhammers and explosives, chemical or manual removal of vegetation, plowing or disking, and wood loading activities. For example, stream crossing, culvert, and bridge projects generally involve removing, replacing, modifying, retrofitting, installing, or resetting the existing culverts, fords, bridges, and other stream crossings and water control structures. Constructing and installing such infrastructure may include excavating the site, forming and pouring a concrete foundation and walls/abutments, and installing the crossing structure.

Construction sites could be visible from nearby waterways, roads, cities, residences, and recreational areas where viewer sensitivity is elevated and visual quality is moderate to high. Views of construction sites and activities could temporarily and adversely affect the visual qualities and character of the surrounding landscape. In addition, the time to construct restoration projects could be as short as a few days, in the case of minor projects, to as long as several years for major projects (e.g., restoration projects requiring construction during certain months of the year).

Therefore, construction activities for restoration projects permitted under the Order could cause temporary changes in local visual conditions. Views could include excavation, grading, vegetation removal, construction equipment, parking vehicles, and temporary construction offices. These elements would be removed after construction; therefore, their presence would not cause permanent changes to local visual conditions. This impact would be **less than significant**.

Projects implementing applicable general protection measures (Appendix E) included in the Order would further reduce impacts to visual resources. The following general protection measures may apply to visual resources:

- GPM-11: Material Disposal
- GPM-14: Project Cleanup after Completion
- GPM-15: Revegetate Disturbed Areas
- VHDR-1: Avoidance of Vegetation Disturbance
- VHDR-3: Revegetation Materials and Methods
- VHDR-4: Revegetation Erosion Control Materials and Methods
- VHDR-5: Revegetation Monitoring and Reporting

Implementing these general protection measures would further reduce the less-than-significant impact of project construction on the visual qualities of the study area.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects permitted under the Order are expected to be beneficial; they would restore the natural character of disturbed sites and result in an increase in aquatic or riparian resource areas and habitat that would attract fish and wildlife. For example, projects to remove small dams, tide gates, flood gates, and legacy structures are designed to reconnect stream corridors, floodplains, and estuaries; establish wetlands; improve passage by aquatic organisms; and restore more natural channel and flow conditions. They also restore fisheries access to historic habitat for spawning and rearing, and improve the long-term quality of aquatic habitat and stream geomorphology. Removing legacy structures and returning these sites to natural habitat would improve visual quality.

Construction of restoration projects could permanently alter the existing visual landscape. New setback levees could slightly extend the existing levee footprint on the landside, which could increase the amount of riparian habitat on the waterside of the existing levee. This type of improvement would not typically result in a substantial long-term or permanent change to visual quality; it would modify the existing infrastructure only slightly and would not add new elements to the landscape.

Restoration projects associated with streambank alterations (e.g., streambank restoration, stabilizing bank with vegetation cover, change in bank structure, planting/ seeding of native plants and trees) could permanently alter the existing visual landscape by increasing the amount of riparian habitat in the surrounding area. These visual changes would be considered beneficial, as they would help increase the establishment of native vegetation communities within the project area. During construction, some restoration projects could temporarily alter the existing visual landscape due to soil exposure and immature vegetation during and after construction. However, it is anticipated that these changes would be temporary until revegetation has been successfully established.

However, some restoration projects could result in the placement of infrastructure such as storage tanks, ponds, culverts, fish screens, fencing, and pumps. Adding a project feature that prominently contrasts with the existing visual qualities and character of the surrounding landscape could cause a change in visual quality. These facilities may not be of the same visual character as surrounding landscapes. For example, an intake modified with a new fish screen in a river could change the structure, which could detract from the natural setting. However, a new structure (e.g., fish screen) may not be significant because the existing visual character of the project area could already be defined by human-made levees, a highly altered river system, and agricultural lands. Another example is a storage tank or ponds that would alter the visual character of the area by introducing man-made structures into areas that could be visible to nearby residential or recreationalists. The storage tanks or ponds may be screened by existing vegetation; however, in some locations these structures may still alter the visual character.

In conclusion, future restoration projects permitted under the Order could result in the permanent alteration of visual qualities. Many of the long-term effects of these projects on visual qualities are expected to be beneficial or neutral, because the projects would

involve habitat restoration that would return the existing sites to more natural characteristics. For example, removing legacy structures and returning these sites to natural habitat would improve visual quality in the study area. Restoration projects permitted under the Order could result in the placement of infrastructure such as storage tanks, ponds, culverts, fish screens, fencing, and pumps. However, while these structures may not be visible from great distances, these projects would likely have relatively localized effects, would cause substantial degradation of visual quality. Therefore, this impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

Projects implementing applicable general protection measures (Appendix E) included in the Order would further reduce impacts to visual resources. The following general protection measures may apply to visual resources:

- VHDR-5: Revegetation Monitoring and Reporting

Implementing this general protection measure would reduce the impacts to visual character from constructed restoration facilities, but not to a less-than-significant level. This impact would be **potentially significant**.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure AES-1 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure AES-1: Minimize Degradation of Visual Quality

- Use compatible colors for proposed structural features, such as fish screens and storage tanks. Use earth tone paints and stains with low levels of reflectivity.
- Minimize the vertical profile of proposed structures as much as possible.
- Use vegetation plantings on proposed facility walls, such as climbing plants, espaliers, and other forms that soften the appearance of structures.
- Provide vegetative screening to soften views of structures. Landscaping should complement the surrounding landscape.

Implementing the general protection measure and Mitigation Measure AES-1 would reduce this potentially significant impact to a **less-than-significant** level.

Impact 3.2-2: Implementing future restoration projects permitted under the Order could result in substantial adverse effects on scenic vistas and scenic resources.

Effects of Project Construction Activities

Construction activities for future restoration projects permitted under the Order could result in a temporary adverse effect on an existing scenic vista or scenic resource. Similar to Impact 3.2-1, construction activities such as excavation, grading, and removal of vegetation, as well as the presence of equipment, vehicle parking, and temporary construction offices could result in temporary changes to local visual conditions.

Construction sites could be visible from designated scenic roads and highways. Views from roads and highways are typically broad when seen from an elevated position (e.g., roads on a levee) and are expansive. The visibility of construction activities and associated equipment could temporarily and adversely affect scenic views from scenic vistas and designated scenic roads.

Construction activities for restoration projects permitted under the Order could be visible from designated scenic roads and highways, resulting in significant temporary and long-term or permanent adverse changes to scenic vistas. However, construction elements would be removed after construction; therefore, their presence would not cause permanent changes to local visual conditions. This impact would be **less than significant**.

Projects implementing applicable general protection measures (Appendix E) included in the Order would further reduce impacts to visual resources. The following general protection measures may apply to visual resources:

- GPM-11: Material Disposal
- GPM-14: Project Cleanup after Completion
- GPM-15: Revegetate Disturbed Areas
- VHDR-1: Avoidance of Vegetation Disturbance
- VHDR-3: Revegetation Materials and Methods
- VHDR-4: Revegetation Erosion Control Materials and Methods
- VHDR-5: Revegetation Monitoring and Reporting

Implementing these general protection measures would further reduce the less-than-significant impact of project construction on scenic resources.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects permitted under the Order would not dominate or obstruct views of scenic vistas from any of the designated scenic resources including highways, expressways, routes, or waterways. Restoration projects are expected to be beneficial to visual resources in that they would restore the natural character of disturbed sites and result in an increase in aquatic or riparian resource areas. Some restoration projects could result in the placement of infrastructure such as culverts, fish screens, fencing, ponds and storage tanks, and pumps. Adding a project feature that prominently contrasts with the existing visual qualities and character of the surrounding landscape could cause a substantial change in visual quality. However, for example, the appearance of a constructed setback levee may not be considered significant because it would be similar to the existing landscape and would be visible in the background from many vantage points.

Operations and maintenance (O&M) activities would introduce workers and vehicles into the study area but would be temporary and intermittent.

Many long-term effects on visual quality from restoration projects permitted under the Order are expected to be beneficial or neutral; the projects would involve habitat restoration, which would return the existing sites to more natural characteristics.

Restoration projects permitted under the Order would be visible from any of the designated scenic resources including highways, expressways, routes, or waterways. However, they would not result in substantial adverse effects on scenic vistas or scenic resources, given the relatively localized effects, and the visual qualities of the area would not be substantially degraded. Therefore, this impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Impact 3.2-3: Implementing future restoration projects permitted under the Order could result in new sources of substantial light or glare.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order could result in new sources of substantial light or glare. For example, glare could occur if reflective construction materials were positioned in highly visible locations where sunlight could be reflected. However, any glare would be highly transitory and short-term, given the movement of construction equipment and materials in the construction area, and the effect would likely be negligible. In addition, construction activities would typically not occur on surfaces that would be large enough and flat enough to generate substantial glare.

Construction activities could require the use of nighttime flood lighting if work were to extend into the nighttime hours. For example, if the construction schedule were approaching the flood season or a blackout time period for sensitive species, restoration projects may require continuous daytime and nighttime work. These temporary sources of light could be visible to residents, businesses, and other people in the vicinity. They would be particularly noticeable in rural areas with lower levels of light pollution from existing sources, such as street lights.

Construction activities or the use of construction lighting for restoration projects permitted under the Order could temporarily generate glare. Because these construction activities could result in a substantial adverse effect associated with night lighting and glare in the study area, this impact would be **potentially significant**.

Projects implementing applicable general protection measures (Appendix E) included in the Order would further reduce impacts to visual resources. The following general protection measures may apply to visual resources:

- GPM-3: Construction Hours

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure AES-2 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure AES-2: Avoid Effects of Project Lighting

Proposed lighting facilities shall use shields, and lighting shall be directed downward and inward toward the facilities.

Implementing the general protection measure and Mitigation Measure AES-2 would reduce this potentially significant impact to a **less-than-significant** level.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects permitted under the Order would not be expected to include new permanent lighting, or buildings or other facilities that would include highly reflective materials. Other ongoing O&M activities would temporarily introduce workers and vehicles to the study area; however, such activities would occur during daylight and would not introduce substantial new sources of light or glare to the area. For example, upslope watershed sites may be restored to reduce the delivery of sediment to streams, promote natural hydrologic processes, and restore habitat for birds, amphibians, fish, and other species. This project type also includes road- and trail-related restoration including decommissioning, upgrading, and storm-proofing of roads and trails. These types of projects do not include materials that would produce glare or nighttime lighting.

Restoration projects permitted under the Order would not be expected to include new permanent lighting, or buildings or other facilities that would include highly reflective materials. Some restoration projects could result in the integration of temporary bioengineered materials that blend in with the natural environment to help reinforce bank stability. For example, bioengineered bank stabilization projects that would be permitted under the Order could include the integration of living woody and herbaceous materials with earthwork and recontouring of streambanks with the placement of organic and inorganic materials (e.g., biodegradable fabric/logs) to increase the stabilization and structure of bank soil. These types of projects do not include materials that would produce glare or nighttime lighting. Routine O&M activities would introduce workers and vehicles into the study area, but nighttime lighting would not likely be required and no new sources of light and glare would be introduced to the study area. In addition, natural light reflected by constructed restoration projects (e.g., additional water present as a result of a setback levee or increase in floodplain area) is not expected to be annoying or distracting, because water features are considered aesthetically beneficial. This impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

3.3 Agriculture and Forestry Resources

3.3.1 Introduction

This section discusses agriculture and forestry resources in the study area and evaluates the potential impacts of the types of restoration projects that would be permitted under the Order. (See Section 2.6, *Categories of Restoration Projects in the Order*.)

The environmental setting and evaluation of impacts on agriculture and forestry resources is based on a review of existing published documents, including city and county general plans and land management plans, and information regarding example projects that are similar to those permitted under the Order. Data for the regional and local setting were compiled from publicly available sources published by state agencies, such as the California Department of Conservation and California Department of Forestry and Fire Protection. Additional information sources are listed in Chapter 8, *References*.

This section evaluates actions that could occupy, encroach onto, convert, or damage resources of farmlands, forestlands, or timber production zones. Impacts involving conversion of riparian and oak forest habitats are addressed in Section 3.5, *Biological Resources—Terrestrial*.

No comments specifically addressing agriculture and forestry resources were received in response to the notice of preparation (NOP). See Appendix B for NOP comment letters.

3.3.2 Environmental Setting

Definitions

Agricultural Land

The State of California established the Farmland Mapping and Monitoring Program (FMMP) in 1982 to continue the Important Farmland mapping efforts begun in 1975 by the U.S. Natural Resources Conservation Service (NRCS). The intent of NRCS (then named the Soil Conservation Service) was to produce maps of agricultural resources based on soil quality and land use across the nation. The California Department of Conservation sponsors the FMMP and is responsible for establishing agricultural easements in accordance with California Public Resources Code (PRC) Sections 10250–10255.

As part of the nationwide effort to map agricultural land uses, NRCS uses a series of definitions known as the Land Inventory and Monitoring criteria. These criteria classify the land's suitability for agricultural production. Suitability is determined based on the physical and chemical characteristics of soils, as well as the actual land use. Maps of Important Farmland are derived from the NRCS soil survey maps using the Land Inventory and Monitoring criteria and are available by county. The maps prepared by NRCS classify land into water and seven other categories:

- **Prime Farmland**—Land that has the best combination of features for producing agricultural crops. Prime Farmland must have been used for production of irrigated crops at some time during the 4 years before the FMMP's mapping date.

- **Farmland of Statewide Importance**—Land, other than Prime Farmland, with a good combination of physical and chemical characteristics for producing crops. Farmland of Statewide Importance must have been used for production of irrigated crops at some time during the 4 years before the mapping date.
- **Unique Farmland**—Land that has been used to produce specific crops with high economic value but does not meet the criteria for Prime Farmland or Farmland of Statewide Importance. This land is usually irrigated, but it may include non-irrigated orchards or vineyards found in some climatic zones. Unique Farmland must have been used for crops at some time during the 4 years before the mapping date.
- **Farmland of Local Importance**—Land other than Prime Farmland, Farmland of Statewide Importance, and Unique Farmland that either is currently producing crops, has the capability to produce crops, or is used to produce confined livestock. This land includes farmland of potential local importance.
- **Grazing Land**—Land on which existing vegetation, whether grown naturally or through management, is suitable for grazing or browsing by livestock.
- **Other Land**—Land that is not included in any of the other mapping categories. This land generally includes land in rural residential development; land not suitable for livestock grazing; government land; rights-of-way outside of urban and built-up areas; facilities for confined livestock or aquaculture; mines, borrow pits, or gravel pits; water bodies smaller than 40 acres; or other rural land uses not suitable for agricultural operations.
- **Urban and Built-Up Land**—Land occupied by structures with a density of at least one dwelling unit per 1.5 acres, or approximately six structures to a 10-acre parcel. This land is used for residential, industrial, commercial, institutional, public utility structures, and other developed purposes.

Prime Farmland, Farmland of Statewide Importance, and Unique Farmland are collectively called “Special Designated Farmland” in this section.

Forestry Resources

The discussion of forestry resources uses the following terms:

- **Forestland**—Land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits (PRC Section 12220[g]).
- **Timberland**—Land, other than land owned by the federal government and land designated as experimental forestland, which is available for, and capable of, growing a crop of trees of any commercial species used to produce lumber and other forest products, including Christmas trees (PRC Section 4526). The criterion used to determine whether forestland qualifies as timberland is whether

the land is capable of growing 20 cubic feet or more of industrial wood per acre per year (CAL FIRE 2010).

Study Area

According to the California Department of Conservation (DOC 2018), the patterns of land cover in the study area include agriculture, developed areas, natural habitat or open space, and water. Table 3.3-1 shows the Important Farmland in the study area.

Table 3.3-1
Important Farmland in California, 2016 (Study Area)

Category		Acres	Percent
Farmland (under CEQA)	Prime Farmland	5,031,474	10
	Farmland of Statewide Importance	2,544,481	5
	Unique Farmland	1,404,240	3
	Subtotal	*8,980,195*	*18*
Other Agricultural Land	Farmland of Local Importance	3,215,425	7
	Grazing Land	19,155,570	39
	Subtotal	*22,370,995*	*46*
Other Land and Water	Urban and Built-Up Land	3,738,337	8
	Other Land[1]	13,267,942	27
	Water	715,266	1
	Subtotal	*17,721,545*	*36*
	Total[2,3]	**49,072,735**	**100**

SOURCE: DOC 2018

NOTES: CEQA = California Environmental Quality Act

[1] Other Land in this table consists of the Other Land, Rural Residential, Vacant, or Disturbed Land.

[2] Totals may vary from actual acreage in the study area due to rounding.

[3] The total acreage includes all Important Farmland in the study area; however, only a subset of the study area would include riparian and/or aquatic areas where restoration projects that would be permitted under the Order would occur. For example, restoration projects permitted under the Order would not occur in upland areas.

Agriculture

Agricultural Land Uses

Farmland Categories and Acreage

The FMMP, administered by the California Department of Conservation Division of Land Resource Protection, provides a consistent data source for analyzing the distribution of farmland and long-term urbanization trends based on soil type and the availability of

water. Unlike the maps of existing land cover included in Section 3.12, *Land Use and Planning*, FMMP data do not illustrate areas of active agriculture, but can be used to analyze the potential for agricultural production. Table 3.3-1 presents the acreages of farmland in the study area by FMMP category.

Approximately 25 percent of the study area is made up of land that contains physical and chemical characteristics favorable for agriculture, or that meets other criteria for Farmland of Local Importance as determined by the county (i.e., all Farmland categories as defined under CEQA, as well as Farmland of Local Importance). In particular, the Central Valley is a contiguous stretch of farmland in the core of the state. In 2017, the value of agricultural production in the 19 Central Valley counties represented approximately 70 percent of the total gross value of California's agricultural production (CDFA n.d.:21). Seven of the top eight agriculture-producing counties in California (Tulare, Kern, Fresno, Merced, Stanislaus, San Joaquin, and Kings Counties) are located in the Central Valley. Outside of the Central Valley, land is mostly urban and built-up land, grazing land, non-timber, agricultural land, and federally managed lands (e.g., Bureau of Land Management, the National Park Service, and the Forest Service), with large areas of locally significant agricultural land interspersed. The state of California has approximately 100 million acres of which 45 million are administered as federal land (CRS 2020). Forest land covers 33 million acres of the state with 19 million of those acres being federally owned (USDA 2016). While significant portions of federal lands are given over to rangeland and timber production, the relative actual area given over to urban lands is much smaller than the area of the non-urban lands.

According to the DOC *2010–2012 California Farmland Conversion Report*, irrigated farmland in California decreased by approximately 58,587 acres between 2010 and 2012 with loss of Prime Farmland comprising 81 percent of the total loss (DOC 2015). Conversion to urban development was approximately 29,342 acres of the total reduction in irrigated farmland acreage, with natural vegetation or vacant lands accounting for the majority of the total reduction during this period. Losses of irrigated farmland have resulted in part from drought and salinity-related reductions in water supply and from reclassification of lands. In addition, the Public Policy Institute of California estimated that 500,000–780,000 acres would have to be fallowed for the state's natural aquifers to come back into balance in response to the Sustainable Groundwater Management Act (PPIC 2019a, 2019b).

Williamson Act

As of 2016, about 14.8 million acres of farmland in counties in the study area were enrolled in the Williamson Act program (DOC 2016). Approximately 866,355 additional acres of farmland were designated as Farmland Security Zone lands.

Agricultural Production

Agricultural land uses in the study area include farmlands that support a variety of crops. Based on the total value of production, some of the top crops and agricultural use in the study area are almonds, grapes, pistachios, berries, lettuce, hay, tomatoes, rice, pears, and various vegetables (CDFA n.d.). Livestock products produced in the study

area include milk and cream, and cattle and calves. Significant acreage is also given over to forage production (e.g., hay and alfalfa) for livestock.

Forest Resources

Forestland and Timber Resources

Almost one-third of California is forested. The total land area in the study area is about 100 million acres, of which 33 million are forested acres (USDA 2016).

Timber Production

Of the 33 million forested acres in the study area, almost 17 million acres can be considered timberland (USDA 2016).

3.3.3 Regulatory Setting

This section discusses federal, state, and regional and local plans, policies, regulations, and laws, and ordinances pertaining to agricultural and forestry resources.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location.

Federal

Farmland Protection Policy Act

NRCS is the agency primarily responsible for implementing the federal Farmland Protection Policy Act (FPPA). The purpose of the FPPA is to minimize federal contributions to the conversion of farmland to nonagricultural uses by ensuring that federal programs are administered in a manner compatible with state, local, and private programs to protect farmland.

NRCS administers the FPPA through a voluntary program that provides funds to help purchase development rights to keep productive farmland in agricultural use. The program provides matching funds to state, local, or tribal government entities and nongovernmental organizations with existing farmland protection programs to purchase conservation easements. Participating landowners agree not to convert the land to nonagricultural uses and retain all rights to the property for future agriculture.
A minimum 30-year term is required for conservation easements, and priority is given to applications with perpetual easements (NRCS 2017a).

The FPPA established the Farmland Protection Program and the Land Evaluation and Site Assessment system. The system is a tool used to rank lands for suitability and inclusion in the Farmland Protection Program. The land evaluation involves rating soils and placing them into groups ranging from the best to the least suited for a specific agricultural use, such as for cropland, forestland, or rangeland. The site assessment involves three major areas: non-soil factors related to agricultural use of a site, factors related to development pressures, and other public values of a site. Each factor selected is assigned a range of possible values according to local needs and objectives (NRCS 2017b).

Central Valley Project Improvement Act

The Central Valley Project Improvement Act (CVPIA) is discussed in Section 3.11.3, *Regulatory Setting*, in Section 3.11, *Hydrology and Water Quality*. The U.S. Bureau of Reclamation and U.S. Fish and Wildlife Service, in coordination with the State of California, participating CALFED Bay-Delta Program agencies, and other partners, have implemented numerous programs, projects, and actions to meet the goals of the CVPIA, many of which have affected land use and agriculture throughout the Central Valley, especially in the Sacramento–San Joaquin Delta watershed.

To achieve the CVPIA's purposes and the identified goals and objectives, numerous provisions for agriculture were incorporated into the statute. Specific programs, measures, and operational and management directives address water, habitat, and land management. Among these are directives for the retirement of drainage-impaired farmlands through the Land Retirement Program and implementation of an "Agricultural Waterfowl Incentives Program." The goal of the Land Retirement Program is to retire 15,000 acres of agricultural lands (Reclamation and USFWS 2014:ES-9). As of 2013, the program had acquired more than 9,300 acres of farmland in the Sacramento–San Joaquin Delta and completed restoration on more than 6,800 acres (Reclamation and USFWS 2014:73). In the Agricultural Waterfowl Incentives Program, farmers are paid to keep private agricultural fields flooded during the winter months when doing so would increase the amount of habitat and the availability of food for waterfowl.

Z'berg-Nejedly Forest Practice Act of 1973

Logging on private and corporate nonfederal land in California is regulated by the 1973 Z'berg-Nejedly Forest Practice Act. This law established the Forest Practice Rules and a politically appointed Board of Forestry to oversee their implementation. The California Department of Forestry and Fire Protection (CAL FIRE) works under the direction of the Board of Forestry and is the lead government agency responsible for approving logging plans and enforcing the Forest Practice Rules.

To log on private or corporate land, a Registered Professional Forester must prepare a Timber Harvest Plan (TMP), which outlines the proposed logging operations and submit this to the state. CAL FIRE considers recommendations from reviewing agencies such as CDFW and the Water Boards, and conducts final review and approval of all timber harvest plans. The Forest Practice Rules describe timber harvest plans as having two functions: to provide information for the CAL FIRE director to determine whether the proposed logging conforms to the rules; and to provide direction to logging operators who carry out the timber harvest plan. These documents are certified as the "functional equivalent" of an EIR to comply with CEQA. THPs are required to evaluate all potential direct and cumulative impacts of the logging plan and to implement any feasible measures that would reduce this impact to a less-than-significant level.

CALFIRE also plays a significant statewide role in regulating and assisting with fuels hazard reduction, as well as firefighting activities.

Regional and Local

The study area encompasses all counties and cities throughout California. Each county and city has local regulations, ordinances, and a general plan containing unique goals and policies intended to preserve agriculture and forestry resources, guide development of lands within its local jurisdiction, and reduce environmental impacts. Cities and counties in the study area that include agricultural and timber lands provide regulations, goals, and/or policies that promote the preservation and protection of areas of identified high agricultural or timberland value. For example, special protection is provided for prime and important farmlands, lands under Williamson Act contract, and lands zoned for timber production.

3.3.4 Impacts and Mitigation Measures

Methods of Analysis

Agriculture and forestry impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could cause conversion of Special Designation Farmland and forestland and other related impacts. However, the precise locations and detailed characteristics of potential future permitted restoration projects are yet to be determined. Therefore, this impact analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis.

Permanent impacts are considered those that would result from environmental conditions created indefinitely in one location as a result of the restoration projects permitted under the Order (e.g., individual restoration projects that may result in the removal of agricultural land from a facility's footprint). Temporary impacts are considered those that would be temporary in nature (e.g., construction-related activities).

The approach to assessing agriculture and forestry impacts was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of Restoration Projects in the Order*, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an impact related to agriculture and forestry is considered significant if the types of projects that would be permitted under the Order would do any of the following:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (referred to in this section as "Special Designation Farmland"), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use
- Conflict with existing zoning for agricultural use, or a Williamson Act contract
- Conflict with existing zoning for, or cause rezoning of, forestland (as defined in PRC Section 12220[g]), timberland (as defined by PRC Section 4526), or

timberland zoned Timberland Production (as defined by Government Code Section 51104[g])

- Result in the loss of forestland or conversion of forestland to non-forest use
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Special Designation Farmland, to non-agricultural use or conversion of forestland to non-forest use

Impacts and Mitigation Measures

Table 3.3-2 summarizes the impact conclusions presented in this section for easy reference.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Table 3.3-2
Summary of Impact Conclusions—Agriculture and Forestry Resources

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.3-1: Restoration projects permitted under the Order could convert Special Designation Farmland to nonagricultural use or conflict with a Williamson Act contract or zoning for agricultural use.	LTS	SU
3.3-2: Restoration projects permitted under the Order could conflict with existing zoning for forestland, timberland, or timberland zoned Timberland Production, or could result in the loss of forestland from conversion of land to non-forest use.	LTS	LTS
3.3-3: Restoration projects permitted under the Order could involve other changes in the existing environment that, because of their location or nature, could indirectly result in the conversion of Special Designation Farmland to nonagricultural use or conversion of forestland to non-forest use.	LTSG	LTSG

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2020

NOTE: LTS = less than significant; LTSG = less than significant with general protection measures; SU = significant and unavoidable

Impact 3.3-1: Restoration projects permitted under the Order could convert Special Designation Farmland to nonagricultural use or conflict with a Williamson Act contract or zoning for agricultural use.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order (e.g., culverts, bridges, fish screens, ladders, or pilings; removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; installation of cofferdams during construction) could occur on Special Designation Farmland or lands zoned for agricultural use, or lands under a Williamson Act contract. Approximately 18 percent of the study area is Prime Farmland, Farmland of Statewide Importance, or Unique Farmland (collectively called “Farmland” in State CEQA Guidelines Appendix G, and referred to here in this section as “Special Designation Farmland”) (see Table 3.3-1).

Project construction work could require grading and excavation; use of staging areas, access routes, and haul routes; site preparation; preparation of borrow sites; site restoration and demobilization; stockpiling of construction materials; and disposal of excess materials. These activities could result in temporary conversion of Special Designation Farmland or a conflict with agricultural zoning or Williamson Act contracts if they would occur on such lands. For example, restoring and enhancing off-channel/side-channel habitat would involve reconnecting and creating side-channel, alcove, oxbow, pond, off-channel, floodplain, and other habitats, and potentially removing off-channel fill and plugs. Work may include removing or breaching levees, berms, and dikes; excavating channels; constructing wood or rock tailwater control structures; and constructing large wood habitat features. Excess earthen materials, such as organic soils, vegetation, and excavated material, may be temporarily stockpiled before being re-spread at the project site or used to reclaim borrow sites. Stockpiling on agricultural lands may result in the temporary conversion of Special Designation Farmland or a conflict with agricultural zoning or Williamson Act contracts.

In addition, the time to construct restoration projects could be as short as a few days, in the case of minor projects, to as long as several years for major projects (e.g., for projects that can be constructed only during certain months of the year). Therefore, construction of these projects could affect Special Designation Farmland, lands under Williamson Act contract, or zoning for agricultural use.

Construction of some types of restoration projects permitted under the Order is not anticipated to affect Special Designation Farmland, agricultural zoning, or land under Williamson Act contracts. For example, some projects—stream crossing and fish passage improvements; removal of small dams, tide gates, flood gates, and legacy structures; bioengineered bank stabilization; and removal of pilings and other in-water

structures—would occur in existing water channels and may not extend to agricultural lands. Therefore, these actions would not likely result in the conversion of Special Designation Farmland or a conflict with agricultural zoning or Williamson Act contracts. Additionally, some projects—including establishing, restoring, and enhancing stream and riparian habitats—would reduce soil erosion from associated activities such as bank stabilization and erosion control work. In some cases, they would also help to recharge groundwater, provide buffers to protect water quality, and create opportunities for natural pest control. Therefore, these actions would be beneficial for existing Special Designation Farmland, agricultural zoning areas, or land under Williamson Act contracts.

Some construction work may take place outside of existing water channels. For example, some projects would establish temporary work areas and staging and equipment storage areas off-stream. However, temporary conversion of Special Designation Farmland and conflicts with agricultural zoning or Williamson Act contracts would not be substantial, because construction would be temporary and would likely not extend very far beyond the margins of agricultural land. In addition, as described under *Site Restoration and Demobilization* in Chapter 2, Section 2.7.1, *Construction Activities and Methods*, topsoil removed from temporarily disturbed areas would be replaced after construction is complete. In addition, noncommercial borrow sites would be restored or reclaimed by replacing topsoil that has been set aside and regraded to allow continued uses such as farming, or may be converted to other uses such as other restoration sites.

Construction for restoration projects permitted under the Order could temporarily convert Special Designation Farmland to nonagricultural use, or could conflict with a Williamson Act contract or zoning for agricultural use. However, these conversions would be temporary, and the land is expected to be returned to agricultural use after construction. Therefore, this impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects permitted under the Order could result in new long-term or permanent features that could result in permanent conversion of Special Designation Farmland to nonagricultural use or conflicts with agricultural zoning or Williamson Act contracts. For example:

- Some types of projects—restoration of off-channel/side-channel habitat, floodplain restoration, and establishment, restoration, and enhancement of tidal, subtidal, and freshwater wetlands—could result in long-term or permanent changes to land use that would convert Special Designation Farmland to nonagricultural uses, conflict with agricultural zoning, or conflict with Williamson Act contracts.
- Water conservation projects that would include off-stream storage tanks and ponds could result in long-term or permanent conversion of Special Designation Farmland to nonagricultural use or conflicts with agricultural zoning or Williamson Act contracts. For these projects, agricultural land within the alignment of a proposed storage tank or pond and associated off-channel infrastructure would

have to be removed. Alternatively, off-stream storage tanks may provide more reliable water for agricultural uses.

- Restoration projects that would construct surface impoundments could affect adjacent agricultural resources (e.g., by seepage of nuisance water onto adjacent lands affecting the root zone of crops; see Section 3.9, *Geology and Soils*) and could result in long-term or permanent changes to land use that would convert Special Designation Farmland to nonagricultural uses, conflict with agricultural zoning, or conflict with Williamson Act contracts.

Long-term effects on groundwater recharge from some of the restoration projects permitted under the Order are expected to be neutral or beneficial, as restoration projects may improve hydrology and connectivity to the water table. Projects such as fish screens, fishways, and bioengineered bank stabilization would have minimal operational impacts because they would be located along streambanks or riverbanks, or in the river itself, and would not affect agricultural land. Additionally, some projects—including bank stabilization, restoration and enhancement of off-channel and side-channel habitat, floodplain restoration, water conservation, and removal of nonnative terrestrial and aquatic invasive species and revegetating with native plants—would reduce soil erosion, recharge groundwater, use off-stream water storage during the dry season, provide natural pest control, and provide water quality buffers. Therefore, these actions would be beneficial for existing Special Designation Farmland, agricultural zoning areas, or land under Williamson Act contracts.

Restoration projects permitted under the Order could result in short-term, long-term, or permanent conversion of Special Designation Farmland to nonagricultural uses; conflicts with agricultural zoning; and conflicts with Williamson Act contracts. Therefore, this impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of an NOA for a restoration project under the Order, compliance with Mitigation Measure AG-1 and AG-2 and Mitigation Measure GEO-6 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure AG-1: Minimize and Avoid Loss of Special Designation Farmland

The following measures shall be implemented before and during construction of restoration projects permitted under the Order to minimize and avoid loss of Special Designation Farmland, as applicable.

- Restoration projects shall be designed to minimize, to the greatest extent feasible, the loss of agricultural land with the highest values.

- Restoration projects that will result in permanent conversion of Special Designated Farmland shall preserve other Special Designation Farmland in perpetuity by acquiring an agricultural conservation easement, or by contributing

funds to a land trust or other entity qualified to preserve Special Designation Farmland in perpetuity (at a target ratio of 1:1, depending on the nature of the conversion and the characteristics of the Special Designated Farmland to be converted, to compensate for the permanent loss).

Based upon the cost and availability of farmland, whether the landowner is sponsoring the project, recent (within 5 years) and ongoing farmland viability, and other factors, the CEQA lead agency for the individual restoration project should consider whether a 1:1 ratio is appropriate and feasible on a case-by-case basis. For example, contributions to a program such as the California Farmland Conservancy Program, which establishes conservation easements to preserve existing farmland in California, may be prohibitively expensive at a 1:1 ratio where there is a significant amount of affected Special Designated Farmland because it is based on a farm real estate average value per acre. For example, the farm real estate average value per acre in 2019 was $10,000 [USDA 2019].

- Restoration project features shall be designed to minimize fragmentation or isolation of Special Designation Farmland. Where a project involves acquiring land or easements, the remaining nonproject area shall be of a size sufficient to allow viable farming operations. The project proponents shall be responsible for acquiring easements, making lot line adjustments, and merging affected land parcels into units suitable for continued commercial agricultural management.
- Any utility or infrastructure serving agricultural uses shall be reconnected if it is disturbed by project construction. If a project temporarily or permanently cuts off roadway access or removes utility lines, irrigation features, or other infrastructure, the project proponents shall be responsible for restoring access as necessary to ensure that economically viable farming operations are not interrupted.
- Where applicable to a project site, buffer areas shall be established between restoration projects and adjacent agricultural land. The buffers shall be sufficient to protect and maintain land capability and flexibility in agricultural operations. Buffers shall be designed to protect the feasibility of ongoing agricultural operations and reduce the effects of construction-related or operational activities (including the potential to introduce special-status species in the agricultural areas) on adjacent or nearby properties. Buffers shall also serve to protect restoration areas from noise, dust, and the application of agricultural chemicals. The width of each buffer shall be determined on a project-by-project basis to account for variations in prevailing winds, crop types, agricultural practices, ecological restoration, or infrastructure. Buffers can function as drainage swales, trails, roads, linear parkways, or other uses compatible with ongoing agricultural operations.

Mitigation Measure AG-2: Minimize Impacts on Lands Protected by Agricultural Zoning or Williamson Act Contract

Restoration projects shall be designed to minimize, to the greatest extent feasible, conflicts and inconsistencies with land protected by agricultural zoning or a Williamson Act contract and the terms of the applicable zoning/contract.

Mitigation Measure GEO-6: Implement Measures for Waterway Construction Activities

See Section 3.9.4, *Impacts and Mitigation Measures*, in Section 3.9, *Geology and Soils.*

Mitigation Measures AG-1, AG-2, and GEO-6 would be implemented to reduce the impacts of restoration projects under the Order. However, because the extent and location of such actions are not known at this time, it is not possible to conclude that the mitigation measure or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. Therefore, this impact would be **significant and unavoidable**.

Impact 3.3-2: Restoration projects permitted under the Order could conflict with existing zoning for forestland, timberland, or timberland zoned Timberland Production, or could result in the loss of forestland from conversion of land to non-forest use.

Effects of Project Construction Activities

Approximately 33 percent (33 million acres) of the study area is forested. Construction activities for restoration projects permitted under the Order could occur on forestland or land zoned for forestland, timberland, or timberland zoned Timberland Production. Project construction work could require grading and excavation; the use of staging areas, access routes, and haul routes; site preparation; preparation of borrow sites; site restoration and demobilization; stockpiling of construction materials; and disposal of excess materials. These construction activities could result in temporary conversion of forestland or land zoned for forestland, timberland, or timberland zoned Timberland Production if they would occur on such lands. For example, water conservation projects could include off-stream storage tanks and ponds and associated off-channel infrastructure, requiring site preparation. Preparing a project site typically involves clearing the ground of structures, woody and herbaceous vegetation, and debris using heavy equipment such as backhoes, excavators, dozers, mowers, and dump trucks. Site preparation on forestland or timberland may result in the conversion of forestland or timberland. Some construction activities could also be located on grazing lands that could result in the potential loss of rangeland available for livestock. However, restoration projects can generally allow for managed grazing. Meadow restoration may involve reconnecting down-cut channels to their floodplains to restore hydrologic processes to restore hydrologic processes and meadow health; filling incised, entrenched channels; creating new stream channels; regrading floodplains; or realigning channels or installing stabilization structures. Meadow restoration may result in the conversion of timberland.

In addition, the time to construct restoration projects could be as short as a few days, in the case of minor projects, to as long as several years for major projects (e.g., projects that can be constructed only during certain months of the year). Therefore, these projects could result in temporary conversion of forestland or timberland that would persist throughout the construction period.

Construction of some types of restoration projects permitted under the Order would not affect forestland or timberland. For example, some projects—stream crossing and fish passage improvements; removal of small dams, tide gates, flood gates, and legacy structures; bioengineered bank stabilization; and removal of pilings and other in-water structures—would occur in existing water channels and would not extend to forestland or timberland. Therefore, these actions would not likely conflict with existing zoning for forestland or land zoned for forestland, timberland, or timberland zoned Timberland Production. Additionally, some projects—including establishing, restoring, and enhancing stream and riparian habitats—would reduce soil erosion from associated activities such as bank stabilization and erosion control work. Therefore, these actions would be beneficial for existing zoning for forestland, timberland, or timberland zoned Timberland Production.

Construction for restoration projects permitted under the Order could temporarily convert forestland or land zoned for forestland, timberland, or timberland zoned Timberland Production. However, these conversions would be temporary, and the land is expected to be returned to forestland and/or timberland use after construction. Therefore, this impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Some types of restoration projects permitted under the Order would have beneficial impacts on forestland or land zoned for forestland, timberland, and timberland zoned timberland production (e.g., enhancement of meadow production/meadow restoration). Other restoration projects—fish screens, fishways, and bioengineered bank stabilization—would have minimal operational impacts because they would be located along streambanks or riverbanks, or in the river and would not be expected to affect forestland or timberland. Additionally, some projects—including bank stabilization, restoration and enhancement of off-channel and side-channel habitat, floodplain restoration, water conservation, and removal of nonnative terrestrial and aquatic invasive species and revegetating with native plants—would reduce soil erosion, recharge groundwater, use off-stream water storage for dry season use, provide natural pest control, and provide water quality buffers. Therefore, these actions would be beneficial for existing zoning for forestland, timberland, or timberland zoned Timberland Production. Water conservation projects (e.g., off-stream storage tanks and ponds) could be located in forestland or land zoned for forestland, timberland, or timberland zoned Timberland Production. However, water conservation projects would not be expected to remove forestland creating less than 10 percent native tree cover or substantially lessen the ability to grow crops associated with Timberlands. Some restoration sites could also be located on grazing lands that would result in the potential loss of rangeland available for livestock. However, restoration projects can generally allow for managed grazing. Therefore, this impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Impact 3.3-3: Restoration projects permitted under the Order could involve other changes in the existing environment that, because of their location or nature, could indirectly result in the conversion of Special Designation Farmland to nonagricultural use or conversion of forestland to non-forest use.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order could negatively affect the viability of surrounding agricultural or forest uses, impede access to agricultural areas, or disrupt agricultural infrastructure. For example, restoration and enhancement of off-channel/side-channel habitat would involve reconnecting and creating side-channel, alcove, oxbow, pond, off-channel, floodplain, and other habitats, and potentially removing off-channel fill and plugs. Work may include removing or breaching levees, berms, and dikes; excavating channels; constructing wood or rock tailwater control structures; and constructing large wood habitat features. Excess earthen materials, such as organic soils, vegetation, and excavated material, may be temporarily stockpiled before being re-spread at the project site or used to reclaim borrow sites. Stockpiling on agricultural lands may result in the temporary conversion of Special Designation Farmland to nonagricultural use or conversion of forestland to non-forest use.

Project construction could temporarily restrict access to Special Designation Farmland or forestland. For example, storing construction materials could block access points. Other short-term disturbances of agricultural lands could also occur during construction. Irrigation systems could be disrupted and soil compaction could affect drainage, indirectly reducing or removing the ability of an area of Special Designation Farmland to provide the agricultural use or level of productivity that lead to the designation. Ground disturbance, vegetation removal, and operation of construction equipment near Special Designation Farmland or forestlands adjacent to waterways, levees, or floodways could generate dust that may affect crop growth or promote the spread of invasive species to new areas. (See Section 3.4, *Air Quality and Greenhouse Gas Emissions,* and Section 3.5, *Biological Resources—Terrestrial.*).

Some projects—including establishing, restoring, and enhancing stream and riparian habitats—would reduce soil erosion from associated activities such as bank stabilization and erosion control work. Therefore, these actions would be beneficial for existing Special Designation Farmland or forestland.

Construction activities for restoration projects permitted under the Order have the potential to negatively affect the viability of surrounding agricultural or forest uses, impede access to agricultural areas, or disrupt agricultural infrastructure. This impact would be **potentially significant**.

Projects implementing applicable general protection measures (see Appendix E) included in the Order would further reduce impacts to agricultural and forestry resources. The following general protection measures may apply to agricultural and forestry resources:

- GPM-8: Prevent Spread of Invasive Exotic Plants
- GPM-10: Equipment Maintenance and Materials Storage

- GPM-11: Material Disposal
- GPM-12: Fugitive Dust Reduction
- GPM-15: Revegetate Disturbed Areas
- IWW-14: Dredging Operations and Dredging Materials Reuse Plan
- VHDR-1: Avoidance of Vegetation Disturbance
- VHDR-2: Native and Invasive Vegetation Removal Materials and Methods
- VHDR-3: Revegetation Materials and Methods
- VHDR-4: Revegetation Erosion Control Materials and Methods
- VHDR-5: Revegetation Monitoring and Reporting
- VHDR-6: Herbicide Use

Implementing these general protection measures would reduce the impacts of project construction related to indirect conversion of Special Designation Farmland to nonagricultural use or conversion of forestland to non-forest use to a **less-than-significant** level.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Operations and maintenance (O&M) activities would be limited to the footprint created during construction of restoration projects permitted by the Order. This work would be unlikely to result in indirect conversion of forestland to non-forest use, or of Special Designation Farmland to nonagricultural use. For example, periodic maintenance could include monitoring, vegetation or debris removal, and exclusion fencing adjustments that would occur within the project footprint, and would likely not be of sufficient scale or duration to indirectly convert Special Designation Farmland or forestland. Additionally, some projects—including bank stabilization, restoration and enhancement of off-channel and side-channel habitat, floodplain restoration, water conservation, and removal nonnative terrestrial and aquatic invasive species and revegetating with native plants—would reduce soil erosion, recharge groundwater, use off-stream water storage during the dry season, provide natural pest control, and provide water quality buffers. Therefore, these actions would be beneficial for existing Special Designation Farmland or forestland. Therefore, this impact would be **less than significant**. The general protection measures listed for this impact above under *Effects of Project Construction* would be followed to further reduce the less-than-significant impacts associated with O&M activities.

3.4 Air Quality and Greenhouse Gas Emissions

3.4.1 Introduction

This section describes air quality conditions and greenhouse gas (GHG) emissions in the study area and the potential impacts of the types of restoration projects that would be permitted under the Order. (See Section 2.6, *Categories of Restoration Projects in the Order*.) The environmental setting and evaluation of impacts related to air quality and GHG emissions are based on a review of existing published documents, including air quality plans and climate action plans; information on example projects similar to those permitted under the Order that may be implemented by other agencies; and other information sources listed in Chapter 8, *References*. Restoration projects that would be permitted under the Order that could impair air quality are evaluated in this section. No comments on air quality and GHG emissions were received in response to the notice of preparation (NOP). See Appendix B for the NOP comment letters.

3.4.2 Environmental Setting

In California, regional or local air districts have been established to administer air pollution laws and regulations that protect air quality within designated air basins. Table 3.4-1 lists the air basins in the study area.

Air Quality

Background

Criteria Air Pollutants

As required by the federal Clean Air Act (CAA), which was enacted in 1970, the U.S. Environmental Protection Agency (EPA) has identified six criteria air pollutants (CAPs) for which state and national health-based ambient air quality standards have been established. EPA calls these pollutants “criteria air pollutants” because the agency has regulated them by developing specific public health– and welfare-based criteria as the basis for setting permissible levels. Ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable and fine particulate matter (PM_{10} and $PM_{2.5}$), and lead are the six CAPs.

Ozone

Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) (referred to by some regulating agencies as volatile organic compounds), and oxides of nitrogen (NO_X). The main sources of ROG and NO_X, often referred to as ozone precursors, are products of combustion processes (including motor vehicle engines) and the evaporation of solvents, paints, and fuels. Ozone is a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the photochemical reaction process. Ozone causes eye irritation, airway constriction, and shortness of breath and can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

Table 3.4-1
Air Basins in the Study Area

Air Basin	Counties in the Air Basin
Great Basin Valleys	Alpine, Inyo, Mono
Lake County	Lake
Lake Tahoe	El Dorado, Placer
Mojave Desert	Kern, Los Angeles, San Bernardino, Riverside
Mountain Counties	Amador, Calaveras, El Dorado, Mariposa, Nevada, Placer, Plumas, Sierra, Tuolumne
North Central Coast	Monterey, San Benito, Santa Cruz
North Coast	Del Norte, Humboldt, Mendocino, Sonoma, Trinity
Northeast Plateau	Lassen, Modoc, Siskiyou
Sacramento Valley	Butte, Colusa, Glenn, Placer, Sacramento, Shasta, Solano, Sutter, Tehama, Yolo, Yuba
Salton Sea	Imperial, Riverside
San Diego	San Diego
San Francisco Bay Area	Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma
San Joaquin Valley	Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, Tulare
South Central Coast	San Luis Obispo, Santa Barbara, Ventura
South Coast	Los Angeles, Orange, Riverside, San Bernardino

SOURCE: Data compiled by Environmental Science Associates in 2020

Carbon Monoxide

CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicle engines; the highest emissions occur during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue; impair central nervous system function; and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal.

Particulate Matter

PM_{10} and $PM_{2.5}$ consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively (a micron is one-millionth of a meter). PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects. Major pollutant sources of PM_{10} include: dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-

raised dust and ocean sprays). Major pollutant sources of $PM_{2.5}$ include: fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; also, formed from photochemical reactions of other pollutants, including NO_X, SO_X, and organics. Some sources of particulate matter, such as wood burning in fireplaces, demolition, and construction activities, are more local; others, such as vehicular traffic, have a more regional effect.

Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility. Large dust particles (diameter greater than 10 microns) settle out rapidly and are easily filtered by human breathing passages. This large dust is of more concern as a soiling nuisance rather than a health hazard. The remaining fraction, PM_{10} and $PM_{2.5}$, are a health concern, particularly at levels above the federal and state ambient air quality standards. $PM_{2.5}$ (including diesel exhaust particles) has greater effects on health, because these particles are so small and can penetrate to the deepest parts of the lungs.

Scientific studies have suggested links between fine particulate matter and numerous health problems, including asthma, bronchitis, and acute and chronic respiratory symptoms, such as shortness of breath and painful breathing. Recent studies have shown an association between morbidity (ill health) and mortality and daily concentrations of particulate matter in the air. Children are more susceptible to the health risks of PM_{10} and $PM_{2.5}$ because their immune and respiratory systems are still developing.

Studies conducted since the 1990s have shown a statistically significant direct association between mortality (premature deaths) and daily concentrations of particulate matter in the air. Despite important gaps in scientific knowledge and continued reasons for some skepticism, a comprehensive evaluation of the research findings provides persuasive evidence that exposure to fine particulate air pollution has adverse effects on cardiopulmonary health.

Nitrogen Dioxide

NO_2 is a reddish-brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO_2. Aside from its contribution to ozone formation, NO_2 can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as a coloring component on high-pollution days, especially in conjunction with high ozone levels.

Sulfur Dioxide

SO_2 is a combustion product of sulfur or sulfur-containing fuels such as coal and diesel. SO_2 is also a precursor to the formation of particulate matter, atmospheric sulfate, and atmospheric sulfuric acid formation that could precipitate downwind as acid rain.

Lead

Leaded gasoline (phased out in the United States beginning in 1973), lead-based paint (on older houses and cars), smelters (metal refineries), and the manufacture of lead storage batteries have been the primary sources of lead released into the atmosphere. Lead has a range of adverse neurotoxic health effects, which puts children at special

risk. Some lead-containing chemicals cause cancer in animals. Lead levels in the air have decreased substantially since leaded gasoline was eliminated. Ambient lead concentrations are monitored only on an as-warranted, site-specific basis in California.

Non-criteria Air Pollutants Covered under the California Ambient Air Quality Standards

Hydrogen Sulfide

Hydrogen sulfide is a colorless gas with the odor of rotten eggs. The most common sources of hydrogen sulfide emissions are oil and natural gas extraction and processing, and natural emissions from geothermal fields. It is also formed during bacterial decomposition of human and animal wastes, and is present in emissions from sewage treatment facilities and landfills. Hydrogen sulfide has an extremely strong and foul odor that can induce tearing of the eyes and symptoms related to overstimulation of the sense of smell, including headache, nausea, or vomiting.

Sulfates

Sulfates are a family of chemicals that contain the fully oxidized ionic form of sulfur, in combination with metal and/or hydrogen ions. In California, sulfur-containing compounds are emitted primarily during the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. Because sulfate particles are part of $PM_{2.5}$, they have health effects similar to those from exposure to $PM_{2.5}$.

Visibility-Reducing Particles

Particulate matter pollution affects the environment by decreasing visibility (causing haze). These particles vary greatly in shape, size, and chemical composition, and come from a variety of natural and manmade sources. Some haze-causing particles, such as windblown dust and soot, are emitted directly to the air. Others are formed in the air from the chemical transformation of gaseous pollutants (e.g., sulfates, nitrates, organic carbon particles), which are the major constituents of fine particulate matter. These fine particles, caused largely by combustion of fuel, can travel hundreds of miles and impair visibility. Some haze-causing pollutants have been linked to serious health problems and are described in the *Particulate Matter* section above.

Vinyl Chloride

Vinyl chloride (chloroethene), a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used in the process of making polyvinyl chloride plastic and vinyl products, and thus is emitted from industrial processes. Exposure to vinyl chloride is primarily an occupational concern. Short-term exposure to high levels (10 parts per million [ppm] or above) of vinyl chloride in air causes central nervous system effects, such as dizziness, drowsiness, and headaches. The primary non-cancer health effect of long-term exposure to vinyl chloride through inhalation or oral exposure is liver damage. Inhalation exposure to vinyl chloride increases the risk of angiosarcoma, a rare form of liver cancer in humans.

Toxic Air Contaminants

Non-criteria air pollutants or toxic air contaminants (TACs) are airborne substances that can cause short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer-

causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances. They are emitted from a variety of common sources, including gasoline stations, automobiles, diesel engines, dry cleaners, industrial operations, and painting operations. TACs are regulated differently from CAPs at both the federal and state levels. At the federal level, these airborne substances are referred to as hazardous air pollutants (HAPs). The state list of TACs identifies 243 substances (ARB 2020b), and the federal list of HAPs identifies 187 substances (EPA 2020).

The California Air Resources Board (CARB) identified diesel particulate matter (DPM) as a TAC in 1998, based primarily on evidence demonstrating cancer effects in humans. The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and concentrations of DPM are higher near heavily traveled highways and rail lines with diesel locomotive operations. The cancer risk from DPM as determined by CARB declined from 750 in one million in 1990 to 570 in one million in 1995; by 2000, CARB estimated the average statewide cancer risk from DPM at 540 in one million. This calculated cancer risk value from ambient air exposure can be compared against the lifetime probability of being diagnosed with cancer in the United States, from all causes, which is approximately 38.5 percent according to the National Cancer Institute (CARB 2020b).

Another notable TAC is asbestos, a fibrous mineral that is both naturally occurring in ultramafic rock (a rock type commonly found in California) and used as a processed component of building materials. Because asbestos has been proven to cause serious adverse health effects, including asbestosis and lung cancer, it is strictly regulated based on its natural widespread occurrence and its use as a building material.

Odorous Emissions

Odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the receptors. Odor impacts should be considered for any proposed new odor sources located near existing receptors, as well as any new sensitive receptors located near existing odor sources. Generally, increasing the distance between the receptor and the odor source will mitigate odor impacts.

Attainment Area Designations

Attainment Area Designations

The CAA and the California Clean Air Act (CCAA) require all areas of California to be classified as attainment, non-attainment, or unclassified as to their status with regard to the national ambient air quality standards (NAAQS) and California ambient air quality standards (CAAQS). Under the CAA and the CCAA, CARB designates portions of the state based on air quality monitoring data. Section 3.4.3, *Regulatory Setting*, includes a more detailed discussion of these federal and state standards.

Table 3.4-2 shows the federal and state non-attainment status for the air basins in the study area for criteria pollutants. For this assessment, an air basin was considered non-attainment if any portion of the basin is designated non-attainment even if whole or portions of counties are in attainment or unclassified. Because of the differences between the NAAQS and CAAQS, the designation of non-attainment areas is different under the federal and state legislation.

Table 3.4-2
Federal and State Non-attainment Status for Air Basins in the Study Area

Air Basin	Federal Non-attainment Designations—NAAQS	State Non-attainment Designations—CAAQS
Great Basin Valleys	PM_{10} (Mono Basin, Mammoth Lakes, Owens Valley)	Ozone, PM_{10}
Lake County	Not Applicable	
Lake Tahoe	Not Applicable	PM_{10}
Mojave Desert	Ozone (Antelope Valley and Western Mojave Desert), PM_{10}	Ozone, PM_{10}, hydrogen sulfide (Searles Valley)
Mountain Counties	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$ (Portola Valley), PM_{10}
North Central Coast	Not Applicable	Ozone (Non-attainment–Transitional), PM_{10}
North Coast	Not Applicable	PM_{10}
Northeast Plateau	Not Applicable	
Sacramento Valley	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$, PM_{10}
Salton Sea	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}
San Diego	Ozone	Ozone, $PM_{2.5}$, PM_{10}
San Francisco Bay Area	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$, PM_{10}
San Joaquin Valley	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$, PM_{10}
South Central Coast	Ozone	Ozone, PM_{10}
South Coast	Ozone, $PM_{2.5}$, Lead	Ozone, $PM_{2.5}$, PM_{10}, NO (State Route 60 portion)

SOURCE: CARB 2020a.

NOTES: CAAQS = California ambient air quality standards; NAAQS = national ambient air quality standards; NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter

Sensitive Receptors

Given the geographical range of the study area and the variety of land uses present, this section describes sensitive receptors at a high level. A specific discussion of sensitive receptors would require knowledge of the local land uses near the restoration projects permitted under the Order.

Air quality does not affect every individual or group in the population in the same way, and some groups are more sensitive than others to adverse health effects caused by exposure to air pollutants. Population subgroups sensitive to the health effects of air pollutants include the elderly and the young, those with higher rates of respiratory disease such as asthma and chronic obstructive pulmonary disease, and those with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases. Land uses such as schools, children's day care centers, hospitals, and nursing and convalescent homes are more sensitive than the general public to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress. Parks and playgrounds are considered moderately sensitive to poor air quality because persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality; however, exposure times are generally far shorter in parks and playgrounds than in residential locations and schools, which typically reduces overall exposure to pollutants. Residential areas are more sensitive to air quality conditions than commercial and industrial areas because people generally spend longer periods of time at their residences, with associated greater exposure to ambient air quality conditions. Workers are not considered sensitive receptors because all employers must follow regulations set forth by the U.S. Occupational Safety and Health Administration to ensure the health and well-being of their employees.

The study area spans urbanized areas, rural areas, as well as parks and open space. In urbanized areas, sensitive receptors include schools, day care centers, residences, nursing homes, hospitals, and parks. In rural areas, the primary sensitive receptor would be rural residences.

Toxic Air Contaminants

The study area spans a variety of land uses that include sources of TACs, such as gas stations, automobile traffic, diesel engines, railways, dry cleaners, asbestos, industrial operations, and painting operations.

Odors

Odor-generating uses that may be present in the study area include wastewater treatment plants; landfills; chemical plants; decaying material in waterlogged areas; anaerobic decomposition of organic materials; and agricultural sources such as dairy and poultry farms, pesticide, fertilizer, and herbicide application, and rendering plants.

Greenhouse Gases

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface,

and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. GHG emissions contributing to global climate change are attributable, in large part, to human activities: on-road and off-road transportation, industrial/manufacturing, electricity generation by utilities and consumption by end users, residential and commercial on-site fuel usage, and agriculture and forestry. CO_2 emissions are largely byproducts of fossil fuel combustion. Methane, a highly potent GHG, results primarily from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions), largely from agricultural practices and landfills. Nitrous oxide emissions are also largely attributable to agricultural practices and soil management.

Gases with high global warming potential have atmospheric insulative properties that are hundreds to tens of thousands of times greater than that of CO_2. Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are some of the most common types of high global warming potential gases and result from a variety of industrial processes. Hydrofluorocarbons and perfluorocarbons are used as refrigerants and can be emitted through evaporation and leakage. Sulfur hexafluoride is a powerful electrical insulator used in power transmission and semiconductor manufacturing and is emitted through evaporation and leakage into the atmosphere.

According to the Intergovernmental Panel on Climate Change (IPCC), "It is extremely likely that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in GHG concentrations and other anthropogenic forcings together" (IPCC 2014:5). Climate change is a global problem. GHGs are global pollutants, unlike CAPs and TACs, which are pollutants of regional and local concern.

Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about 1 day), GHGs have long atmospheric lifetimes (one to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the lifetime of any particular GHG molecule is dependent on multiple variables and cannot be determined with any certainty, it is understood that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 55 percent is sequestered through ocean and land uptake

every year, averaged over the last 50 years, and the remaining 45 percent remains stored in the atmosphere (IPCC 2013:467).

The quantity of GHGs in the atmosphere that ultimately result in climate change is not precisely known, but is enormous; no single project alone would measurably contribute to an incremental change in the global average temperature, or to global, local, or micro climates. From the standpoint of CEQA, GHG impacts relative to global climate change are inherently cumulative. Chapter 5, *Cumulative Impacts*, includes a more detailed discussion of climate change.

Table 3.4-3 summarizes the most recent California statewide GHG emissions inventory. In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation for residential, commercial, and industrial use (CARB 2016).

Table 3.4-3
California Statewide Greenhouse Gas Emissions Inventory (2000–2017)

Emissions Sector	MMT CO_2e 2000	MMT CO_2e 2005	MMT CO_2e 2010	MMT CO_2e 2015	MMT CO_2e 2017	Percent of Total (2017)	Percent Change (2000–2017)
Transportation	180.3	189.1	165.1	166.2	169.9	40.1	-5.8
Electricity Generation[a]	104.8	107.9	90.3	83.8	62.4	14.7	-40.5
Industrial	97.4	95.9	91.5	91.5	89.4	21.1	-8.2
Commercial and Residential	44.0	43.1	45.9	38.8	41.1	9.7	-6.6
Agriculture	31.0	33.7	33.7	33.8	32.4	7.6	-4.5
High Global Warming Potential	6.3	9.3	13.5	18.6	19.9	4.7	+215.9
Recycling and Waste	7.3	7.8	8.4	8.7	8.9	2.1	+21.9
Total[b]	471.1	486.8	448.4	441.4	424.0	100	

SOURCE: CARB 2019

NOTES: MMT CO_2e = million metric tons of carbon dioxide equivalent

[a] Includes both in-state electricity generation and out-of-state imported electricity that is consumed in-state.

[b] Totals may not sum exactly due to rounding.

Carbon Sequestration

Carbon sequestration is the long-term storage of CO_2 that has been removed from the atmosphere and stored in a carbon reservoir (e.g., trees, vegetation, soil, and ocean). During these processes, CO_2 is absorbed from the atmosphere by trees and vegetation during photosynthesis. The CO_2 is then broken down and the carbon is stored (e.g., plant parts or soil), while the oxygen is released back into the atmosphere. Carbon sequestration plays an important role in preventing global climate change by reducing

greenhouse gas emissions and by preserving carbon "sinks" such as forests and wetlands. *An Inventory of Ecosystem Carbon in California's Natural & Working Lands* (CARB 2020c) provides an estimate of carbon sequestration in California. The inventory includes forest and other natural lands, urban land, cropland, soil carbon, and wetlands.

3.4.3 Regulatory Setting

This section discusses federal, state, and regional and local plans, policies, regulations, and laws, and ordinances pertaining to air quality and GHG emissions resources.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location.

Federal

Criteria Air Pollutants

EPA is in charge of implementing national air quality programs. EPA's air quality mandates are drawn primarily from the federal CAA, enacted in 1970. As required by the CAA, EPA has established primary and secondary NAAQS for the following criteria air pollutants: CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. The primary standards protect public health and the secondary standards protect public welfare. Table 3.4-4 lists the current NAAQS, along with the current CAAQS that are discussed later in this section.

Table 3.4-4
Summary of Ambient Air Quality Standards

Pollutant	Averaging Time	State Standard	National Standard	Major Pollutant Sources
Ozone	1 hour	0.09 ppm	–	Formed when reactive organic gases and NO_X react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial/industrial mobile equipment.
	8 hour	0.070 ppm	0.070 ppm	
Carbon Monoxide	1 hour	20 ppm	35 ppm	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hour [a]	9 ppm	9 ppm	
Nitrogen Dioxide	1 hour	0.18 ppm	100 ppb	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
	Annual Avg.	0.030 ppm	0.053 ppm	
Sulfur Dioxide	1 hour	0.25 ppm	75 ppb	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	3 hour	–	0.5 ppm [b]	
	24 hour	0.04 ppm	0.14 ppm	
	Annual Avg.	–	0.030 ppm	

Table 3.4-4
Summary of Ambient Air Quality Standards

Pollutant	Averaging Time	State Standard	National Standard	Major Pollutant Sources
Respirable Particulate Matter (PM_{10})	24 hour	50 µg/m^3	150 µg/m^3	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	Annual Avg.	20 µg/m^3	–	
Fine Particulate Matter ($PM_{2.5}$)	24 hour	–	35 µg/m^3	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including NO_X, oxides of sulfur, and organics.
	Annual Avg.	12 µg/m^3	12.0 µg/m^3	
Lead	Monthly Ave.	1.5 µg/m^3	–	Present source: lead smelters, battery manufacturing and recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	–	1.5 µg/m^3	
Hydrogen Sulfide	1 hour	0.03 ppm	No National Standard	Geothermal power plants, petroleum production and refining.
Sulfates	24 hour	25 µg/m^3	No National Standard	Produced by the reaction in the air of SO_2.
Visibility-Reducing Particles	8 hour	Extinction of 0.23/km; visibility of 10 miles or more	No National Standard	See $PM_{2.5}$.
Vinyl Chloride	24 hour	0.01 ppm	No National Standard	Polyvinyl chloride and vinyl manufacturing.

SOURCES: CARB 2009, 2016.

NOTES: µg/m^3 = micrograms per cubic meter; km = kilometer; NO_X = oxides of nitrogen; ppb = parts per billion; ppm = parts per million; SO_2 = sulfur dioxide

[a] A more stringent 8-hour carbon monoxide state standard exists around Lake Tahoe (6 ppm).

[b] Secondary national standard.

The CAA also requires each state to prepare an air quality control plan, referred to as a state implementation plan (SIP), for areas that do not attain the NAAQS. Table 3.4-2 lists the NAAQS non-attainment status for air basins in the study area.

The federal CAA Amendments of 1990 added requirements for states with areas that are not in attainment of all NAAQSs to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA reviews SIPs to determine whether they conform to the mandates of the CAA and its amendments, and whether implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, a federal implementation plan that imposes additional control measures may be prepared for the non-attainment area. If an approvable SIP is not submitted or implemented within the mandated time frame, sanctions may be applied to transportation funding and permitting of stationary air pollution sources in the non-attainment air basin.

Toxic Air Contaminants

Air quality regulations also cover TACs, which federal agencies refer to as HAPs. In general, for TACs that cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may not be expected to occur. Instead, EPA and, in California, CARB, regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum available control technology or best available control technology for toxics to limit emissions.

Greenhouse Gases

EPA is the federal agency responsible for implementing the CAA and its amendments. The U.S. Supreme Court ruled on April 2, 2007, that CO_2 is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of GHGs. Based on the ruling in this case, EPA took steps to regulate GHG emissions and lent its support to state and local agencies' efforts to reduce GHG emissions.

Greenhouse Gas Permitting Requirements

The CAA requires that new major stationary emissions sources and major modifications at existing stationary sources obtain an air pollution permit before beginning construction. On May 13, 2010, EPA issued the Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule (EPA 2011). This final rule sets thresholds for GHG emissions that define when permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.

PSD permitting requirements now cover new construction projects that emit at least 100,000 tons (90,718 metric tons [MT]) of GHGs per year, even if they do not exceed the permitting thresholds for any other attainment pollutant. Modifications at existing facilities that increase GHG emissions by at least 75,000 tons (68,039 MT) per year are subject to PSD requirements, even if they do not significantly increase emissions of any other attainment pollutant. Title V Operating Permit requirements apply to sources based on their GHG emissions even if they would not apply based on emissions of any other pollutant. Facilities that emit at least 100,000 tons (90,718 MT) per year of carbon dioxide equivalent (CO_2e) are subject to Title V permitting requirements.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the United States. In general, this national reporting requirement provides EPA with accurate and timely GHG emissions data from facilities that emit 25,000 MT or more of CO_2e per year. These publicly available data allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost-effective opportunities to reduce emissions in the future. Reporting is conducted at the facility level, except that certain suppliers of fossil fuels and industrial GHGs along with vehicle and engine manufacturers report at the corporate level. An estimated 85 percent of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule.

State

Criteria Air Pollutants

CARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California, and for implementing the CCAA. The CCAA, adopted in 1988, required the CARB to establish CAAQS. CARB has established CAAQS, as shown in Table 3.4-4 above, for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned federal criteria air pollutants.

Table 3.4-2 lists the CAAQS non-attainment status for air basins in the study area. In most cases, the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health-effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals. The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest date practical. The act specifies that local air districts should focus attention on reducing the emissions from transportation and area-wide emission sources, and provides air districts with the authority to regulate indirect sources.

Toxic Air Contaminants/Hazardous Air Pollutants

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807, Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588, Chapter 1252, Statutes of 1987). AB 1807 established a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review are required before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs and adopted EPA's list of HAPs as TACs. Most recently, particulate matter exhaust from diesel engines (DPM) was added to CARB's list of TACs.

Once a TAC is identified, CARB adopts an airborne toxics control measure for sources that emit that particular TAC. If a safe threshold exists for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If no safe threshold exists, the measure must incorporate best available control technology for toxics to minimize emissions.

CARB has adopted diesel exhaust control measures and more stringent emissions standards for various transportation-related mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). Over time, replacing older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, DPM) have been reduced significantly over the last decade and will be reduced further in California through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of CARB's Risk Reduction Plan (CARB 2000), it is expected that DPM concentrations will be 85 percent less in 2020 than in the year 2000. Adopted regulations are also expected to reduce formaldehyde emissions from cars and light-duty trucks. As emissions are reduced, the risks from exposure to the emissions should also be reduced.

Greenhouse Gas Emissions

Executive Order S-3-05

Executive Order S-3-05, signed by Governor Arnold Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra Nevada snowpack, exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those problems, the executive order established targets for the state's total GHG emissions: reduce emissions to the 2000 level by 2010, to the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

Executive Order B-30-15

On April 20, 2015, Governor Edmund G. Brown Jr. signed Executive Order B-30-15, which established a GHG emissions reduction target for California of 40 percent below the 1990 level by 2030. The executive order aligns California's GHG emissions reduction targets with those of leading international governments such as the 28-nation European Union, which adopted the same target in October 2014. The California Global Warming Solutions Act of 2006 (AB 32, discussed below) established the target of reducing GHG emissions to the 1990 level (431 MMT CO_2e) by 2020. This goal was achieved 4 years early in 2016 (CalEPA 2018).

Meeting California's emissions reduction target for 2030, emissions 40 percent below the 1990 level, will make it possible to reach the ultimate goal of reducing emissions to 80 percent below the 1990 level by 2050. This is in line with the scientifically established levels needed in the U.S. to limit global warming below 2 degrees Celsius (°C)—the warming threshold at which there will likely be major climate disruptions such as super droughts and rising sea levels, according to scientific consensus.

Assembly Bill 32, the California Global Warming Solutions Act of 2006

In September 2006, Governor Schwarzenegger signed AB 32, which established regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 required that statewide GHG emissions be reduced to 1990 levels by 2020. AB 32 also requires that these

reductions “shall remain in effect unless otherwise amended or repealed,” further stating the following (Health and Safety Code Section 38551):

> *(b) It is the intent of the Legislature that the statewide greenhouse gas emissions limit continue in existence and be used to maintain and continue reductions in emissions of greenhouse gases beyond 2020.*
>
> *(c) The state board [California Air Resources Board] shall make recommendations to the Governor and the Legislature on how to continue reductions of greenhouse gas emissions beyond 2020.*

In 2017 CARB released California’s 2017 Climate Change Scoping Plan which included recommendations to maintain and continue reductions beyond 2020 (ARB 2017). AB 32 requires CARB to update the Scoping Plan at least every 5 years.

Assembly Bill 32 Climate Change Scoping Plan and Updates

In December 2008, CARB adopted its Climate Change Scoping Plan, which contains the main strategies California will implement to reduce CO_2e emissions by approximately 118 million metric tons (MMT), or approximately 21.7 percent from the state’s projected 2020 emissions level of 545 MMT CO_2e under a business-as-usual scenario. (This is a reduction of 47 MMT CO_2e, or almost 10 percent, from 2008 emissions.)

CARB released the First Update to the Climate Change Scoping Plan in May 2014 and subsequently adopted the plan, which identifies the next steps to reaching the goals of AB 32 and evaluates the progress that was made between 2000 and 2012 (CARB 2014). The update stated that California was on track to meet the near-term 2020 GHG limit and is well positioned to maintain and continue reductions beyond 2020 (CARB 2014). The update also reported trends in GHG emissions from various emissions sectors (e.g., transportation, building energy, agriculture).

On December 14, 2017, CARB adopted the 2017 Climate Change Scoping Plan (2017 Scoping Plan) (CARB 2017), which presents the framework for achieving the 2030 reductions established in more recent legislation. The 2017 Scoping Plan identifies the GHG reductions needed by each emissions sector to achieve a statewide emissions level before 2030 that is 40 percent below the 1990 level.

The 2017 Scoping Plan also identifies how GHGs from proposed projects could be evaluated under CEQA. Specifically, it states that achieving “no net increase” in GHG emissions is the correct overall objective for projects evaluated under CEQA if the projects cannot be shown to conform with applicable local GHG reduction plans. CARB recognizes that it may not be appropriate or feasible for every development project to mitigate its GHG emissions to no net increase, and that this may not necessarily imply a substantial contribution to the cumulatively significant environmental impact of climate change.

Senate Bill 375

Senate Bill (SB) 375, signed by Governor Schwarzenegger in September 2008, aligns regional transportation planning efforts, regional GHG emissions reduction targets, and land use and housing allocation. SB 375 requires metropolitan planning organizations

(MPOs) to adopt a sustainable communities strategy (SCS) or alternative planning strategy, showing prescribed land use allocation in each MPO's regional transportation plan. CARB, in consultation with the MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in their respective regions for 2020 and 2035.

Senate Bill X1-2, the California Renewable Energy Resources Act of 2011

SB X1-2 (2011) requires all California utilities to generate 33 percent of their electricity from renewables by the end of 2020. SB X1-2 set a three-stage compliance period requiring all California utilities, including independently owned utilities, energy service providers, and community choice aggregators, to generate 20 percent of their electricity from renewables by December 31, 2013; 25 percent by December 31, 2016; and 33 percent by December 31, 2020.

SB X1-2 also requires that the renewable electricity standard be met increasingly with renewable energy supplied to California's grid from sources in or near California. SB X1-2 specified that renewables from these sources must make up at least 50 percent of total renewable energy for the 2011–2013 compliance period, at least 65 percent for the 2014–2016 compliance period, and at least 75 percent for 2016 and beyond.

Senate Bill 350, the Clean Energy and Pollution Reduction Act of 2015

SB 350 requires the California Public Utilities Commission (CPUC) to focus its energy procurement decisions on reducing GHG emissions by 40 percent by 2030, including through efforts to procure at least 50 percent renewable energy, double energy efficiency, and promote electrification of transportation.

Senate Bill 100, California Renewables Portfolio Standard Program: Emissions of Greenhouse Gases

SB 100 requires that California's renewable-energy and zero-carbon resources supply 100 percent of electric retail sales to end-use customers, and 100 percent of the electricity procured for state agencies, by December 31, 2045. The policy specifies that the transition to a zero-carbon electric system must not cause or contribute to increases of GHG emissions elsewhere in the western electricity grid.

SB 100 also requires the California Energy Commission (CEC), CPUC, and CARB to complete a joint agency report to the Legislature evaluating the 100 percent zero-carbon electricity policy. The report will be developed using a public process and qualitative and quantitative analyses to address the requirements and intent of the statute.

In consultation with all California balancing authorities and as part of a public process, the three agencies will issue a report to the Legislature by January 1, 2021, and at least every 4 years afterward. The joint report will include:

- A review of the 100 percent zero-carbon policy focused on technologies, forecasts, then-existing transmission, and the maintenance of safety, environmental and public safety protection, affordability, and system and local reliability.
- An evaluation identifying the potential benefits and impacts of achieving the policy on system and local reliability.

- An evaluation of the nature of any anticipated financial costs and benefits to electric, gas, and water utilities, including customer rate impacts and benefits.
- The barriers to, and benefits of, achieving the policy.
- Alternative scenarios in which the policy can be achieved and the estimated costs and benefits of each scenario.

Senate Bill 32 and Assembly Bill 197 (2016)

In August 2016, Governor Brown signed SB 32 and AB 197, which extended California's GHG emissions reduction programs beyond 2020. SB 32 amended the Health and Safety Code to include Section 38566, which contains language authorizing CARB to achieve a statewide GHG emissions reduction of at least 40 percent below the 1990 level by no later than December 31, 2030. SB 32 codified the targets established by Executive Order B-30-15 for 2030, which set the next interim step in the state's continuing efforts to pursue the long-term target expressed in Executive Orders S-3-05 and B-30-15 of 80 percent below the 1990 emissions level by 2050.

Regional and Local

The study area encompasses multiple counties, cities, and air districts throughout California. Each county, city, and air district has local regulations, an air quality management plan (AQMP), a general plan, and in some cases a climate action plan, containing goals and policies to improve air quality and address community health and sustainability. Counties and cities may set community GHG emissions reduction targets, require best management practices to reduce emissions of air pollutants such as fugitive dust, and reinforce local air district recommendations.

3.4.4 Impacts and Mitigation Measures

Methods of Analysis

Air quality and GHG emissions impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could emit criteria air pollutants and precursors, odors, TACs, and GHGs. However, the precise locations and detailed characteristics of potential future individual restoration projects are yet to be determined. Therefore, this air quality and GHG emissions analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis.

Permanent impacts are those that would continue through the life of a project as a result of the environmental conditions caused by restoration projects permitted under the Order (e.g., new infrastructure such as fish screens that would require routine maintenance and cleaning of fish screens and removal of debris and sediment from stream crossings). Temporary impacts are considered those that would be temporary in nature (e.g., construction-related activities).

The approach to assessing air quality and GHG emissions impacts was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of*

Restoration Projects in the Order, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an air quality– or GHG emissions–related impact is considered significant if the types of projects that would be permitted under the Order would do any of the following:

- Conflict with or obstruct implementation of the applicable air quality plan
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard
- Expose sensitive receptors to substantial pollutant concentrations
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people
- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs

Appendix G of the State CEQA Guidelines further indicates that, where available, the thresholds of significance established by the applicable air district may be relied upon to make the significance determinations. If the applicable air district has not established specific thresholds, then the thresholds of neighboring air districts or emissions limits used for stationary-source permitting may be used.

Impacts and Mitigation Measures

Table 3.4-5 summarizes the impact conclusions presented in this section for easy reference.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Table 3.4-5
Summary of Impact Conclusions—Air Quality and Greenhouse Gas Emissions

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.4-1: Implementing future restoration projects permitted under the Order could conflict with an applicable air quality plan.	SU	LTS
3.4-2: Emissions from future restoration projects permitted under the Order could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.	SU	LTS
3.4-3: Emissions from future restoration projects permitted under the Order could result in other emissions (such as those leading to odors) that would adversely affect a substantial number of people.	LTS	LTS
3.4-4: Emissions from future restoration projects permitted under the Order could expose sensitive receptors to substantial pollutant concentrations.	SU	LTS
3.4-5: Implementing future restoration projects permitted under the Order could result in an increase in GHG emissions that may have a significant impact on the environment.	SU	LTS
3.4-6: Implementing future restoration projects permitted under the Order could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.	SU	LTS

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2020
NOTES: LTS = less than significant; SU = significant and unavoidable

Impact 3.4-1: Implementing future restoration projects permitted under the Order could conflict with an applicable air quality plan.

As described in Section 3.4.3, *Regulatory Setting*, most of the air districts in the study area have one or more air quality management plans that include control measures, rules, and regulations to bring air districts into attainment for certain criteria air pollutants.

Effects of Project Construction Activities

Construction activities permitted under the Order would include construction of culverts, bridges, fish screens, ladders, and pilings; removal of small dams, tide gates, flood

gates, and legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams during construction. These activities could require the use of mobile diesel-powered construction equipment such as excavators, graders, scrapers, bulldozers, and backhoes. For example, haul trucks would be used to move borrow and/or spoils and other materials and would emit pollutants. ROG, NO_X, PM_{10}, $PM_{2.5}$, CO, and CO_2 would be emitted during the combustion of fuels in construction equipment and material transport trucks.

It is reasonable to assume that the construction of projects would comply with the control measures, rules, and regulations stated in the AQMPs of local air districts. For example, analysis of a project designed to restore the natural geomorphic processes and ecological functions at a marsh could find that the generation of construction-related emissions of ROG, NO_X, and PM_{10} would not violate or contribute substantially to an existing or projected air quality violation.

AQMPs set forth rules, regulations, and control measures to bring an air district into attainment for certain criteria pollutants. If a project would substantially contribute to pollutant concentrations that exceed the NAAQS and CAAQS, it may also conflict with the local AQMP. As discussed for Impact 3.4-2 below, emissions from construction activities permitted under the Order could violate an air quality standard; contribute substantially to an air quality violation; and/or result in a short-term cumulatively considerable net increase in pollutants for which the region is non-attainment. Therefore, it is possible that construction activities for restoration projects permitted under the Order could conflict with an applicable air quality plan.

The specific locations and emissions of possible construction activities are not known at this time. Therefore, the potential for a conflict between a given restoration project permitted under the Order and an applicable air quality plan cannot be determined. Factors necessary to identify specific impacts include the location and size of the project, construction characteristics, attainment status of the local air basin or basins, and the applicable AQMPs of the local air quality district. Because air pollutant emissions from restoration projects permitted under the Order could conflict with applicable air quality plans, this impact would be **potentially significant**.

Projects implementing applicable general protection measures (see Appendix E) included in the Order would further reduce impacts to air quality and greenhouse gas emissions. The following general protection measures may apply to air quality and greenhouse gas emissions:

- GPM-8: Work Area and Speed Limits
- GPM-17: Fugitive Dust Reduction

Integration of these general protection measures into project designs and plans would reduce the impact of air pollutant emissions from project construction activities, but not to a less-than-significant level. This impact would be **potentially significant**.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure AIR-1 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure AIR-1: Minimize Conflicts with Applicable Air Quality Plans

Proponents of restoration projects permitted under the Order and their construction contractors shall implement the following measures to minimize conflicts between project construction and applicable air quality plans:

- Use equipment and vehicles that comply with CARB requirements and emission standards for on-road and off-road fleets and engines. New engines and retrofit control systems should reduce NO_X and PM emissions from diesel-fueled on-road and off-road vehicles and equipment.
- Minimize idling times, either by shutting equipment off when not in use or by reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure, Title 13, Section 2485 of the California Code of Regulations). Clear signage should be posted for construction workers at all entrances to the site.
- Maintain all equipment in proper working condition according to the manufacturer's specifications.
- Use electric equipment when possible. Use lower emitting alternative fuels to power vehicles and equipment where feasible.
- Use low–volatile organic compound (VOC) coatings and chemicals; minimize chemical use.

Mitigation measures for individual restoration projects would also include recommendations or requirements of the local air district(s). Project proponents would coordinate with local air district(s) regarding project-specific mitigation and implement applicable measures during construction. For example, the Bay Area Air Quality Management District (BAAQMD) lists basic and additional mitigation measures to reduce emissions from project construction (BAAQMD 2010, 2017). The following basic construction mitigation measures are recommended for restoration projects permitted under the Order:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).

- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- Post a publicly visible sign with the telephone number and person at the lead agency to contact regarding dust complaints. This person shall respond and take corrective action within 48 hours. The air district's phone number shall also be visible to ensure compliance with applicable regulations.

The following additional construction mitigation measures are recommended for projects with construction emissions above the threshold determined for the local AQMP:

- All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent. Moisture content can be verified by lab samples or moisture probe.
- All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.
- Wind breaks (e.g., trees, fences) shall be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50 percent air porosity.
- Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
- The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.
- Site accesses to a distance of 100 feet from the paved road shall be treated with a 6- to 12-inch compacted layer of wood chips, mulch, or gravel.
- Erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than 1 percent.
- The idling time of diesel-powered construction equipment shall be minimized to 2 minutes.
- The project shall develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a project-wide fleet-average 20 percent NO_X reduction and 45 percent PM reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as such become available.

- The project shall use low-VOC (i.e., ROG) coatings beyond local requirements (i.e., Regulation 8, Rule 3: Architectural Coatings).
- All construction equipment, diesel trucks, and generators shall be equipped with best available control technology for emission reductions of NO_X and PM.
- All contractors shall use equipment that meets CARB's most recent certification standard for off-road heavy-duty diesel engines.

Mitigation Measure AIR-1 would be implemented to reduce the impacts of restoration projects permitted under the Order. However, because the extent and location of such actions are not known at this time, it is not possible to conclude that the mitigation measure, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. Therefore, this impact would be **significant and unavoidable**.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects permitted under the Order could require periodic and routine maintenance. For example, operations and maintenance (O&M) necessary to support the functionality of constructed infrastructure may include maintenance and cleaning of fish screens, removal of debris and sediment from stream crossings, and O&M of fishways, which would produce air pollutant emissions from the use of equipment and vehicles that could conflict with applicable air quality plans. Emissions-generating activities would be similar to those described for the construction of restoration projects; however, the level of activity would be less intense and less frequent in the operational phase than during construction. Therefore, it is anticipated that emissions from restoration projects permitted under the Order would not violate an air quality standard, contribute substantially to an air quality violation, or result in a short-term cumulatively considerable net increase of non-attainment pollutants. Therefore, this impact would be **less than significant**.

The general protection measures listed above for project construction would be followed to further reduce the impacts of ground-disturbing activities for restoration projects permitted under the Order related to work area and speed limits and dust suppression.

Integration of these general protection measures into project designs and plans would continue to reduce the **less-than-significant** impacts of constructed facilities related to a conflict with an applicable air quality plan.

Impact 3.4-2: Emissions from future restoration projects permitted under the Order could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.

Construction activities from restoration projects permitted under the Order could be located in one or more air basins. Most of these air basins have established numeric thresholds for construction-generated emissions of criteria air pollutants and precursors,

indicating when emissions are significant at the project level and when emissions are cumulatively considerable.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order could require the use of diesel-powered construction equipment such as excavators, graders, scrapers, bulldozers, and backhoes. Haul trucks would be used to move borrow and/or spoils and other materials and would emit pollutants. ROG, NO_X, PM_{10}, $PM_{2.5}$, CO, and CO_2 would be emitted during the combustion of fuels in construction equipment and material transport trucks. Construction of restoration projects would emit fugitive PM_{10} and $PM_{2.5}$ dust, primarily during earthmoving activities. Other sources of fugitive dust would include vehicle travel on paved and unpaved roads, creation and management of borrow sites, concrete batch plants, and material handling, storage, and transport.

It is reasonable to expect that construction activities for restoration projects permitted under the Order may be intensive enough to result in substantial pollutant emissions. For example, floodplain restoration projects within the jurisdictional area of BAAQMD (e.g., including setting back, breaching, and removal of levees, berms, and dikes, and hydraulic reconnection and revegetation) may require the extensive use of heavy equipment and haul trips that would generate NO_X emissions in excess of BAAQMD's maximum daily threshold of 54 pounds per day, one of the more stringent thresholds in the study area.

Construction activities for restoration projects permitted under the Order could emit air pollutants. However, the specific locations and emissions of possible future facilities are not known at this time. Therefore, the potential for substantial construction-related emissions impacts cannot be determined. Factors necessary to identify site- or resource-specific impacts include the project's location, duration, and construction characteristics, and the thresholds of the local air quality district. Because the construction activities for restoration projects permitted under the Order could result in a cumulatively considerable net increase of a criteria pollutant for which a project region is in non-attainment status under an applicable federal or state ambient air quality standard, this impact would be **potentially significant**.

The general protection measures listed for Impact 3.4-1 would be followed to reduce the impacts of ground-disturbing activities for restoration projects permitted under the Order related to work area and speed limits and dust suppression.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure AIR-1 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure AIR-1 would be implemented to reduce the impacts of restoration projects permitted under the Order. However, because the extent and location of such actions are not known at this time, it is not possible to conclude that the mitigation measure, or equally effective mitigation measures, would reduce the significant impacts

of restoration projects constructed by other agencies to a less-than-significant level in all cases. Therefore, this impact would be **significant and unavoidable**.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects permitted under the Order could require periodic and routine maintenance. For example, O&M activities necessary to support the functionality of constructed infrastructure may include maintenance and cleaning of fish screens, removal of debris and sediment from stream crossings, and fishways O&M. These activities would produce air pollutant emissions that could result in a cumulatively considerable net increase of a criteria pollutant for which a project region is non-attainment under an applicable federal or state ambient air quality standard. Emissions-generating activities would be similar to those described for the construction of projects; however, the level of activity would be less intense and less frequent in the operational phase than during construction.

Routine O&M activities for restoration projects permitted under the Order would not be expected to result in a cumulatively considerable net increase of any criteria pollutant for which a project region is non-attainment under an applicable federal or state ambient air quality standard. Therefore, this impact would be **less than significant**.

The general protection measures listed for Impact 3.4-1 would be followed to further reduce the impacts of ground-disturbing O&M activities for restoration projects permitted under the Order related to work area and speed limits and dust suppression.

Integration of these general protection measures into project designs and plans would continue to reduce the **less-than-significant** impacts of constructed facilities related to the potential for a cumulatively considerable net increase of any criteria pollutant for which a project region is non-attainment under an applicable federal or state ambient air quality standard.

Impact 3.4-3: Emissions from future restoration projects permitted under the Order could result in other emissions (such as those leading to odors) that would adversely affect a substantial number of people.

The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors.

Effects of Project Construction Activities

Construction of restoration projects permitted under the Order could require the use of diesel-powered equipment and haul trucks such as excavators, graders, scrapers, bulldozers, and backhoes. Exhaust emissions from diesel equipment may generate odors. Haul trucks would move borrow and/or spoils and other materials and would emit exhaust. Odors may also be emitted during dredging and the placement of dredge spoils on adjacent lands for drying; if present, organic material could release gases, specifically hydrogen sulfide (H_2S), commonly described as having a foul or “rotten egg” smell.

Sources of construction-related emissions generally would not be in one location for long periods of time. The emissions would be intermittent and would dissipate from the

source rapidly over a short distance. For example, the analysis of a project designed to restore natural geomorphic processes and ecological functions at a marsh could find that the project would not result in any major sources of odors and that construction odors would be intermittent and short-term.

Construction activities for restoration projects permitted under the Order could temporarily generate odorous emissions. The specific locations and emissions of possible future projects are not currently known; therefore, the precise odor impacts cannot be identified at this time. Factors necessary to identify specific impacts include the project's location, construction characteristics, frequency and duration, and the location of sensitive receptors. However, given the temporary and intermittent nature of the impacts and the dissipation of odors, objectionable odors are unlikely to affect a substantial number of people. Impacts would be **less than significant**.

Projects implementing applicable general protection measures (see Appendix E) included in the Order would further reduce impacts to air quality and greenhouse gas emissions. The following general protection measures may apply to air quality and greenhouse gas emissions:

- IWW-13: Dredging Operations and Dredging Materials Reuse Plan

Integration of this general protection measure into project designs and plans would further reduce the **less-than-significant** impact related to other emissions (such as those leading to odors).

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects constructed under the Order could require periodic and routine maintenance work, such as sediment removal within or near the facilities, vegetation removal, and inspection and maintenance of facilities. Odor-generating activities would be similar to those described for construction of projects; however, the level of activity would be less intensive in the operational phase than during construction. For example, repairing damage to a fish screen may require the use of heavy equipment that would create odorous diesel emissions, but the activity would not be as intense as during the initial construction of the fish screen.

In addition to maintenance activities, the operational characteristics of restoration projects permitted under the Order could generate odors. For example, floodplain restoration, including setting back, breaching, and removal of levees, berms, and dikes, and hydraulic reconnection and revegetation may increase the acreage that could be temporarily flooded, which could expose decomposing organic matter to the atmosphere and create objectionable odors. However, odorous emissions would be intermittent and dissipate from the source rapidly over a short distance. Thus, it is unlikely that projects would create objectionable odors affecting a substantial number of people.

Restoration projects permitted under the Order could temporarily generate odorous emissions. The specific locations and emissions of future facilities are not currently known; therefore, the precise odor impacts cannot be identified at this time. Factors necessary to identify specific impacts include the project's location, operational

characteristics, frequency and duration, and the location of sensitive receptors. However, given the temporary and intermittent nature of the impacts and the dissipation of odors, objectionable odors are unlikely to affect a substantial number of people. Impacts would be **less than significant**.

Projects implementing applicable general protection measures (see Appendix E) included in the Order would further reduce impacts to air quality and greenhouse gas emissions. The following general protection measures may apply to air quality and greenhouse gas emissions:

- IWW-13: Dredging Operations and Dredging Materials Reuse Plan

Integration of this general protection measure into project designs and plans would further reduce **less-than-significant** impacts related to other emissions (such as those leading to odors).

Impact 3.4-4: Emissions from future restoration projects permitted under the Order could expose sensitive receptors to substantial pollutant concentrations.

High concentrations of fugitive dust, CO, and TACs generated during construction activities are of particular concern for sensitive receptors. The study area contains vast rural areas that are sparsely populated as well as cities of significant size, density, and population.

Effects of Project Construction Activities

Construction activities from restoration projects permitted under the Order could include activities that would generate air pollutant emissions such as fugitive dust, CO, and TACs that could present health risks to sensitive receptors. The dose to which receptors are exposed is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Dose is a function of the concentration of a substance and the duration of exposure. According to the California Office of Environmental Health Hazard Assessment, health risk assessments that determine the exposure of sensitive receptors to TAC emissions should be based on a 30-year exposure period (OEHHA 2015:8-1).

It is therefore important to consider that the use of off-road heavy-duty diesel equipment for construction of restoration projects permitted under the Order would be temporary, occurring in any one location for short periods of time. For example, setback levee construction is linear, and emissions would not take place in just one location for the duration of construction, which would take far less than 30 years.

It is also important to consider the proximity of the nearby sensitive receptors. Studies show that DPM is highly dispersive (e.g., DPM concentrations decrease by 70 percent at 500 feet from the source) (Zhu et al. 2002), and receptors must be close to emissions sources to result in the possibility of exposure to concentrations of concern. Although some projects, such as a setback levee, could be located near cities and communities of substantial size, density, and population, many would be far from sensitive receptors. For example, analysis of a project designed to restore the natural geomorphic processes and ecological functions of a marsh could find that the project would not

result in any major sources of emissions and would be required to comply with established standards and regulations for emissions.

The health impacts from exposure to these pollutants depend on the concentrations to which sensitive receptors are exposed, the duration of the exposure, and the toxicity of the pollutant. Although construction-related emissions would last no more than a few years and are transient, some construction activities for restoration projects permitted under the Order could occur over several years and could be close to sensitive receptors. For example, setback levee construction may be required near existing infrastructure, potentially exposing sensitive receptors to substantial concentrations of air pollutant emissions and TACs.

Because the construction activities for restoration projects permitted under the Order could expose sensitive receptors to substantial pollutant concentrations, this impact would be **potentially significant**.

The general protection measures listed for Impact 3.4-1 would be followed to reduce the impacts of ground-disturbing O&M activities for restoration projects permitted under the Order related to work area and speed limits and dust suppression.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure AIR-2 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure AIR-2: Minimize Construction Air Pollutant Emissions

Air quality analyses prepared for future restoration projects shall evaluate human health risks from potential exposures of sensitive receptors to substantial pollutant concentrations from the projects. The need for a human health risk analysis should be evaluated using approved screening tools, and discussed with the local air quality management district or air pollution control district during the preparation of the air quality analysis.

If the project's health risk is determined to be significant, control measures should be implemented to reduce health risks to levels below the applicable air district threshold.

Implementation of one or more of the following requirements, where feasible and appropriate, would reduce the effects of construction:

- Use equipment with diesel engines designed or retrofitted to minimize DPM emissions, usually through the use of catalytic particulate filters in the exhaust.
- Use electric equipment to eliminate local combustion emissions.
- Use alternative fuels, such as compressed natural gas or liquefied natural gas.

If the restoration project would result in significant emissions of airborne, naturally occurring asbestos, or metals from excavation, hauling, blasting, tunneling, placement, or other handling of rocks or soil, a dust mitigation and air monitoring plan shall identify individual restoration project measures to minimize emissions and

ensure that airborne concentrations of the TACs of concern do not exceed regulatory or risk-based trigger levels.

Mitigation Measure AIR-1 and AIR-2 would be implemented to reduce the impacts of restoration projects permitted under the Order. However, because the extent and location of such actions are not known at this time, it is not possible to conclude that the mitigation measure or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. Therefore, this impact would be **significant and unavoidable**.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects constructed under the Order could require periodic and routine maintenance work, such as removal of sediment within or near the facilities, vegetation removal, and inspection and maintenance of facilities. These O&M activities could generate emissions of air pollutants such as fugitive dust, CO, and TACs that, at high dosages, present health risks to sensitive receptors. For example, O&M activities necessary to support the functionality of constructed infrastructure may include maintenance and cleaning of fish screens, removal of debris and sediment from stream crossings, and fishways O&M, which would generate pollutant emissions.

Emissions-generating activities during the operational phase would be similar to those described for construction; however, the level of activity would be much lower in the operational phase than during construction. Sensitive receptors could be located in the vicinity of O&M activities, and thus could be exposed to air pollutants. As described above for construction impacts, the health impacts from exposure to these pollutants depend on the concentrations to which sensitive receptors are exposed, the duration of the exposure, and the toxicity of the pollutant. Operational activities would not be of sufficient duration or intensity to rise to the level of chronic exposure necessary to cause health impacts because: (1) routine O&M work would be temporary and intermittent, (2) activity levels would be less intense and less frequent during the operational phase than during construction, and (3) pollutants that would be emitted would not be of substantial toxicity at anticipated concentrations and duration. For example, the analysis of a project designed to restore the natural geomorphic processes and ecological functions of a marsh could find that the project would not result in any major sources of emissions and would be required to comply with established standards and regulations for emissions.

Restoration projects permitted under the Order could temporarily generate emissions of air pollutants. The specific locations and emissions of possible future facilities during O&M activities are not currently known; therefore, the precise air pollutant emissions impacts cannot be identified at this time. Factors necessary to identify specific impacts include the project’s location and operational characteristics, frequency and duration of emissions, and the location of sensitive receptors. However, given the temporary and intermittent nature of the impacts and the dissipation of pollutant concentrations, such emissions are unlikely to affect a substantial number of people. Impacts would be **less than significant**.

The general protection measures listed for Impact 3.4-1 would be followed to further reduce the **less-than-significant** impacts of ground-disturbing O&M activities for restoration projects permitted under the Order related to work area and speed limits and dust suppression.

Impact 3.4-5: Implementing future restoration projects permitted under the Order could result in an increase in GHG emissions that may have a significant impact on the environment.

Restoration projects permitted under the Order could be located in one or more air basins, some of which have established numeric thresholds for construction-generated GHG emissions that indicate when emissions are significant.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order could emit GHGs from fuel combustion during the use of construction equipment, trucks, worker vehicles, and dredging equipment. For example, a levee setback project would require extensive use of heavy equipment, such as excavators, graders, scrapers, bulldozers, backhoes, and dredges, which would result in GHG emissions. Numerous haul truck trips would be required to move borrow and/or spoils and other materials.

Equipment used for the construction of restoration projects permitted under the Order could increase GHG emissions in the short term. Following project completion, all construction emissions would cease.

Despite the intensity and duration of construction activities, and the lack of available mitigation measures to abate GHG emissions from heavy-duty construction equipment and on-road hauling emissions, the incremental contribution to climate change by the project's construction emissions could be short term and minimal. However, construction activities permitted under the Order could increase GHG emissions. The specific locations and GHG emissions of possible future projects are not currently known; therefore, the potential for significant construction-related GHG emissions impacts cannot be identified at this time. Factors necessary to identify specific impacts include the project's location and construction characteristics, and the frequency and duration of emissions. Impacts would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure AIR-3 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure AIR-3: Minimize GHG Emissions

Restoration projects permitted under the Order shall implement the GHG mitigation measures listed in the most recent air district guidance documents (e.g., CAPCOA

2010; BAAQMD 2011), as appropriate for the project site and conditions. Current versions of such guidance documents list the following for construction of projects:

- Use alternative fuels for construction equipment.
- Use electric and hybrid construction equipment.
- Limit construction equipment idling beyond regulatory requirements.
- Institute a heavy-duty off-road vehicle plan.
- Implement a construction vehicle inventory tracking system.
- Use local building materials for at least 10 percent of total materials.
- Recycle or reuse at least 50 percent of construction waste or demolition materials.

In addition, the California Attorney General's Office has developed a list of measures and strategies to reduce GHG emissions at the individual project level. As appropriate, the measures can be included as design features of a restoration project, required as changes to the project, or imposed as mitigation (whether undertaken directly by the project proponent or funded by mitigation fees). The measures are examples; the list is not intended to be exhaustive. The following are best management practices to consider and implement (as applicable) during design, construction, and O&M of project facilities.

Transportation and Motor Vehicles

- Limit idling time for commercial vehicles, including delivery and construction vehicles.
- Use low- or zero-emission vehicles, including construction vehicles.
- Institute a heavy-duty off-road vehicle plan and a construction vehicle inventory tracking system for construction projects.
- Promote ridesharing.
- Provide the necessary facilities and infrastructure to encourage the use of low- or zero-emission vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations).
- Provide a shuttle service to public transit/work sites.
- Provide information on all options for individuals and businesses to reduce transportation-related emissions.

SmartWay Truck Efficiency

This strategy involves requiring existing trucks/trailers to be retrofitted with the best available "SmartWay Transport" and/or CARB-approved technology. Technologies that reduce GHG emissions from trucks include devices that reduce aerodynamic drag and rolling resistance. Aerodynamic drag may be reduced using devices such as cab roof fairings, cab side gap fairings, cab side skirts, and on the trailer side, skirts, gap fairings, and trailer tail. Rolling resistance can be reduced using single wide tires or low-rolling resistance tires and automatic tire inflation systems on both the tractor and the trailer.

Tire Inflation Program

The strategy involves actions to ensure that vehicle tire pressure is maintained to manufacturer specifications.

Blended Cements

The strategy to reduce CO_2 emissions involves the addition of blending materials such as limestone, fly ash, natural pozzolan, and/or slag to replace some of the clinker in the production of Portland cement.

Anti-Idling Enforcement

The strategy guarantees emissions reductions as claimed by increasing compliance with anti-idling rules, thereby reducing the amount of fuel burned through unnecessary idling. Measures include enhanced field enforcement of anti-idling regulations, increased penalties for violations of anti-idling regulations, and restriction on registrations of heavy-duty diesel vehicles with uncorrected idling violations.

Because the extent and location of such actions are not known at this time, it is not possible to conclude that Mitigation Measure AIR-3, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. It is reasonable to expect that construction activities could result in substantial GHG emissions, especially given the wide range of air district GHG emissions thresholds. For example, it is likely that GHG emissions would exceed local air district thresholds if the permitted action is undertaken by a lead agency that has adopted a net zero GHG emissions threshold. Therefore, this impact would be **significant and unavoidable**.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects permitted under the Order could consist of periodic and routine maintenance work such as sediment removal within or near the facilities, vegetation removal, and inspection and maintenance of facilities. Maintenance activities that would generate GHG emissions would be similar to those described for the construction of projects permitted under the Order; however, the level of activity, and therefore the level of emissions, would be much lower in the operational phase than during construction because activity would not be as intense during operations. Additionally, establishing, restoring, and enhancing tidal, subtidal, and freshwater wetlands would result in the creation of new wetlands, which sequester carbon. Carbon sequestration plays an important role in preventing global climate change by reducing greenhouse gas emissions and by preserving carbon "sinks" such as forests and wetlands. Therefore, establishing, restoring, and enhancing tidal, subtidal, and freshwater wetlands would provide more trees and plants which store carbon as they absorb CO_2 from the air, thus reducing net GHG emissions.

Restoration projects permitted under the Order could result in GHG emissions during O&M activities. However, the specific locations and emissions of possible future facilities are not known at this time. Factors necessary to identify site- or resource-specific impacts include the project’s location and construction characteristics, duration

of emissions, and the specific GHG thresholds of the local air quality district. Activities that generate GHG emissions would be similar to those described for the construction of projects permitted under the Order; however, the level of activity, and therefore the level of emissions, would be much lower during operations than during construction because activity would not cause an equal duration or concentration of emissions. Because operational emissions would not approach CARB's recommended thresholds and legislation that has established screening levels, the projects' GHG emissions would not be substantial and would not conflict with state and local planning efforts. Therefore, this impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Impact 3.4-6: Implementing future restoration projects permitted under the Order could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

As described in Section 3.4.3, *Regulatory Setting*, most air districts, cities, and counties in the study area have plans and policies regarding the reduction of GHGs.

Effects of Project Construction Activities

Construction activities from restoration projects permitted under the Order could require the use of diesel-powered construction equipment such as excavators, graders, scrapers, bulldozers, and backhoes. Haul trucks would move borrow and/or spoils and other materials. These activities would emit GHGs. It is assumed that projects would be constructed in compliance with any policies that have been adopted as rules or regulations to reduce emissions of GHGs. However, construction activities may not be consistent with policies that have not been adopted as rules or regulations. For example, the construction of setback levees requires the use of some specialized off-road equipment that could result in significant GHG emissions. It may not be feasible to use electric or alternatively fueled equipment, which would conflict with a specific county's climate action plan. For example, the analysis of a project designed to restore the natural geomorphic processes and ecological functions of a marsh could find that, although any increase in GHG emissions would add to the quantity of emissions that contribute to global climate change, emissions associated with construction of the project would occur over a limited period. Following completion of the project, all construction emissions would cease and the project's construction-related GHG emissions would not be substantial and would not conflict with state and local planning efforts.

Construction of projects permitted under the Order could conflict with GHG emissions reduction policies, plans, and regulations. However, the specific locations and scale of possible future facilities are not currently known; therefore, the precise conflicts and subsequent impacts cannot be identified at this time. Factors necessary to identify specific impacts include the project's location, design features, and size, and the applicable GHG emissions reduction plans and policies of jurisdictions. Because it may not be feasible in all cases to comply with GHG emissions plans and policies, this impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure AIR-1, AIR-2, and AIR-3 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measures AIR-1, AIR-2, and AIR-3 would reduce the impacts of restoration projects permitted under the Order. However, because the extent and location of such actions are not known at this time, it is not possible to conclude that the mitigation measures, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. It is possible that construction activities may not be consistent with policies that have not been adopted as rules or regulations. Therefore, this impact would be **significant and unavoidable**.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects permitted under the Order could would require periodic and routine maintenance work such as monitoring restoration projects and cleaning fish screens. Activities that would generate GHG emissions would be similar to those described for construction of projects permitted under the Order; however, activities would be less intense and less frequent in the operational phase than during construction. It is assumed that projects would be operated in compliance with any policies that have been adopted as rules or regulations to reduce emissions of GHGs.

The specific locations and scale of possible future facilities are not known at this time. Factors necessary to identify specific impacts include the project's location, design features, size, and the applicable GHG reduction plans and policies of jurisdictions. However, the level of activity and therefore the level of emissions would be much lower in the O&M phase than during construction because activity would not be as intense. Also, it is assumed that projects would be operated and maintained in compliance with any policies that have been adopted as rules or regulations to reduce emissions of GHGs. Therefore, this impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

3.4 Air Quality and Greenhouse Gas Emissions

3.4.1 Introduction

This section describes air quality conditions and greenhouse gas (GHG) emissions in the study area and the potential impacts of the types of restoration projects that would be permitted under the Order. (See Section 2.6, *Categories of Restoration Projects in the Order*.) The environmental setting and evaluation of impacts related to air quality and GHG emissions are based on a review of existing published documents, including air quality plans and climate action plans; information on example projects similar to those permitted under the Order that may be implemented by other agencies; and other information sources listed in Chapter 8, *References*. Restoration projects that would be permitted under the Order that could impair air quality are evaluated in this section. No comments on air quality and GHG emissions were received in response to the notice of preparation (NOP). See Appendix B for the NOP comment letters.

3.4.2 Environmental Setting

In California, regional or local air districts have been established to administer air pollution laws and regulations that protect air quality within designated air basins. Table 3.4-1 lists the air basins in the study area.

Air Quality

Background

Criteria Air Pollutants

As required by the federal Clean Air Act (CAA), which was enacted in 1970, the U.S. Environmental Protection Agency (EPA) has identified six criteria air pollutants (CAPs) for which state and national health-based ambient air quality standards have been established. EPA calls these pollutants “criteria air pollutants” because the agency has regulated them by developing specific public health– and welfare-based criteria as the basis for setting permissible levels. Ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable and fine particulate matter (PM_{10} and $PM_{2.5}$), and lead are the six CAPs.

Ozone

Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) (referred to by some regulating agencies as volatile organic compounds), and oxides of nitrogen (NO_X). The main sources of ROG and NO_X, often referred to as ozone precursors, are products of combustion processes (including motor vehicle engines) and the evaporation of solvents, paints, and fuels. Ozone is a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the photochemical reaction process. Ozone causes eye irritation, airway constriction, and shortness of breath and can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

Table 3.4-1
Air Basins in the Study Area

Air Basin	Counties in the Air Basin
Great Basin Valleys	Alpine, Inyo, Mono
Lake County	Lake
Lake Tahoe	El Dorado, Placer
Mojave Desert	Kern, Los Angeles, San Bernardino, Riverside
Mountain Counties	Amador, Calaveras, El Dorado, Mariposa, Nevada, Placer, Plumas, Sierra, Tuolumne
North Central Coast	Monterey, San Benito, Santa Cruz
North Coast	Del Norte, Humboldt, Mendocino, Sonoma, Trinity
Northeast Plateau	Lassen, Modoc, Siskiyou
Sacramento Valley	Butte, Colusa, Glenn, Placer, Sacramento, Shasta, Solano, Sutter, Tehama, Yolo, Yuba
Salton Sea	Imperial, Riverside
San Diego	San Diego
San Francisco Bay Area	Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma
San Joaquin Valley	Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, Tulare
South Central Coast	San Luis Obispo, Santa Barbara, Ventura
South Coast	Los Angeles, Orange, Riverside, San Bernardino

SOURCE: Data compiled by Environmental Science Associates in 2020

Carbon Monoxide

CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicle engines; the highest emissions occur during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue; impair central nervous system function; and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal.

Particulate Matter

PM_{10} and $PM_{2.5}$ consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively (a micron is one-millionth of a meter). PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects. Major pollutant sources of PM_{10} include: dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-

raised dust and ocean sprays). Major pollutant sources of $PM_{2.5}$ include: fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; also, formed from photochemical reactions of other pollutants, including NO_X, SO_X, and organics. Some sources of particulate matter, such as wood burning in fireplaces, demolition, and construction activities, are more local; others, such as vehicular traffic, have a more regional effect.

Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility. Large dust particles (diameter greater than 10 microns) settle out rapidly and are easily filtered by human breathing passages. This large dust is of more concern as a soiling nuisance rather than a health hazard. The remaining fraction, PM_{10} and $PM_{2.5}$, are a health concern, particularly at levels above the federal and state ambient air quality standards. $PM_{2.5}$ (including diesel exhaust particles) has greater effects on health, because these particles are so small and can penetrate to the deepest parts of the lungs.

Scientific studies have suggested links between fine particulate matter and numerous health problems, including asthma, bronchitis, and acute and chronic respiratory symptoms, such as shortness of breath and painful breathing. Recent studies have shown an association between morbidity (ill health) and mortality and daily concentrations of particulate matter in the air. Children are more susceptible to the health risks of PM_{10} and $PM_{2.5}$ because their immune and respiratory systems are still developing.

Studies conducted since the 1990s have shown a statistically significant direct association between mortality (premature deaths) and daily concentrations of particulate matter in the air. Despite important gaps in scientific knowledge and continued reasons for some skepticism, a comprehensive evaluation of the research findings provides persuasive evidence that exposure to fine particulate air pollution has adverse effects on cardiopulmonary health.

Nitrogen Dioxide

NO_2 is a reddish-brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO_2. Aside from its contribution to ozone formation, NO_2 can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as a coloring component on high-pollution days, especially in conjunction with high ozone levels.

Sulfur Dioxide

SO_2 is a combustion product of sulfur or sulfur-containing fuels such as coal and diesel. SO_2 is also a precursor to the formation of particulate matter, atmospheric sulfate, and atmospheric sulfuric acid formation that could precipitate downwind as acid rain.

Lead

Leaded gasoline (phased out in the United States beginning in 1973), lead-based paint (on older houses and cars), smelters (metal refineries), and the manufacture of lead storage batteries have been the primary sources of lead released into the atmosphere. Lead has a range of adverse neurotoxic health effects, which puts children at special

risk. Some lead-containing chemicals cause cancer in animals. Lead levels in the air have decreased substantially since leaded gasoline was eliminated. Ambient lead concentrations are monitored only on an as-warranted, site-specific basis in California.

Non-criteria Air Pollutants Covered under the California Ambient Air Quality Standards

Hydrogen Sulfide

Hydrogen sulfide is a colorless gas with the odor of rotten eggs. The most common sources of hydrogen sulfide emissions are oil and natural gas extraction and processing, and natural emissions from geothermal fields. It is also formed during bacterial decomposition of human and animal wastes, and is present in emissions from sewage treatment facilities and landfills. Hydrogen sulfide has an extremely strong and foul odor that can induce tearing of the eyes and symptoms related to overstimulation of the sense of smell, including headache, nausea, or vomiting.

Sulfates

Sulfates are a family of chemicals that contain the fully oxidized ionic form of sulfur, in combination with metal and/or hydrogen ions. In California, sulfur-containing compounds are emitted primarily during the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. Because sulfate particles are part of $PM_{2.5}$, they have health effects similar to those from exposure to $PM_{2.5}$.

Visibility-Reducing Particles

Particulate matter pollution affects the environment by decreasing visibility (causing haze). These particles vary greatly in shape, size, and chemical composition, and come from a variety of natural and manmade sources. Some haze-causing particles, such as windblown dust and soot, are emitted directly to the air. Others are formed in the air from the chemical transformation of gaseous pollutants (e.g., sulfates, nitrates, organic carbon particles), which are the major constituents of fine particulate matter. These fine particles, caused largely by combustion of fuel, can travel hundreds of miles and impair visibility. Some haze-causing pollutants have been linked to serious health problems and are described in the *Particulate Matter* section above.

Vinyl Chloride

Vinyl chloride (chloroethene), a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used in the process of making polyvinyl chloride plastic and vinyl products, and thus is emitted from industrial processes. Exposure to vinyl chloride is primarily an occupational concern. Short-term exposure to high levels (10 parts per million [ppm] or above) of vinyl chloride in air causes central nervous system effects, such as dizziness, drowsiness, and headaches. The primary non-cancer health effect of long-term exposure to vinyl chloride through inhalation or oral exposure is liver damage. Inhalation exposure to vinyl chloride increases the risk of angiosarcoma, a rare form of liver cancer in humans.

Toxic Air Contaminants

Non-criteria air pollutants or toxic air contaminants (TACs) are airborne substances that can cause short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer-

causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances. They are emitted from a variety of common sources, including gasoline stations, automobiles, diesel engines, dry cleaners, industrial operations, and painting operations. TACs are regulated differently from CAPs at both the federal and state levels. At the federal level, these airborne substances are referred to as hazardous air pollutants (HAPs). The state list of TACs identifies 243 substances (ARB 2020b), and the federal list of HAPs identifies 187 substances (EPA 2020).

The California Air Resources Board (CARB) identified diesel particulate matter (DPM) as a TAC in 1998, based primarily on evidence demonstrating cancer effects in humans. The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and concentrations of DPM are higher near heavily traveled highways and rail lines with diesel locomotive operations. The cancer risk from DPM as determined by CARB declined from 750 in one million in 1990 to 570 in one million in 1995; by 2000, CARB estimated the average statewide cancer risk from DPM at 540 in one million. This calculated cancer risk value from ambient air exposure can be compared against the lifetime probability of being diagnosed with cancer in the United States, from all causes, which is approximately 38.5 percent according to the National Cancer Institute (CARB 2020b).

Another notable TAC is asbestos, a fibrous mineral that is both naturally occurring in ultramafic rock (a rock type commonly found in California) and used as a processed component of building materials. Because asbestos has been proven to cause serious adverse health effects, including asbestosis and lung cancer, it is strictly regulated based on its natural widespread occurrence and its use as a building material.

Odorous Emissions

Odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the receptors. Odor impacts should be considered for any proposed new odor sources located near existing receptors, as well as any new sensitive receptors located near existing odor sources. Generally, increasing the distance between the receptor and the odor source will mitigate odor impacts.

Attainment Area Designations

Attainment Area Designations

The CAA and the California Clean Air Act (CCAA) require all areas of California to be classified as attainment, non-attainment, or unclassified as to their status with regard to the national ambient air quality standards (NAAQS) and California ambient air quality standards (CAAQS). Under the CAA and the CCAA, CARB designates portions of the state based on air quality monitoring data. Section 3.4.3, *Regulatory Setting*, includes a more detailed discussion of these federal and state standards.

Table 3.4-2 shows the federal and state non-attainment status for the air basins in the study area for criteria pollutants. For this assessment, an air basin was considered non-attainment if any portion of the basin is designated non-attainment even if whole or portions of counties are in attainment or unclassified. Because of the differences between the NAAQS and CAAQS, the designation of non-attainment areas is different under the federal and state legislation.

Table 3.4-2
Federal and State Non-attainment Status for Air Basins in the Study Area

Air Basin	Federal Non-attainment Designations—NAAQS	State Non-attainment Designations—CAAQS
Great Basin Valleys	PM_{10} (Mono Basin, Mammoth Lakes, Owens Valley)	Ozone, PM_{10}
Lake County	Not Applicable	
Lake Tahoe	Not Applicable	PM_{10}
Mojave Desert	Ozone (Antelope Valley and Western Mojave Desert), PM_{10}	Ozone, PM_{10}, hydrogen sulfide (Searles Valley)
Mountain Counties	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$ (Portola Valley), PM_{10}
North Central Coast	Not Applicable	Ozone (Non-attainment–Transitional), PM_{10}
North Coast	Not Applicable	PM_{10}
Northeast Plateau	Not Applicable	
Sacramento Valley	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$, PM_{10}
Salton Sea	Ozone, PM_{10}, $PM_{2.5}$	Ozone, PM_{10}
San Diego	Ozone	Ozone, $PM_{2.5}$, PM_{10}
San Francisco Bay Area	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$, PM_{10}
San Joaquin Valley	Ozone, $PM_{2.5}$	Ozone, $PM_{2.5}$, PM_{10}
South Central Coast	Ozone	Ozone, PM_{10}
South Coast	Ozone, $PM_{2.5}$, Lead	Ozone, $PM_{2.5}$, PM_{10}, NO (State Route 60 portion)

SOURCE: CARB 2020a.

NOTES: CAAQS = California ambient air quality standards; NAAQS = national ambient air quality standards; NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter

Sensitive Receptors

Given the geographical range of the study area and the variety of land uses present, this section describes sensitive receptors at a high level. A specific discussion of sensitive receptors would require knowledge of the local land uses near the restoration projects permitted under the Order.

Air quality does not affect every individual or group in the population in the same way, and some groups are more sensitive than others to adverse health effects caused by exposure to air pollutants. Population subgroups sensitive to the health effects of air pollutants include the elderly and the young, those with higher rates of respiratory disease such as asthma and chronic obstructive pulmonary disease, and those with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases. Land uses such as schools, children's day care centers, hospitals, and nursing and convalescent homes are more sensitive than the general public to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress. Parks and playgrounds are considered moderately sensitive to poor air quality because persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality; however, exposure times are generally far shorter in parks and playgrounds than in residential locations and schools, which typically reduces overall exposure to pollutants. Residential areas are more sensitive to air quality conditions than commercial and industrial areas because people generally spend longer periods of time at their residences, with associated greater exposure to ambient air quality conditions. Workers are not considered sensitive receptors because all employers must follow regulations set forth by the U.S. Occupational Safety and Health Administration to ensure the health and well-being of their employees.

The study area spans urbanized areas, rural areas, as well as parks and open space. In urbanized areas, sensitive receptors include schools, day care centers, residences, nursing homes, hospitals, and parks. In rural areas, the primary sensitive receptor would be rural residences.

Toxic Air Contaminants

The study area spans a variety of land uses that include sources of TACs, such as gas stations, automobile traffic, diesel engines, railways, dry cleaners, asbestos, industrial operations, and painting operations.

Odors

Odor-generating uses that may be present in the study area include wastewater treatment plants; landfills; chemical plants; decaying material in waterlogged areas; anaerobic decomposition of organic materials; and agricultural sources such as dairy and poultry farms, pesticide, fertilizer, and herbicide application, and rendering plants.

Greenhouse Gases

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface,

and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. GHG emissions contributing to global climate change are attributable, in large part, to human activities: on-road and off-road transportation, industrial/manufacturing, electricity generation by utilities and consumption by end users, residential and commercial on-site fuel usage, and agriculture and forestry. CO_2 emissions are largely byproducts of fossil fuel combustion. Methane, a highly potent GHG, results primarily from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions), largely from agricultural practices and landfills. Nitrous oxide emissions are also largely attributable to agricultural practices and soil management.

Gases with high global warming potential have atmospheric insulative properties that are hundreds to tens of thousands of times greater than that of CO_2. Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are some of the most common types of high global warming potential gases and result from a variety of industrial processes. Hydrofluorocarbons and perfluorocarbons are used as refrigerants and can be emitted through evaporation and leakage. Sulfur hexafluoride is a powerful electrical insulator used in power transmission and semiconductor manufacturing and is emitted through evaporation and leakage into the atmosphere.

According to the Intergovernmental Panel on Climate Change (IPCC), "It is extremely likely that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in GHG concentrations and other anthropogenic forcings together" (IPCC 2014:5). Climate change is a global problem. GHGs are global pollutants, unlike CAPs and TACs, which are pollutants of regional and local concern.

Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about 1 day), GHGs have long atmospheric lifetimes (one to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the lifetime of any particular GHG molecule is dependent on multiple variables and cannot be determined with any certainty, it is understood that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 55 percent is sequestered through ocean and land uptake

every year, averaged over the last 50 years, and the remaining 45 percent remains stored in the atmosphere (IPCC 2013:467).

The quantity of GHGs in the atmosphere that ultimately result in climate change is not precisely known, but is enormous; no single project alone would measurably contribute to an incremental change in the global average temperature, or to global, local, or micro climates. From the standpoint of CEQA, GHG impacts relative to global climate change are inherently cumulative. Chapter 5, *Cumulative Impacts*, includes a more detailed discussion of climate change.

Table 3.4-3 summarizes the most recent California statewide GHG emissions inventory. In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation for residential, commercial, and industrial use (CARB 2016).

Table 3.4-3
California Statewide Greenhouse Gas Emissions Inventory (2000–2017)

Emissions Sector	MMT CO_2e 2000	MMT CO_2e 2005	MMT CO_2e 2010	MMT CO_2e 2015	MMT CO_2e 2017	Percent of Total (2017)	Percent Change (2000–2017)
Transportation	180.3	189.1	165.1	166.2	169.9	40.1	-5.8
Electricity Generation[a]	104.8	107.9	90.3	83.8	62.4	14.7	-40.5
Industrial	97.4	95.9	91.5	91.5	89.4	21.1	-8.2
Commercial and Residential	44.0	43.1	45.9	38.8	41.1	9.7	-6.6
Agriculture	31.0	33.7	33.7	33.8	32.4	7.6	-4.5
High Global Warming Potential	6.3	9.3	13.5	18.6	19.9	4.7	+215.9
Recycling and Waste	7.3	7.8	8.4	8.7	8.9	2.1	+21.9
Total[b]	471.1	486.8	448.4	441.4	424.0	100	

SOURCE: CARB 2019

NOTES: MMT CO_2e = million metric tons of carbon dioxide equivalent

[a] Includes both in-state electricity generation and out-of-state imported electricity that is consumed in-state.

[b] Totals may not sum exactly due to rounding.

Carbon Sequestration

Carbon sequestration is the long-term storage of CO_2 that has been removed from the atmosphere and stored in a carbon reservoir (e.g., trees, vegetation, soil, and ocean). During these processes, CO_2 is absorbed from the atmosphere by trees and vegetation during photosynthesis. The CO_2 is then broken down and the carbon is stored (e.g., plant parts or soil), while the oxygen is released back into the atmosphere. Carbon sequestration plays an important role in preventing global climate change by reducing

greenhouse gas emissions and by preserving carbon "sinks" such as forests and wetlands. *An Inventory of Ecosystem Carbon in California's Natural & Working Lands* (CARB 2020c) provides an estimate of carbon sequestration in California. The inventory includes forest and other natural lands, urban land, cropland, soil carbon, and wetlands.

3.4.3 Regulatory Setting

This section discusses federal, state, and regional and local plans, policies, regulations, and laws, and ordinances pertaining to air quality and GHG emissions resources.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location.

Federal

Criteria Air Pollutants

EPA is in charge of implementing national air quality programs. EPA's air quality mandates are drawn primarily from the federal CAA, enacted in 1970. As required by the CAA, EPA has established primary and secondary NAAQS for the following criteria air pollutants: CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. The primary standards protect public health and the secondary standards protect public welfare. Table 3.4-4 lists the current NAAQS, along with the current CAAQS that are discussed later in this section.

Table 3.4-4
Summary of Ambient Air Quality Standards

Pollutant	Averaging Time	State Standard	National Standard	Major Pollutant Sources
Ozone	1 hour	0.09 ppm	–	Formed when reactive organic gases and NO_X react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial/industrial mobile equipment.
	8 hour	0.070 ppm	0.070 ppm	
Carbon Monoxide	1 hour	20 ppm	35 ppm	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hour [a]	9 ppm	9 ppm	
Nitrogen Dioxide	1 hour	0.18 ppm	100 ppb	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
	Annual Avg.	0.030 ppm	0.053 ppm	
Sulfur Dioxide	1 hour	0.25 ppm	75 ppb	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	3 hour	–	0.5 ppm [b]	
	24 hour	0.04 ppm	0.14 ppm	
	Annual Avg.	–	0.030 ppm	

Table 3.4-4
Summary of Ambient Air Quality Standards

Pollutant	Averaging Time	State Standard	National Standard	Major Pollutant Sources
Respirable Particulate Matter (PM_{10})	24 hour	50 µg/m^3	150 µg/m^3	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	Annual Avg.	20 µg/m^3	–	
Fine Particulate Matter ($PM_{2.5}$)	24 hour	–	35 µg/m^3	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including NO_X, oxides of sulfur, and organics.
	Annual Avg.	12 µg/m^3	12.0 µg/m^3	
Lead	Monthly Ave.	1.5 µg/m^3	–	Present source: lead smelters, battery manufacturing and recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	–	1.5 µg/m^3	
Hydrogen Sulfide	1 hour	0.03 ppm	No National Standard	Geothermal power plants, petroleum production and refining.
Sulfates	24 hour	25 µg/m^3	No National Standard	Produced by the reaction in the air of SO_2.
Visibility-Reducing Particles	8 hour	Extinction of 0.23/km; visibility of 10 miles or more	No National Standard	See $PM_{2.5}$.
Vinyl Chloride	24 hour	0.01 ppm	No National Standard	Polyvinyl chloride and vinyl manufacturing.

SOURCES: CARB 2009, 2016.

NOTES: µg/m^3 = micrograms per cubic meter; km = kilometer; NO_X = oxides of nitrogen; ppb = parts per billion; ppm = parts per million; SO_2 = sulfur dioxide

[a] A more stringent 8-hour carbon monoxide state standard exists around Lake Tahoe (6 ppm).

[b] Secondary national standard.

The CAA also requires each state to prepare an air quality control plan, referred to as a state implementation plan (SIP), for areas that do not attain the NAAQS. Table 3.4-2 lists the NAAQS non-attainment status for air basins in the study area.

The federal CAA Amendments of 1990 added requirements for states with areas that are not in attainment of all NAAQSs to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA reviews SIPs to determine whether they conform to the mandates of the CAA and its amendments, and whether implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, a federal implementation plan that imposes additional control measures may be prepared for the non-attainment area. If an approvable SIP is not submitted or implemented within the mandated time frame, sanctions may be applied to transportation funding and permitting of stationary air pollution sources in the non-attainment air basin.

Toxic Air Contaminants

Air quality regulations also cover TACs, which federal agencies refer to as HAPs. In general, for TACs that cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may not be expected to occur. Instead, EPA and, in California, CARB, regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum available control technology or best available control technology for toxics to limit emissions.

Greenhouse Gases

EPA is the federal agency responsible for implementing the CAA and its amendments. The U.S. Supreme Court ruled on April 2, 2007, that CO_2 is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of GHGs. Based on the ruling in this case, EPA took steps to regulate GHG emissions and lent its support to state and local agencies' efforts to reduce GHG emissions.

Greenhouse Gas Permitting Requirements

The CAA requires that new major stationary emissions sources and major modifications at existing stationary sources obtain an air pollution permit before beginning construction. On May 13, 2010, EPA issued the Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule (EPA 2011). This final rule sets thresholds for GHG emissions that define when permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.

PSD permitting requirements now cover new construction projects that emit at least 100,000 tons (90,718 metric tons [MT]) of GHGs per year, even if they do not exceed the permitting thresholds for any other attainment pollutant. Modifications at existing facilities that increase GHG emissions by at least 75,000 tons (68,039 MT) per year are subject to PSD requirements, even if they do not significantly increase emissions of any other attainment pollutant. Title V Operating Permit requirements apply to sources based on their GHG emissions even if they would not apply based on emissions of any other pollutant. Facilities that emit at least 100,000 tons (90,718 MT) per year of carbon dioxide equivalent (CO_2e) are subject to Title V permitting requirements.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the United States. In general, this national reporting requirement provides EPA with accurate and timely GHG emissions data from facilities that emit 25,000 MT or more of CO_2e per year. These publicly available data allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost-effective opportunities to reduce emissions in the future. Reporting is conducted at the facility level, except that certain suppliers of fossil fuels and industrial GHGs along with vehicle and engine manufacturers report at the corporate level. An estimated 85 percent of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule.

State

Criteria Air Pollutants

CARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California, and for implementing the CCAA. The CCAA, adopted in 1988, required the CARB to establish CAAQS. CARB has established CAAQS, as shown in Table 3.4-4 above, for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned federal criteria air pollutants.

Table 3.4-2 lists the CAAQS non-attainment status for air basins in the study area. In most cases, the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health-effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals. The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest date practical. The act specifies that local air districts should focus attention on reducing the emissions from transportation and area-wide emission sources, and provides air districts with the authority to regulate indirect sources.

Toxic Air Contaminants/Hazardous Air Pollutants

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807, Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588, Chapter 1252, Statutes of 1987). AB 1807 established a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review are required before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs and adopted EPA's list of HAPs as TACs. Most recently, particulate matter exhaust from diesel engines (DPM) was added to CARB's list of TACs.

Once a TAC is identified, CARB adopts an airborne toxics control measure for sources that emit that particular TAC. If a safe threshold exists for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If no safe threshold exists, the measure must incorporate best available control technology for toxics to minimize emissions.

CARB has adopted diesel exhaust control measures and more stringent emissions standards for various transportation-related mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). Over time, replacing older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, DPM) have been reduced significantly over the last decade and will be reduced further in California through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of CARB's Risk Reduction Plan (CARB 2000), it is expected that DPM concentrations will be 85 percent less in 2020 than in the year 2000. Adopted regulations are also expected to reduce formaldehyde emissions from cars and light-duty trucks. As emissions are reduced, the risks from exposure to the emissions should also be reduced.

Greenhouse Gas Emissions

Executive Order S-3-05

Executive Order S-3-05, signed by Governor Arnold Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra Nevada snowpack, exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those problems, the executive order established targets for the state's total GHG emissions: reduce emissions to the 2000 level by 2010, to the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

Executive Order B-30-15

On April 20, 2015, Governor Edmund G. Brown Jr. signed Executive Order B-30-15, which established a GHG emissions reduction target for California of 40 percent below the 1990 level by 2030. The executive order aligns California's GHG emissions reduction targets with those of leading international governments such as the 28-nation European Union, which adopted the same target in October 2014. The California Global Warming Solutions Act of 2006 (AB 32, discussed below) established the target of reducing GHG emissions to the 1990 level (431 MMT CO_2e) by 2020. This goal was achieved 4 years early in 2016 (CalEPA 2018).

Meeting California's emissions reduction target for 2030, emissions 40 percent below the 1990 level, will make it possible to reach the ultimate goal of reducing emissions to 80 percent below the 1990 level by 2050. This is in line with the scientifically established levels needed in the U.S. to limit global warming below 2 degrees Celsius (°C)—the warming threshold at which there will likely be major climate disruptions such as super droughts and rising sea levels, according to scientific consensus.

Assembly Bill 32, the California Global Warming Solutions Act of 2006

In September 2006, Governor Schwarzenegger signed AB 32, which established regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 required that statewide GHG emissions be reduced to 1990 levels by 2020. AB 32 also requires that these

reductions “shall remain in effect unless otherwise amended or repealed,” further stating the following (Health and Safety Code Section 38551):

> *(b) It is the intent of the Legislature that the statewide greenhouse gas emissions limit continue in existence and be used to maintain and continue reductions in emissions of greenhouse gases beyond 2020.*
>
> *(c) The state board [California Air Resources Board] shall make recommendations to the Governor and the Legislature on how to continue reductions of greenhouse gas emissions beyond 2020.*

In 2017 CARB released California’s 2017 Climate Change Scoping Plan which included recommendations to maintain and continue reductions beyond 2020 (ARB 2017). AB 32 requires CARB to update the Scoping Plan at least every 5 years.

Assembly Bill 32 Climate Change Scoping Plan and Updates

In December 2008, CARB adopted its Climate Change Scoping Plan, which contains the main strategies California will implement to reduce CO_2e emissions by approximately 118 million metric tons (MMT), or approximately 21.7 percent from the state’s projected 2020 emissions level of 545 MMT CO_2e under a business-as-usual scenario. (This is a reduction of 47 MMT CO_2e, or almost 10 percent, from 2008 emissions.)

CARB released the First Update to the Climate Change Scoping Plan in May 2014 and subsequently adopted the plan, which identifies the next steps to reaching the goals of AB 32 and evaluates the progress that was made between 2000 and 2012 (CARB 2014). The update stated that California was on track to meet the near-term 2020 GHG limit and is well positioned to maintain and continue reductions beyond 2020 (CARB 2014). The update also reported trends in GHG emissions from various emissions sectors (e.g., transportation, building energy, agriculture).

On December 14, 2017, CARB adopted the 2017 Climate Change Scoping Plan (2017 Scoping Plan) (CARB 2017), which presents the framework for achieving the 2030 reductions established in more recent legislation. The 2017 Scoping Plan identifies the GHG reductions needed by each emissions sector to achieve a statewide emissions level before 2030 that is 40 percent below the 1990 level.

The 2017 Scoping Plan also identifies how GHGs from proposed projects could be evaluated under CEQA. Specifically, it states that achieving “no net increase” in GHG emissions is the correct overall objective for projects evaluated under CEQA if the projects cannot be shown to conform with applicable local GHG reduction plans. CARB recognizes that it may not be appropriate or feasible for every development project to mitigate its GHG emissions to no net increase, and that this may not necessarily imply a substantial contribution to the cumulatively significant environmental impact of climate change.

Senate Bill 375

Senate Bill (SB) 375, signed by Governor Schwarzenegger in September 2008, aligns regional transportation planning efforts, regional GHG emissions reduction targets, and land use and housing allocation. SB 375 requires metropolitan planning organizations

(MPOs) to adopt a sustainable communities strategy (SCS) or alternative planning strategy, showing prescribed land use allocation in each MPO's regional transportation plan. CARB, in consultation with the MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in their respective regions for 2020 and 2035.

Senate Bill X1-2, the California Renewable Energy Resources Act of 2011

SB X1-2 (2011) requires all California utilities to generate 33 percent of their electricity from renewables by the end of 2020. SB X1-2 set a three-stage compliance period requiring all California utilities, including independently owned utilities, energy service providers, and community choice aggregators, to generate 20 percent of their electricity from renewables by December 31, 2013; 25 percent by December 31, 2016; and 33 percent by December 31, 2020.

SB X1-2 also requires that the renewable electricity standard be met increasingly with renewable energy supplied to California's grid from sources in or near California. SB X1-2 specified that renewables from these sources must make up at least 50 percent of total renewable energy for the 2011–2013 compliance period, at least 65 percent for the 2014–2016 compliance period, and at least 75 percent for 2016 and beyond.

Senate Bill 350, the Clean Energy and Pollution Reduction Act of 2015

SB 350 requires the California Public Utilities Commission (CPUC) to focus its energy procurement decisions on reducing GHG emissions by 40 percent by 2030, including through efforts to procure at least 50 percent renewable energy, double energy efficiency, and promote electrification of transportation.

Senate Bill 100, California Renewables Portfolio Standard Program: Emissions of Greenhouse Gases

SB 100 requires that California's renewable-energy and zero-carbon resources supply 100 percent of electric retail sales to end-use customers, and 100 percent of the electricity procured for state agencies, by December 31, 2045. The policy specifies that the transition to a zero-carbon electric system must not cause or contribute to increases of GHG emissions elsewhere in the western electricity grid.

SB 100 also requires the California Energy Commission (CEC), CPUC, and CARB to complete a joint agency report to the Legislature evaluating the 100 percent zero-carbon electricity policy. The report will be developed using a public process and qualitative and quantitative analyses to address the requirements and intent of the statute.

In consultation with all California balancing authorities and as part of a public process, the three agencies will issue a report to the Legislature by January 1, 2021, and at least every 4 years afterward. The joint report will include:

- A review of the 100 percent zero-carbon policy focused on technologies, forecasts, then-existing transmission, and the maintenance of safety, environmental and public safety protection, affordability, and system and local reliability.
- An evaluation identifying the potential benefits and impacts of achieving the policy on system and local reliability.

- An evaluation of the nature of any anticipated financial costs and benefits to electric, gas, and water utilities, including customer rate impacts and benefits.
- The barriers to, and benefits of, achieving the policy.
- Alternative scenarios in which the policy can be achieved and the estimated costs and benefits of each scenario.

Senate Bill 32 and Assembly Bill 197 (2016)

In August 2016, Governor Brown signed SB 32 and AB 197, which extended California's GHG emissions reduction programs beyond 2020. SB 32 amended the Health and Safety Code to include Section 38566, which contains language authorizing CARB to achieve a statewide GHG emissions reduction of at least 40 percent below the 1990 level by no later than December 31, 2030. SB 32 codified the targets established by Executive Order B-30-15 for 2030, which set the next interim step in the state's continuing efforts to pursue the long-term target expressed in Executive Orders S-3-05 and B-30-15 of 80 percent below the 1990 emissions level by 2050.

Regional and Local

The study area encompasses multiple counties, cities, and air districts throughout California. Each county, city, and air district has local regulations, an air quality management plan (AQMP), a general plan, and in some cases a climate action plan, containing goals and policies to improve air quality and address community health and sustainability. Counties and cities may set community GHG emissions reduction targets, require best management practices to reduce emissions of air pollutants such as fugitive dust, and reinforce local air district recommendations.

3.4.4 Impacts and Mitigation Measures

Methods of Analysis

Air quality and GHG emissions impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could emit criteria air pollutants and precursors, odors, TACs, and GHGs. However, the precise locations and detailed characteristics of potential future individual restoration projects are yet to be determined. Therefore, this air quality and GHG emissions analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis.

Permanent impacts are those that would continue through the life of a project as a result of the environmental conditions caused by restoration projects permitted under the Order (e.g., new infrastructure such as fish screens that would require routine maintenance and cleaning of fish screens and removal of debris and sediment from stream crossings). Temporary impacts are considered those that would be temporary in nature (e.g., construction-related activities).

The approach to assessing air quality and GHG emissions impacts was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of*

Restoration Projects in the Order, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an air quality– or GHG emissions–related impact is considered significant if the types of projects that would be permitted under the Order would do any of the following:

- Conflict with or obstruct implementation of the applicable air quality plan
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard
- Expose sensitive receptors to substantial pollutant concentrations
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people
- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs

Appendix G of the State CEQA Guidelines further indicates that, where available, the thresholds of significance established by the applicable air district may be relied upon to make the significance determinations. If the applicable air district has not established specific thresholds, then the thresholds of neighboring air districts or emissions limits used for stationary-source permitting may be used.

Impacts and Mitigation Measures

Table 3.4-5 summarizes the impact conclusions presented in this section for easy reference.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Table 3.4-5
Summary of Impact Conclusions—Air Quality and Greenhouse Gas Emissions

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.4-1: Implementing future restoration projects permitted under the Order could conflict with an applicable air quality plan.	SU	LTS
3.4-2: Emissions from future restoration projects permitted under the Order could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.	SU	LTS
3.4-3: Emissions from future restoration projects permitted under the Order could result in other emissions (such as those leading to odors) that would adversely affect a substantial number of people.	LTS	LTS
3.4-4: Emissions from future restoration projects permitted under the Order could expose sensitive receptors to substantial pollutant concentrations.	SU	LTS
3.4-5: Implementing future restoration projects permitted under the Order could result in an increase in GHG emissions that may have a significant impact on the environment.	SU	LTS
3.4-6: Implementing future restoration projects permitted under the Order could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.	SU	LTS

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2020
NOTES: LTS = less than significant; SU = significant and unavoidable

Impact 3.4-1: Implementing future restoration projects permitted under the Order could conflict with an applicable air quality plan.

As described in Section 3.4.3, *Regulatory Setting*, most of the air districts in the study area have one or more air quality management plans that include control measures, rules, and regulations to bring air districts into attainment for certain criteria air pollutants.

Effects of Project Construction Activities

Construction activities permitted under the Order would include construction of culverts, bridges, fish screens, ladders, and pilings; removal of small dams, tide gates, flood

gates, and legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams during construction. These activities could require the use of mobile diesel-powered construction equipment such as excavators, graders, scrapers, bulldozers, and backhoes. For example, haul trucks would be used to move borrow and/or spoils and other materials and would emit pollutants. ROG, NO_X, PM_{10}, $PM_{2.5}$, CO, and CO_2 would be emitted during the combustion of fuels in construction equipment and material transport trucks.

It is reasonable to assume that the construction of projects would comply with the control measures, rules, and regulations stated in the AQMPs of local air districts. For example, analysis of a project designed to restore the natural geomorphic processes and ecological functions at a marsh could find that the generation of construction-related emissions of ROG, NO_X, and PM_{10} would not violate or contribute substantially to an existing or projected air quality violation.

AQMPs set forth rules, regulations, and control measures to bring an air district into attainment for certain criteria pollutants. If a project would substantially contribute to pollutant concentrations that exceed the NAAQS and CAAQS, it may also conflict with the local AQMP. As discussed for Impact 3.4-2 below, emissions from construction activities permitted under the Order could violate an air quality standard; contribute substantially to an air quality violation; and/or result in a short-term cumulatively considerable net increase in pollutants for which the region is non-attainment. Therefore, it is possible that construction activities for restoration projects permitted under the Order could conflict with an applicable air quality plan.

The specific locations and emissions of possible construction activities are not known at this time. Therefore, the potential for a conflict between a given restoration project permitted under the Order and an applicable air quality plan cannot be determined. Factors necessary to identify specific impacts include the location and size of the project, construction characteristics, attainment status of the local air basin or basins, and the applicable AQMPs of the local air quality district. Because air pollutant emissions from restoration projects permitted under the Order could conflict with applicable air quality plans, this impact would be **potentially significant**.

Projects implementing applicable general protection measures (see Appendix E) included in the Order would further reduce impacts to air quality and greenhouse gas emissions. The following general protection measures may apply to air quality and greenhouse gas emissions:

- GPM-8: Work Area and Speed Limits
- GPM-17: Fugitive Dust Reduction

Integration of these general protection measures into project designs and plans would reduce the impact of air pollutant emissions from project construction activities, but not to a less-than-significant level. This impact would be **potentially significant**.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure AIR-1 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure AIR-1: Minimize Conflicts with Applicable Air Quality Plans

Proponents of restoration projects permitted under the Order and their construction contractors shall implement the following measures to minimize conflicts between project construction and applicable air quality plans:

- Use equipment and vehicles that comply with CARB requirements and emission standards for on-road and off-road fleets and engines. New engines and retrofit control systems should reduce NO_X and PM emissions from diesel-fueled on-road and off-road vehicles and equipment.
- Minimize idling times, either by shutting equipment off when not in use or by reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure, Title 13, Section 2485 of the California Code of Regulations). Clear signage should be posted for construction workers at all entrances to the site.
- Maintain all equipment in proper working condition according to the manufacturer's specifications.
- Use electric equipment when possible. Use lower emitting alternative fuels to power vehicles and equipment where feasible.
- Use low–volatile organic compound (VOC) coatings and chemicals; minimize chemical use.

Mitigation measures for individual restoration projects would also include recommendations or requirements of the local air district(s). Project proponents would coordinate with local air district(s) regarding project-specific mitigation and implement applicable measures during construction. For example, the Bay Area Air Quality Management District (BAAQMD) lists basic and additional mitigation measures to reduce emissions from project construction (BAAQMD 2010, 2017). The following basic construction mitigation measures are recommended for restoration projects permitted under the Order:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).

- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- Post a publicly visible sign with the telephone number and person at the lead agency to contact regarding dust complaints. This person shall respond and take corrective action within 48 hours. The air district's phone number shall also be visible to ensure compliance with applicable regulations.

The following additional construction mitigation measures are recommended for projects with construction emissions above the threshold determined for the local AQMP:

- All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent. Moisture content can be verified by lab samples or moisture probe.
- All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.
- Wind breaks (e.g., trees, fences) shall be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50 percent air porosity.
- Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
- The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.
- Site accesses to a distance of 100 feet from the paved road shall be treated with a 6- to 12-inch compacted layer of wood chips, mulch, or gravel.
- Erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than 1 percent.
- The idling time of diesel-powered construction equipment shall be minimized to 2 minutes.
- The project shall develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a project-wide fleet-average 20 percent NO_X reduction and 45 percent PM reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as such become available.

- The project shall use low-VOC (i.e., ROG) coatings beyond local requirements (i.e., Regulation 8, Rule 3: Architectural Coatings).
- All construction equipment, diesel trucks, and generators shall be equipped with best available control technology for emission reductions of NO_X and PM.
- All contractors shall use equipment that meets CARB's most recent certification standard for off-road heavy-duty diesel engines.

Mitigation Measure AIR-1 would be implemented to reduce the impacts of restoration projects permitted under the Order. However, because the extent and location of such actions are not known at this time, it is not possible to conclude that the mitigation measure, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. Therefore, this impact would be **significant and unavoidable**.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects permitted under the Order could require periodic and routine maintenance. For example, operations and maintenance (O&M) necessary to support the functionality of constructed infrastructure may include maintenance and cleaning of fish screens, removal of debris and sediment from stream crossings, and O&M of fishways, which would produce air pollutant emissions from the use of equipment and vehicles that could conflict with applicable air quality plans. Emissions-generating activities would be similar to those described for the construction of restoration projects; however, the level of activity would be less intense and less frequent in the operational phase than during construction. Therefore, it is anticipated that emissions from restoration projects permitted under the Order would not violate an air quality standard, contribute substantially to an air quality violation, or result in a short-term cumulatively considerable net increase of non-attainment pollutants. Therefore, this impact would be **less than significant**.

The general protection measures listed above for project construction would be followed to further reduce the impacts of ground-disturbing activities for restoration projects permitted under the Order related to work area and speed limits and dust suppression.

Integration of these general protection measures into project designs and plans would continue to reduce the **less-than-significant** impacts of constructed facilities related to a conflict with an applicable air quality plan.

Impact 3.4-2: Emissions from future restoration projects permitted under the Order could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.

Construction activities from restoration projects permitted under the Order could be located in one or more air basins. Most of these air basins have established numeric thresholds for construction-generated emissions of criteria air pollutants and precursors,

indicating when emissions are significant at the project level and when emissions are cumulatively considerable.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order could require the use of diesel-powered construction equipment such as excavators, graders, scrapers, bulldozers, and backhoes. Haul trucks would be used to move borrow and/or spoils and other materials and would emit pollutants. ROG, NO_X, PM_{10}, $PM_{2.5}$, CO, and CO_2 would be emitted during the combustion of fuels in construction equipment and material transport trucks. Construction of restoration projects would emit fugitive PM_{10} and $PM_{2.5}$ dust, primarily during earthmoving activities. Other sources of fugitive dust would include vehicle travel on paved and unpaved roads, creation and management of borrow sites, concrete batch plants, and material handling, storage, and transport.

It is reasonable to expect that construction activities for restoration projects permitted under the Order may be intensive enough to result in substantial pollutant emissions. For example, floodplain restoration projects within the jurisdictional area of BAAQMD (e.g., including setting back, breaching, and removal of levees, berms, and dikes, and hydraulic reconnection and revegetation) may require the extensive use of heavy equipment and haul trips that would generate NO_X emissions in excess of BAAQMD's maximum daily threshold of 54 pounds per day, one of the more stringent thresholds in the study area.

Construction activities for restoration projects permitted under the Order could emit air pollutants. However, the specific locations and emissions of possible future facilities are not known at this time. Therefore, the potential for substantial construction-related emissions impacts cannot be determined. Factors necessary to identify site- or resource-specific impacts include the project's location, duration, and construction characteristics, and the thresholds of the local air quality district. Because the construction activities for restoration projects permitted under the Order could result in a cumulatively considerable net increase of a criteria pollutant for which a project region is in non-attainment status under an applicable federal or state ambient air quality standard, this impact would be **potentially significant**.

The general protection measures listed for Impact 3.4-1 would be followed to reduce the impacts of ground-disturbing activities for restoration projects permitted under the Order related to work area and speed limits and dust suppression.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure AIR-1 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure AIR-1 would be implemented to reduce the impacts of restoration projects permitted under the Order. However, because the extent and location of such actions are not known at this time, it is not possible to conclude that the mitigation measure, or equally effective mitigation measures, would reduce the significant impacts

of restoration projects constructed by other agencies to a less-than-significant level in all cases. Therefore, this impact would be **significant and unavoidable**.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects permitted under the Order could require periodic and routine maintenance. For example, O&M activities necessary to support the functionality of constructed infrastructure may include maintenance and cleaning of fish screens, removal of debris and sediment from stream crossings, and fishways O&M. These activities would produce air pollutant emissions that could result in a cumulatively considerable net increase of a criteria pollutant for which a project region is non-attainment under an applicable federal or state ambient air quality standard. Emissions-generating activities would be similar to those described for the construction of projects; however, the level of activity would be less intense and less frequent in the operational phase than during construction.

Routine O&M activities for restoration projects permitted under the Order would not be expected to result in a cumulatively considerable net increase of any criteria pollutant for which a project region is non-attainment under an applicable federal or state ambient air quality standard. Therefore, this impact would be **less than significant**.

The general protection measures listed for Impact 3.4-1 would be followed to further reduce the impacts of ground-disturbing O&M activities for restoration projects permitted under the Order related to work area and speed limits and dust suppression.

Integration of these general protection measures into project designs and plans would continue to reduce the **less-than-significant** impacts of constructed facilities related to the potential for a cumulatively considerable net increase of any criteria pollutant for which a project region is non-attainment under an applicable federal or state ambient air quality standard.

Impact 3.4-3: Emissions from future restoration projects permitted under the Order could result in other emissions (such as those leading to odors) that would adversely affect a substantial number of people.

The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors.

Effects of Project Construction Activities

Construction of restoration projects permitted under the Order could require the use of diesel-powered equipment and haul trucks such as excavators, graders, scrapers, bulldozers, and backhoes. Exhaust emissions from diesel equipment may generate odors. Haul trucks would move borrow and/or spoils and other materials and would emit exhaust. Odors may also be emitted during dredging and the placement of dredge spoils on adjacent lands for drying; if present, organic material could release gases, specifically hydrogen sulfide (H_2S), commonly described as having a foul or “rotten egg” smell.

Sources of construction-related emissions generally would not be in one location for long periods of time. The emissions would be intermittent and would dissipate from the

source rapidly over a short distance. For example, the analysis of a project designed to restore natural geomorphic processes and ecological functions at a marsh could find that the project would not result in any major sources of odors and that construction odors would be intermittent and short-term.

Construction activities for restoration projects permitted under the Order could temporarily generate odorous emissions. The specific locations and emissions of possible future projects are not currently known; therefore, the precise odor impacts cannot be identified at this time. Factors necessary to identify specific impacts include the project's location, construction characteristics, frequency and duration, and the location of sensitive receptors. However, given the temporary and intermittent nature of the impacts and the dissipation of odors, objectionable odors are unlikely to affect a substantial number of people. Impacts would be **less than significant**.

Projects implementing applicable general protection measures (see Appendix E) included in the Order would further reduce impacts to air quality and greenhouse gas emissions. The following general protection measures may apply to air quality and greenhouse gas emissions:

- IWW-13: Dredging Operations and Dredging Materials Reuse Plan

Integration of this general protection measure into project designs and plans would further reduce the **less-than-significant** impact related to other emissions (such as those leading to odors).

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects constructed under the Order could require periodic and routine maintenance work, such as sediment removal within or near the facilities, vegetation removal, and inspection and maintenance of facilities. Odor-generating activities would be similar to those described for construction of projects; however, the level of activity would be less intensive in the operational phase than during construction. For example, repairing damage to a fish screen may require the use of heavy equipment that would create odorous diesel emissions, but the activity would not be as intense as during the initial construction of the fish screen.

In addition to maintenance activities, the operational characteristics of restoration projects permitted under the Order could generate odors. For example, floodplain restoration, including setting back, breaching, and removal of levees, berms, and dikes, and hydraulic reconnection and revegetation may increase the acreage that could be temporarily flooded, which could expose decomposing organic matter to the atmosphere and create objectionable odors. However, odorous emissions would be intermittent and dissipate from the source rapidly over a short distance. Thus, it is unlikely that projects would create objectionable odors affecting a substantial number of people.

Restoration projects permitted under the Order could temporarily generate odorous emissions. The specific locations and emissions of future facilities are not currently known; therefore, the precise odor impacts cannot be identified at this time. Factors necessary to identify specific impacts include the project's location, operational

characteristics, frequency and duration, and the location of sensitive receptors. However, given the temporary and intermittent nature of the impacts and the dissipation of odors, objectionable odors are unlikely to affect a substantial number of people. Impacts would be **less than significant**.

Projects implementing applicable general protection measures (see Appendix E) included in the Order would further reduce impacts to air quality and greenhouse gas emissions. The following general protection measures may apply to air quality and greenhouse gas emissions:

- IWW-13: Dredging Operations and Dredging Materials Reuse Plan

Integration of this general protection measure into project designs and plans would further reduce **less-than-significant** impacts related to other emissions (such as those leading to odors).

Impact 3.4-4: Emissions from future restoration projects permitted under the Order could expose sensitive receptors to substantial pollutant concentrations.

High concentrations of fugitive dust, CO, and TACs generated during construction activities are of particular concern for sensitive receptors. The study area contains vast rural areas that are sparsely populated as well as cities of significant size, density, and population.

Effects of Project Construction Activities

Construction activities from restoration projects permitted under the Order could include activities that would generate air pollutant emissions such as fugitive dust, CO, and TACs that could present health risks to sensitive receptors. The dose to which receptors are exposed is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Dose is a function of the concentration of a substance and the duration of exposure. According to the California Office of Environmental Health Hazard Assessment, health risk assessments that determine the exposure of sensitive receptors to TAC emissions should be based on a 30-year exposure period (OEHHA 2015:8-1).

It is therefore important to consider that the use of off-road heavy-duty diesel equipment for construction of restoration projects permitted under the Order would be temporary, occurring in any one location for short periods of time. For example, setback levee construction is linear, and emissions would not take place in just one location for the duration of construction, which would take far less than 30 years.

It is also important to consider the proximity of the nearby sensitive receptors. Studies show that DPM is highly dispersive (e.g., DPM concentrations decrease by 70 percent at 500 feet from the source) (Zhu et al. 2002), and receptors must be close to emissions sources to result in the possibility of exposure to concentrations of concern. Although some projects, such as a setback levee, could be located near cities and communities of substantial size, density, and population, many would be far from sensitive receptors. For example, analysis of a project designed to restore the natural geomorphic processes and ecological functions of a marsh could find that the project would not

result in any major sources of emissions and would be required to comply with established standards and regulations for emissions.

The health impacts from exposure to these pollutants depend on the concentrations to which sensitive receptors are exposed, the duration of the exposure, and the toxicity of the pollutant. Although construction-related emissions would last no more than a few years and are transient, some construction activities for restoration projects permitted under the Order could occur over several years and could be close to sensitive receptors. For example, setback levee construction may be required near existing infrastructure, potentially exposing sensitive receptors to substantial concentrations of air pollutant emissions and TACs.

Because the construction activities for restoration projects permitted under the Order could expose sensitive receptors to substantial pollutant concentrations, this impact would be **potentially significant**.

The general protection measures listed for Impact 3.4-1 would be followed to reduce the impacts of ground-disturbing O&M activities for restoration projects permitted under the Order related to work area and speed limits and dust suppression.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure AIR-2 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure AIR-2: Minimize Construction Air Pollutant Emissions

Air quality analyses prepared for future restoration projects shall evaluate human health risks from potential exposures of sensitive receptors to substantial pollutant concentrations from the projects. The need for a human health risk analysis should be evaluated using approved screening tools, and discussed with the local air quality management district or air pollution control district during the preparation of the air quality analysis.

If the project's health risk is determined to be significant, control measures should be implemented to reduce health risks to levels below the applicable air district threshold.

Implementation of one or more of the following requirements, where feasible and appropriate, would reduce the effects of construction:

- Use equipment with diesel engines designed or retrofitted to minimize DPM emissions, usually through the use of catalytic particulate filters in the exhaust.
- Use electric equipment to eliminate local combustion emissions.
- Use alternative fuels, such as compressed natural gas or liquefied natural gas.

If the restoration project would result in significant emissions of airborne, naturally occurring asbestos, or metals from excavation, hauling, blasting, tunneling, placement, or other handling of rocks or soil, a dust mitigation and air monitoring plan shall identify individual restoration project measures to minimize emissions and

ensure that airborne concentrations of the TACs of concern do not exceed regulatory or risk-based trigger levels.

Mitigation Measure AIR-1 and AIR-2 would be implemented to reduce the impacts of restoration projects permitted under the Order. However, because the extent and location of such actions are not known at this time, it is not possible to conclude that the mitigation measure or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. Therefore, this impact would be **significant and unavoidable**.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects constructed under the Order could require periodic and routine maintenance work, such as removal of sediment within or near the facilities, vegetation removal, and inspection and maintenance of facilities. These O&M activities could generate emissions of air pollutants such as fugitive dust, CO, and TACs that, at high dosages, present health risks to sensitive receptors. For example, O&M activities necessary to support the functionality of constructed infrastructure may include maintenance and cleaning of fish screens, removal of debris and sediment from stream crossings, and fishways O&M, which would generate pollutant emissions.

Emissions-generating activities during the operational phase would be similar to those described for construction; however, the level of activity would be much lower in the operational phase than during construction. Sensitive receptors could be located in the vicinity of O&M activities, and thus could be exposed to air pollutants. As described above for construction impacts, the health impacts from exposure to these pollutants depend on the concentrations to which sensitive receptors are exposed, the duration of the exposure, and the toxicity of the pollutant. Operational activities would not be of sufficient duration or intensity to rise to the level of chronic exposure necessary to cause health impacts because: (1) routine O&M work would be temporary and intermittent, (2) activity levels would be less intense and less frequent during the operational phase than during construction, and (3) pollutants that would be emitted would not be of substantial toxicity at anticipated concentrations and duration. For example, the analysis of a project designed to restore the natural geomorphic processes and ecological functions of a marsh could find that the project would not result in any major sources of emissions and would be required to comply with established standards and regulations for emissions.

Restoration projects permitted under the Order could temporarily generate emissions of air pollutants. The specific locations and emissions of possible future facilities during O&M activities are not currently known; therefore, the precise air pollutant emissions impacts cannot be identified at this time. Factors necessary to identify specific impacts include the project’s location and operational characteristics, frequency and duration of emissions, and the location of sensitive receptors. However, given the temporary and intermittent nature of the impacts and the dissipation of pollutant concentrations, such emissions are unlikely to affect a substantial number of people. Impacts would be **less than significant**.

The general protection measures listed for Impact 3.4-1 would be followed to further reduce the **less-than-significant** impacts of ground-disturbing O&M activities for restoration projects permitted under the Order related to work area and speed limits and dust suppression.

Impact 3.4-5: Implementing future restoration projects permitted under the Order could result in an increase in GHG emissions that may have a significant impact on the environment.

Restoration projects permitted under the Order could be located in one or more air basins, some of which have established numeric thresholds for construction-generated GHG emissions that indicate when emissions are significant.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order could emit GHGs from fuel combustion during the use of construction equipment, trucks, worker vehicles, and dredging equipment. For example, a levee setback project would require extensive use of heavy equipment, such as excavators, graders, scrapers, bulldozers, backhoes, and dredges, which would result in GHG emissions. Numerous haul truck trips would be required to move borrow and/or spoils and other materials.

Equipment used for the construction of restoration projects permitted under the Order could increase GHG emissions in the short term. Following project completion, all construction emissions would cease.

Despite the intensity and duration of construction activities, and the lack of available mitigation measures to abate GHG emissions from heavy-duty construction equipment and on-road hauling emissions, the incremental contribution to climate change by the project's construction emissions could be short term and minimal. However, construction activities permitted under the Order could increase GHG emissions. The specific locations and GHG emissions of possible future projects are not currently known; therefore, the potential for significant construction-related GHG emissions impacts cannot be identified at this time. Factors necessary to identify specific impacts include the project's location and construction characteristics, and the frequency and duration of emissions. Impacts would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure AIR-3 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure AIR-3: Minimize GHG Emissions

Restoration projects permitted under the Order shall implement the GHG mitigation measures listed in the most recent air district guidance documents (e.g., CAPCOA

2010; BAAQMD 2011), as appropriate for the project site and conditions. Current versions of such guidance documents list the following for construction of projects:

- Use alternative fuels for construction equipment.
- Use electric and hybrid construction equipment.
- Limit construction equipment idling beyond regulatory requirements.
- Institute a heavy-duty off-road vehicle plan.
- Implement a construction vehicle inventory tracking system.
- Use local building materials for at least 10 percent of total materials.
- Recycle or reuse at least 50 percent of construction waste or demolition materials.

In addition, the California Attorney General's Office has developed a list of measures and strategies to reduce GHG emissions at the individual project level. As appropriate, the measures can be included as design features of a restoration project, required as changes to the project, or imposed as mitigation (whether undertaken directly by the project proponent or funded by mitigation fees). The measures are examples; the list is not intended to be exhaustive. The following are best management practices to consider and implement (as applicable) during design, construction, and O&M of project facilities.

Transportation and Motor Vehicles

- Limit idling time for commercial vehicles, including delivery and construction vehicles.
- Use low- or zero-emission vehicles, including construction vehicles.
- Institute a heavy-duty off-road vehicle plan and a construction vehicle inventory tracking system for construction projects.
- Promote ridesharing.
- Provide the necessary facilities and infrastructure to encourage the use of low- or zero-emission vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations).
- Provide a shuttle service to public transit/work sites.
- Provide information on all options for individuals and businesses to reduce transportation-related emissions.

SmartWay Truck Efficiency

This strategy involves requiring existing trucks/trailers to be retrofitted with the best available "SmartWay Transport" and/or CARB-approved technology. Technologies that reduce GHG emissions from trucks include devices that reduce aerodynamic drag and rolling resistance. Aerodynamic drag may be reduced using devices such as cab roof fairings, cab side gap fairings, cab side skirts, and on the trailer side, skirts, gap fairings, and trailer tail. Rolling resistance can be reduced using single wide tires or low-rolling resistance tires and automatic tire inflation systems on both the tractor and the trailer.

Tire Inflation Program

The strategy involves actions to ensure that vehicle tire pressure is maintained to manufacturer specifications.

Blended Cements

The strategy to reduce CO_2 emissions involves the addition of blending materials such as limestone, fly ash, natural pozzolan, and/or slag to replace some of the clinker in the production of Portland cement.

Anti-Idling Enforcement

The strategy guarantees emissions reductions as claimed by increasing compliance with anti-idling rules, thereby reducing the amount of fuel burned through unnecessary idling. Measures include enhanced field enforcement of anti-idling regulations, increased penalties for violations of anti-idling regulations, and restriction on registrations of heavy-duty diesel vehicles with uncorrected idling violations.

Because the extent and location of such actions are not known at this time, it is not possible to conclude that Mitigation Measure AIR-3, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. It is reasonable to expect that construction activities could result in substantial GHG emissions, especially given the wide range of air district GHG emissions thresholds. For example, it is likely that GHG emissions would exceed local air district thresholds if the permitted action is undertaken by a lead agency that has adopted a net zero GHG emissions threshold. Therefore, this impact would be **significant and unavoidable**.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects permitted under the Order could consist of periodic and routine maintenance work such as sediment removal within or near the facilities, vegetation removal, and inspection and maintenance of facilities. Maintenance activities that would generate GHG emissions would be similar to those described for the construction of projects permitted under the Order; however, the level of activity, and therefore the level of emissions, would be much lower in the operational phase than during construction because activity would not be as intense during operations. Additionally, establishing, restoring, and enhancing tidal, subtidal, and freshwater wetlands would result in the creation of new wetlands, which sequester carbon. Carbon sequestration plays an important role in preventing global climate change by reducing greenhouse gas emissions and by preserving carbon "sinks" such as forests and wetlands. Therefore, establishing, restoring, and enhancing tidal, subtidal, and freshwater wetlands would provide more trees and plants which store carbon as they absorb CO_2 from the air, thus reducing net GHG emissions.

Restoration projects permitted under the Order could result in GHG emissions during O&M activities. However, the specific locations and emissions of possible future facilities are not known at this time. Factors necessary to identify site- or resource-specific impacts include the project’s location and construction characteristics, duration

of emissions, and the specific GHG thresholds of the local air quality district. Activities that generate GHG emissions would be similar to those described for the construction of projects permitted under the Order; however, the level of activity, and therefore the level of emissions, would be much lower during operations than during construction because activity would not cause an equal duration or concentration of emissions. Because operational emissions would not approach CARB's recommended thresholds and legislation that has established screening levels, the projects' GHG emissions would not be substantial and would not conflict with state and local planning efforts. Therefore, this impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Impact 3.4-6: Implementing future restoration projects permitted under the Order could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

As described in Section 3.4.3, *Regulatory Setting*, most air districts, cities, and counties in the study area have plans and policies regarding the reduction of GHGs.

Effects of Project Construction Activities

Construction activities from restoration projects permitted under the Order could require the use of diesel-powered construction equipment such as excavators, graders, scrapers, bulldozers, and backhoes. Haul trucks would move borrow and/or spoils and other materials. These activities would emit GHGs. It is assumed that projects would be constructed in compliance with any policies that have been adopted as rules or regulations to reduce emissions of GHGs. However, construction activities may not be consistent with policies that have not been adopted as rules or regulations. For example, the construction of setback levees requires the use of some specialized off-road equipment that could result in significant GHG emissions. It may not be feasible to use electric or alternatively fueled equipment, which would conflict with a specific county's climate action plan. For example, the analysis of a project designed to restore the natural geomorphic processes and ecological functions of a marsh could find that, although any increase in GHG emissions would add to the quantity of emissions that contribute to global climate change, emissions associated with construction of the project would occur over a limited period. Following completion of the project, all construction emissions would cease and the project's construction-related GHG emissions would not be substantial and would not conflict with state and local planning efforts.

Construction of projects permitted under the Order could conflict with GHG emissions reduction policies, plans, and regulations. However, the specific locations and scale of possible future facilities are not currently known; therefore, the precise conflicts and subsequent impacts cannot be identified at this time. Factors necessary to identify specific impacts include the project's location, design features, and size, and the applicable GHG emissions reduction plans and policies of jurisdictions. Because it may not be feasible in all cases to comply with GHG emissions plans and policies, this impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure AIR-1, AIR-2, and AIR-3 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measures AIR-1, AIR-2, and AIR-3 would reduce the impacts of restoration projects permitted under the Order. However, because the extent and location of such actions are not known at this time, it is not possible to conclude that the mitigation measures, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. It is possible that construction activities may not be consistent with policies that have not been adopted as rules or regulations. Therefore, this impact would be **significant and unavoidable**.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects permitted under the Order could would require periodic and routine maintenance work such as monitoring restoration projects and cleaning fish screens. Activities that would generate GHG emissions would be similar to those described for construction of projects permitted under the Order; however, activities would be less intense and less frequent in the operational phase than during construction. It is assumed that projects would be operated in compliance with any policies that have been adopted as rules or regulations to reduce emissions of GHGs.

The specific locations and scale of possible future facilities are not known at this time. Factors necessary to identify specific impacts include the project's location, design features, size, and the applicable GHG reduction plans and policies of jurisdictions. However, the level of activity and therefore the level of emissions would be much lower in the O&M phase than during construction because activity would not be as intense. Also, it is assumed that projects would be operated and maintained in compliance with any policies that have been adopted as rules or regulations to reduce emissions of GHGs. Therefore, this impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

3.6 Biological Resources—Aquatic

3.6.1 Introduction

This section describes fisheries resources (i.e., fishes and their aquatic habitats) in the study area and evaluates the potential impacts of the types of projects that would be permitted under the Order. Section 3.5, *Biological Resources—Terrestrial* evaluates impacts to non-fisheries resources such as mammals, amphibians, reptiles, plants, and their habitats, including riparian communities and wetlands.

The environmental setting and impact evaluation for aquatic resources is based on a review of existing published documents and example analyses across the range of project types permitted under the Order. Aquatic resources include all perennial, seasonal, intermittent, and ephemeral marine, estuarine, and freshwater habitats and special-status fish. This section summarizes federal, state, and regional and local regulations related to aquatic biological resources; analyzes the potential impacts of implementing the types of projects permitted under the Order; and presents mitigation measures for impacts determined to be significant or potentially significant. The study area covers aquatic habitats across the entire geographic extent of California, including rivers, streams, lakes, wetlands (e.g., marshes), and bays.

The following comments addressing biological resources were received in response to the notice of preparation (NOP):

- The EIR should assess the impact of restoration projects on existing tidal marshes, tidal flats, subtidal areas, salt ponds, and managed wetlands.
- Establishing wetlands in subtidal or some tidal areas could result in habitat type conversion that could inadvertently eliminate or reduce the numbers of certain populations of fish and wildlife.
- The analysis of cumulative impacts should specifically consider how multiple projects in the same area could affect the distribution of invasive species.
- The EIR should analyze how large-scale earthmoving operations—particularly those within the floodplain—would affect groundwater and should consider how changes in groundwater patterns could affect mortality of riparian trees.

See Appendix B for the NOP comment letters.

3.6.2 Environmental Setting

This section describes fisheries resources that have the potential to be affected by the types of restoration projects that would be permitted under the Order. The study area covers the entire geographic extent of California and includes numerous aquatic habitats and special-status fish species.

To organize the environmental setting description for aquatic biological resources for the Order, this analysis is organized in the context of “ecoregions.” These ecoregions encompass geographic areas that have similar patterns of physical and biological characteristics that support similar fish and aquatic communities. As a result, the

impacts of the restoration projects permitted under the Order are expected to be similar for all geographic areas in a given ecoregion.

Ecoregion classifications organize the primary environmental variables of ecosystems into an orderly, related set of spatial scales; ecosystem processes and patterns at one level or scale influence or constrain those at lower levels. At broad scales, descriptions and mapping of ecosystems are coarse and typically based on regional factors such as climate, latitude, and major landforms and hydrology. By contrast, those at increasingly finer scales of the same classification systems are more directly correlated with local factors, such as soils, precipitation, vegetation, and land use.

By organizing ecosystems into a hierarchical framework, impacts can be analyzed at an appropriate scale, and the analysis can examine conditions and management issues occurring at finer levels, if needed. Because the Order permits projects that could occur statewide, the ecoregion classification should include multiple hierarchical levels for flexibility.

Although organizing the aquatic biological resources section by ecoregions allows for a program-level analysis, it does not preclude or replace the need for project-level environmental review. Additional project-level biological resources analyses may include field surveys, aerial imagery, and protocol-level or preconstruction surveys for the presence of special-status species. See Section 3.5, *Biological Resources—Terrestrial*, for additional details regarding the ecoregion approach.

Special-Status Species

Special-status species are defined as species that are legally protected or otherwise considered sensitive by federal, state, or local resource agencies. These species may be listed under the federal Endangered Species Act (FESA) or California Endangered Species Act (CESA), or both, or may be identified as Species of Special Concern. Appendix E presents the listing statuses and scientific names of fish species by ecoregion. See Section 3.5, *Biological Resources—Terrestrial*, for details regarding the categories of special-status species.

Sensitive Natural Communities

Sensitive natural communities or habitats are those that are of special concern to resource agencies or are afforded special consideration. This concern may be triggered by the locally or regionally declining extent of these habitats, or because they provide habitat important to common and special-status species. Many of these communities are tracked in the California Natural Diversity Database, maintained by the California Department of Fish and Wildlife (CDFW). Appendix E documents the presence of each sensitive community type by ecoregion.

Critical Habitat

The U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) designate critical habitat for fish species. Critical habitat encompasses a geographic area that is considered essential for the conservation of a threatened or endangered species that may require special management and protection. Critical habitat may include an area that is not currently occupied by the species, but that will be

needed for its recovery. A critical habitat designation affects activities performed by federal agencies or that involve a federal permit, license, or funding, and that are not likely to destroy or adversely modify the area of critical habitat.

Ecoregions in the Study Area

The study area—which encompasses the entire state of California—contains 13 ecoregions: Coast Range, Cascades, Sierra Nevada, Central California Foothills and Coastal Mountains, Central California Valley, Southern California Mountains, Eastern Cascades Slopes and Foothills, Central Basin and Range, Mojave Basin and Range, Klamath Mountains/California High North Coast Range, Northern Basin and Range, Sonoran Basin and Range, and Southern California/Northern Baja Coast. The ecoregions are described below and depicted in Figure 3.5-1 (Section 3.5, *Biological Resources—Terrestrial*).

Coast Range

This ecoregion covers the coastal mountains of California. The entire portion of the Coast Range ecoregion within California lies within 100 kilometers of the coast. Topography is highly variable, with the Coast Ranges and valleys ranging from sea level to more than 3,000 feet in elevation. These relatively low mountains are permitted by highly productive, rain-drenched evergreen forests. Wet forests, lakes, estuarine marshes, and tea-colored (tannic) streams are characteristic features of the landscape. Runoff is rapid and many of the smaller streams are dry by the end of the summer. Notable coastal wetlands within the Coast Range ecoregion include the estuary at the mouth of the Smith River, Lake Talawa, Lake Earl, Klamath River Estuary, Humboldt Bay, the mouth of the Eel River, Bodega Bay, and Big and Stone Lagoons.

The Coast Range ecoregion includes at least 17 known special-status fish species (Appendix E). Among the special-status fish species are California Coast Chinook Salmon evolutionarily significant unit (ESU) (*Oncorhynchus tshawytscha*), Central California Coast Coho Salmon ESU (*O. kisutch*), Central California Coast Steelhead distinct population segment (DPS) (*O. mykiss irideus),* and Tidewater Goby (*Eucyclogobius newberryi*).

Cascades

This mountainous ecoregion includes a disjunct area in Northern California and extends up to western Washington. The west side of the Cascades ecoregion is characterized by long, steep ridges and wide river valleys. Subalpine meadows are present at higher elevations, and alpine glaciers have left till and outwash deposits. The Cascades have a moist temperature climate that supports an extensive, highly productive coniferous forest. This region has a longer summer drought and more intermittent streams than regions to the north in Oregon and Washington.

The Cascades ecoregion includes at least eight known special-status fish species (Appendix E). Among the special-status fish species are Hardhead (*Mylopharodon conocephalus*), Pit Roach (*Lavinia symmetricus mitrulus*), McCloud River Redband Trout (*Oncorhynchus mykiss gairdneri),* and Rough Sculpin (*Cottus asperrimus*).

Sierra Nevada

The Sierra Nevada is a mountainous, deeply dissected, and westerly tilting fault block. The central and southern part of this ecoregion is composed largely of granitic rock. The Sierra Nevada ecoregion is generally oriented north-south and is essentially defined by the Sierra Nevada physiographic province, which separates California's Central Valley to the west from the Great Basin to the east. The Sierra Nevada range is a granitic batholith, much of which is exposed at higher elevations, with a gradual western slope and a generally steep eastern escarpment. At the highest elevations, moraines, cirques, and small lakes are common, remnants of alpine glaciation dating to the Pleistocene Epoch (the "Ice Age"). On the western slope, most runoff flows to the Tuolumne, Merced, San Joaquin, Kings, Kaweah, Tule, or Kern River.

The Sierra Nevada ecoregion includes at least nine known special-status fish species (Appendix E). Among the special-status fish species are California Golden Trout (*Oncorhynchus mykiss aguabonita*), Kern River Rainbow Trout (*O. mykiss gilberti*), Lahontan Cutthroat Trout (*O. clarkii henshawi),* and Owens Sucker (*Catostomus fumeiventris*).

Central California Foothills and Coastal Mountains

The primary distinguishing characteristics of this ecoregion are its Mediterranean climate of hot dry summers and cool moist winters, and the associated vegetative cover that consists primarily of chaparral and oak woodlands. Grasslands are present at some low elevations and patches of pine are found at high elevations. Surrounding the lower and flatter portions of this ecoregion are open low mountains or foothills; there are also some areas of irregular plains and some narrow valleys. Runoff is often rapid, with smaller ephemeral streams draining to larger perennial rivers in the valleys. All but the larger streams are dry through most of the summer.

Monterey Bay and Morro Bay occur along the coastal portion of this ecoregion. The lower stretches of rivers within this ecoregion often form lagoons, as outflow into the ocean or bay is often blocked by sand dunes – until periods of high winter flows reestablish connectivity. This situation of annual lagoon formation occurs for the ecoregion's largest rivers such as the Salinas River, the Carmel River, the Santa Maria River, and the Santa Ynez River.

The Central California Foothills and Coastal Mountains ecoregion includes at least 22 known special-status fish species (Appendix E). Among the special-status fish species are Arrroyo Chub (*Gila orcuttii)*, Central Valley Spring-Run Chinook Salmon ESU (*Oncorhynchus tshawytscha*), Central California Coast Coho Salmon ESU (*O. kisutch),* and Tidewater Goby (*Eucyclogobius newberryi*).

Central California Valley

Flat, intensively farmed plains with long hot, dry summers and mild winters distinguish the Central California Valley ecoregion from its neighboring ecoregions, which are either hilly or mountainous, covered with forest or shrub, and generally nonagricultural. The state's two major rivers flow from opposite ends of the Central California Valley ecoregion, entering the Sacramento–San Joaquin Delta (Delta) and San Pablo Bay.

Vernal pools are present in some areas. Streams drain mostly to the Sacramento River, with a few in the south draining to the lower San Joaquin River. The seasonal wetlands and flooded agricultural land provide seasonal rearing habitat for native fish species.

The Delta is characterized by numerous sloughs and channels formed where the Sacramento, San Joaquin, Cosumnes, Mokelumne, and Calaveras Rivers enter the region. Water from these rivers commingles in the Delta and is influenced by tidal action, streamflow, and water diversion as it flows toward San Francisco Bay. The western part of the ecoregion includes large areas of brackish and seasonally freshwater marshes and wetlands that surround Grizzly Bay and Suisun Bay.

The Central California Valley ecoregion includes at least 10 known special-status fish species (Appendix E). Among the special-status fish species are Delta Smelt (*Hypomesus transpacificus)*, Sacramento River Winter-Run Chinook Salmon (*Oncorhynchus tshawytscha*), Longfin Smelt (*Spirinchus thaleichthys),* Central Valley Steelhead DPS (*O. mykiss irideus*), and the southern DPS of North American Green Sturgeon (*Acipenser medirostris*).

Southern California Mountains

Like other ecoregions in Central and Southern California, the Southern California Mountains ecoregion has a Mediterranean climate of hot dry summers and moist cool winters. The ecoregion is bounded on the far north by the Sierra Nevada ecoregion, on the east by the Mojave Basin and Range ecoregion, on the southeast by the Sonoran Basin and Range Ecoregion, and on the north by the Central California Valley Ecoregion. All but the larger streams are dry through most of the summer.

The Southern California Mountains ecoregion includes at least six known special-status fish species (Appendix E). Among the special-status fish species are Arroyo Chub (*Gila orcuttii)*, Mohave Tui Chub (*Siphateles bicolor mohavensis*), and Santa Ana Sucker (*Catostomus santaanae*).

Eastern Cascades Slopes and Foothills

This ecoregion is located in the rain shadow of the Cascade Range. It has a more continental climate than ecoregions to the west, with greater temperature extremes, less precipitation, and frequent fires. Precipitation (either rain or snow) falls mostly in the fall, through winter into spring. Several marshland wildlife refuges here are critical to preserving regional biodiversity, particularly at-risk bird and fish species. Most streams and rivers originate in adjacent mountain ecoregions.

The Eastern Cascades Slopes and Foothills ecoregion includes at least 20 known special-status fish species (Appendix E). Among the special-status fish species are Eagle Lake Rainbow Trout (*Oncorhynchus mykiss aquilarum*), Hardhead (*Mylopharodon conocephalus*), and Klamath River Lamprey (*Entosphenus similis*).

Central Basin and Range

This ecoregion is composed of north-trending, fault-block ranges and intervening, drier basins. The Central Basin and Range ecoregion is internally drained by ephemeral streams and once contained ancient Lake Lahontan. Playas occur at the lowest

elevations in the Lahontan Basin and are the terminus or “sink” of rivers that flow east from the Sierra Nevada. Three large river systems—the Truckee, Carson, and Walker Rivers—flow eastward through this region from the Sierra Nevada, providing water for agriculture and urban development. The Truckee and Walker Rivers and their tributaries also provide habitat for the threatened Lahontan Cutthroat Trout.

The Central Basin ecoregion includes at least nine known special-status fish species (Appendix E). Among the special-status fish species are Lahontan Cutthroat Trout (*Oncorhynchus clarkii henshawi*), Owens Pupfish (*Cyprinodon radiosus*), and Owens Tui Chub (*Siphateles bicolor snyderi*).

Mojave Basin and Range

Stretching across southeastern California, southern Nevada, southwestern Utah, and northwestern Arizona, this ecoregion is composed of broad basins and scattered mountains that generally are lower, warmer, and drier than those of the Central Basin and Range ecoregion.

The Mohave Basin and Range ecoregion includes at least 12 known special-status fish species (Appendix E). Among the special-status fish species are Arroyo Chub (*Gila orcuttii)*, Mohave Tui Chub (*Siphateles bicolor mohavensis*), and Owens Pupfish (*Cyprinodon radiosus*).

Klamath Mountains/California High North Coast Range

This ecoregion encompasses the highly dissected ridges, foothills, and valleys of the Klamath and Siskiyou Mountains. It extends south into California to include the mixed conifer and montane hardwood forests that occur on mostly mesic soils in the North Coast Ranges. The mild Mediterranean climate of the ecoregion is characterized by hot dry summers and wet winters; the amount of winter moisture in the ecoregion varies, decreasing from west to east. The ecoregion drains to the Klamath, Trinity, Sacramento, Scott, and Shasta Rivers. In much of the ecoregion, all but the larger streams are dry by the end of summer. Natural lakes are absent, but there are a few reservoirs.

The Klamath Mountains/California High North Coast Range ecoregion includes at least 12 known special-status fish species (Appendix E). Among the special-status fish species are Bull Trout (*Salvelinus confluentus*), Coastal Cutthroat Trout (*Oncorhynchus clarkii clarkii*), and Summer-Run Steelhead Trout (*O. mykiss irideus*).

Northern Basin and Range

The Northern Basin and Range ecoregion is characterized by basin-and-range topography. The ecoregion contains several wide basins bordered by scattered low mountains. Despite regional aridity, natural springs and spring-fed wetlands are scattered around the landscape, sustaining much of the region’s wildlife. The western part of the ecoregion is internally drained; its eastern stream network drains to the Snake River system.

The Northern Basin and Range ecoregion includes one known special-status fish species (Appendix E). The special-status fish species is the Cow Head Tui Chub (*Siphateles bicolor vaccaceps*).

Sonoran Basin and Range

Similar in topography to the Mojave Basin and Range ecoregion to the north, this ecoregion contains scattered low mountains and has large tracts of federally owned land, a large portion of which is used for military training. This ecoregion includes one of the driest and hottest areas of the United States, with annual precipitation of only about 3 inches. The terrain is dissected by dry washes that can flash flood during the infrequent rainfall events.

The Sonoran Basin and Range ecoregion includes at least six known special-status fish species (Appendix E). Among the special-status fish species are Desert Pupfish (*Cyprinodon macularius*), Mohave Tui Chub (*Siphateles bicolor mohavensis*), and Unarmored Threespine Stickleback (*Gasterosteus aculeatus williamsoni*).

Southern California/Northern Baja Coast

This ecoregion includes coastal and alluvial plains, marine terraces, and some low hills in coastal Southern California, and extends more than 200 miles south into Baja California. The Santa Clara River drains a portion of the ecoregion and is perennial. Much of the hydrology of the ecoregion has been greatly modified and channelized. Runoff is rapid except from undissected terraces with vernal pools.

Bays and estuaries in this ecoregion are nestled within an arid region generally fed by smaller, seasonal rivers and streams. As a result, most of these systems are small and more marine in character, dominated by estuarine residents and marine aquatic migrant specie. Bays and estuaries in the region vary greatly in size from numerous small, canyon-mouth estuaries such as Malibu Lagoon to large species such as Anaheim Bay, Newport Bay, and San Diego Bay.

The Southern California/Northern Baja Coast ecoregion includes at least seven known special-status fish species (Appendix E). Among the special-status fish species are Santa Ana Sucker (*Catostomus santaanae*), Mohave Tui Chub (*Siphateles bicolor mohavensis*), and Southern California Steelhead DPS (*Oncorhynchus mykiss irideus*).

3.6.3 Regulatory Setting

This section discusses federal, state, and regional and local plans, policies, regulations, laws, and ordinances pertaining to hydrology and water quality.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location.

Federal

Endangered Species Act

FESA Provisions

The FESA applies to proposed federal, state, and local projects that may result in the “take” of a fish or wildlife species that is federally listed as threatened or endangered. The law also applies to actions that are proposed to be authorized, funded, or undertaken by a federal agency and that may jeopardize the continued existence of a

federally listed fish, wildlife, or plant species or may adversely modify or destroy designated critical habitat for such species.

Section 9 of the FESA protects listed wildlife species from take, defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct” (U.S. Code Title 16, Section 1532[19] [16 USC 1532(19)]). Federal regulations define “harm” as “an act which actually kills or injures wildlife.” This definition includes significant habitat modification or degradation that results—or is reasonably expected to result—in death or injury to wildlife by substantially impairing essential behavioral patterns, including breeding, feeding, sheltering, spawning, rearing, and migrating (Code of Federal Regulations Title 50, Sections 17.3 and 222.102). “Harass” is defined similarly broadly.

If a project could result in take of a federally listed species, either a habitat conservation plan and incidental take permit under FESA Section 10(a) or a federal interagency consultation under FESA Section 7 is required. Under the FESA, USFWS has jurisdiction over all terrestrial and plant species, as well as freshwater fish species and a few marine mammals (such as the California sea otter). NMFS has jurisdiction over anadromous fish species.

NMFS Programmatic Biological Opinions for Restoration

As described in Chapter 2, NMFS has developed programmatic Biological Opinions for restoration projects for the North Coast (NMFS 2012), Central Coast (NMFS 2016), South Coast (NMFS 2015), and Central Valley (NMFS 2018) regions of California (collectively referred to as the NMFS Restoration PBOs).[1] These PBOs provide FESA coverage for several categories of restoration project types, which are similar to those described in this Order. In order for the projects to be eligible for coverage under the PBOs, they must meet the definition of "restoration project," which is defined as one that will result in a net increase in aquatic or riparian resource functions and services. Projects permitted by the PBOs may include multiple benefits, such as flood management, groundwater recharge, recreation, or climate change adaptation, all permitted projects must meet the criteria of a restoration project defined by the PBO and must remain consistent with NMFS’ Recovery Plans. Avoidance and minimization measures are also described in the PBOs and must be included in the proposed projects, as applicable. The avoidance and minimization measures included in the PBOs are similar to the general protection measures developed as part of the Order (Appendix E) and species protection measures included as part of the proposed project for purposes of this PEIR (Chapter 2 and Appendix F) to avoid and/or minimize potential impacts to special-status wildlife, fish and plant species.

Clean Water Act

Under the Federal Water Pollution Control Act Amendments of 1972, better known as the Clean Water Act (CWA), the U.S. Environmental Protection Agency (EPA) regulates discharges of pollutants into the waters of the United States, establishes water quality standards, conducts planning studies, and provides funding for grant projects.

[1] Note: NMFS PBOs have 10-year permit terms and will be periodically updated.

The CWA has been amended by Congress several times since 1972. EPA has provided most states with the authority to administer many of the provisions of the CWA. In California, the State Water Board has been designated by EPA to develop and enforce water quality objectives and implementation plans. The State Water Board has delegated the specific responsibilities for development and enforcement actions to the Regional Boards.

Coastal Zone Management Act

The Coastal Zone Management Act is summarized in Section 3.11, *Hydrology and Water Quality*. California's coastal zone management program was approved by the Secretary of Commerce in 1978.

Central Valley Project Improvement Act

The Central Valley Project Improvement Act (CVPIA), enacted by Congress in 1992, amended the CVP's authorization to include fish and wildlife protection, restoration, and mitigation as project purposes of the CVP having equal priority with irrigation and domestic uses, and fish and wildlife enhancement as a project purpose equal to power generation. The CVPIA requires the Secretary of the Interior, through the U.S. Bureau of Reclamation and USFWS, "to operate the CVP consistent with the purposes of the act, to meet the federal trust responsibilities to protect the fishery resources of affected federally recognized Indian tribes, and to achieve a reasonable balance among competing demands for the use of CVP water."

The CVPIA mandated the following changes to the CVP:

- Dedicating 800,000 acre-feet annually to fish, wildlife, and habitat restoration (Section 3406[b][2])
- Authorizing water transfers outside the CVP service area (Section 3405)
- Implementing an anadromous fish restoration program (Section 3406[b][1])
- Creating a restoration fund financed by water and power users (Section 3407)
- Providing for the Shasta Temperature Control Device (Section 3406[b][6])
- Implementing fish passage measures at Red Bluff Diversion Dam (Section 3406[b][10])
- Calling for planning to increase the CVP yield (Section 3406[j])
- Mandating firm water supplies for Central Valley wildlife refuges and wildlife habitat areas (Section 3406[d])
- Improving the Tracy Fish Collection Facility (Section 3406[b][4])
- Meeting the federal trust responsibility to protect fishery resources in the Trinity River (Section 3406[b][23])

The CVPIA is being implemented as authorized; CVP operations reflect the provisions of the CVPIA.

The CVPIA included several provisions governing the use of environmental water accounts. Among these were Section 3406(b)(2), which dedicated 800,000 acre-feet to fish, wildlife, and habitat restoration. On May 9, 2003, the U.S. Department of the Interior issued its Decision on Implementation of Section 3406(b)(2) of CVPIA.

Trinity River Mainstem Fishery Restoration

In 1994, USFWS and Trinity County, as lead agencies under the National Environmental Policy Act (NEPA) and CEQA, respectively, began the public process for developing the Trinity River Mainstem Fishery Restoration Environmental Impact Statement/ Environmental Impact Report. In December 2000, the Department of the Interior signed the record of decision for a variable annual flow regime, mechanical channel rehabilitation, sediment management, watershed restoration, and adaptive management. Based on the record of decision, 368,600–815,000 acre-feet per year are allocated for Trinity River flows. This amount is scheduled in coordination with USFWS to best meet habitat, temperature, and sediment transport objectives for the Trinity Basin.

Bay-Delta Accord of 1994

This topic is discussed in Section 3.11, *Hydrology and Water Quality*.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act (Public Law 104-297), requires federal agencies to consult with NMFS on any activity or proposed activity authorized, funded, or undertaken by that agency that may adversely affect essential fish habitat for commercially managed marine and anadromous fish species. “Essential fish habitat” includes specifically identified waters and substrate necessary for fish spawning, breeding, feeding, or growing to maturity. Essential fish habitat also includes all habitats necessary to allow the production of commercially valuable aquatic species, support a long-term sustainable fishery, and contribute to a healthy ecosystem (16 USC 1802[10]).

To protect and enhance habitat for coastal marine fish and macroinvertebrate species that support commercial fisheries such as Pacific salmon, the Pacific Fishery Management Council has designated the Delta, San Francisco Bay, and Suisun Bay as essential fish habitat. Because essential fish habitat applies only to commercial fisheries, habitat for Chinook salmon is included in the designation, but habitat for steelhead is not included.

The Pacific Fishery Management Council has issued three fishery management plans (for Pacific salmon, coastal pelagic species, and groundfish species) that cover the following species occurring in the study area:

- *Starry flounder*: Identified as a “Monitored” species by the Pacific Coast Groundfish Fishery Management Plan (PFMC 2011)
- *Northern anchovy*: Identified as a “Monitored” species by the Pacific Coast Groundfish Fishery Management Plan (PFMC 1998, 2008)
- *Pacific sardine*: Identified as an “Actively Managed” species by the Coastal Pelagic Species Fishery Management Plan (PFMC 1998)

- *Chinook salmon*: Identified as an "Actively Managed" species by the Pacific Coast Salmon Plan (PFMC 2003)

The NMFS Restoration PBOs, described above, also provide Magnuson-Stevens Fishery Conservation and Management Act coverage for the categories of restoration project types described in the PBOs (similar project types to those described in this Order).

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 USC 651 et seq.), as amended in 1964, was enacted to protect fish and wildlife when federal actions control or modify a natural stream or body of water. The law requires federal agencies to consider the effect of water-related projects on fish and wildlife resources. The agencies must consult and coordinate with USFWS and state fish and game agencies to identify ways to prevent the loss of and damage to fish and wildlife resources, and to further develop and improve these resources.

Marine Mammal Protection Act

The Marine Mammal Protection Act (16 USC 1361–1421h) was enacted in 1972 to protect all marine mammals. The law prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the United States. The Marine Mammal Protection Act defines "take" to mean "to hunt, harass, capture, or kill" any marine mammal or attempt to do so. Exceptions to the moratorium can be made by obtaining permits for take incidental to commercial fishing and other nonfishing activities; for scientific research; and for public display at licensed institutions, such as aquaria and science centers.

National Invasive Species Act of 1996

The National Invasive Species Act (Public Law 104-332) reauthorized and amended the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990. The 1996 law mandated regulations to reduce environmental and economic impacts from invasive species and prevent the introduction and spread of aquatic nuisance species, primarily through ballast water.

In recent years, EPA has joined the U.S. Coast Guard in regulating discharges of ballast water in the United States. Since February 2009, EPA has regulated ballast water, and other discharges incidental to normal vessel operations, under Section 402 of the CWA. U.S. Coast Guard regulations, developed under the National Invasive Species Act, generally require ballast-water management (i.e., exchange) for vessels entering United States waters from outside of the 200-nautical-mile Exclusive Economic Zone of the U.S. The National Invasive Species Act also authorizes funding for research on prevention and control of aquatic nuisance species in San Francisco Bay and the Delta, along the Pacific coast, and elsewhere in the United States.

Executive Order 13112: Invasive Species

Executive Order 13112 (February 3, 1999) directs federal agencies to prevent and control the introduction and spread of invasive nonnative species in a cost-effective, environmentally sound manner to minimize their effects on economic, ecological, and

human health. The executive order was intended to build on existing laws, such as NEPA, the Nonindigenous Aquatic Nuisance Prevention and Control Act, the Lacey Act, the Plant Pest Act, the federal Noxious Weed Act, and the FESA.

Executive Order 11990: Protection of Wetlands

Executive Order 11990 (May 24, 1977) established the protection of wetlands and riparian systems as the official policy of the federal government. The executive order requires federal agencies to consider wetland protection as an important part of their policies, and to act to minimize the destruction, loss, or degradation of wetlands and preserve and enhance their natural and beneficial values.

State

California Endangered Species Act

Sections 2050 through 2115.5 of the California Fish and Game Code—CESA—addresses threats to native fish, wildlife, and plant species. CESA states that these species are in danger of or threatened with extinction because their habitats are threatened with destruction, adverse modification, or severe curtailment, or because of overexploitation, disease, predation, or other factors. These species are of ecological, educational, historical, recreational, esthetic, economic, and scientific value to the people of the state, and the conservation, protection, and enhancement of the species and their habitat is of statewide concern (Fish and Game Code Section 2051).

The Fish and Game Code (Sections 2062 and 2067, respectively) defines “endangered” and “threatened” species as follows:

- *Endangered species:* A native species or subspecies of bird, mammal, fish, amphibian, reptile, or plant that is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes including loss of habitat, change in habitat, overexploitation, predation, competition, or disease.
- *Threatened species:* A native species or subspecies of bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts.

The California Fish and Game Commission is responsible for listing species under CESA; CDFW implements CESA, enforcing the act and issuing permits.

Similar to the FESA, CESA in Fish and Game Code Section 2080 prohibits “take” and “possession,” among other things, of any California native species or subspecies designated (i.e., listed) as an endangered or threatened species, except as authorized under the Fish and Game Code. “Take” for purposes of CESA is defined in Section 86 of the Fish and Game Code to mean hunt, pursue, catch, capture, or kill, or attempt to do so. The Fish and Game Code definition of take does not, in contrast to the FESA, include “harm” or “harass.” Further, in contrast to the FESA, the take prohibition under CESA applies to candidate species pursuant to Fish and Game Code Section 2085.

The Fish and Game Code includes a number of different exceptions to CESA take prohibition and permitting mechanisms for CDFW to authorize otherwise prohibited take and possession of species and subspecies protected by CESA. CDFW, for example, pursuant to Fish and Game Code Section 2081(a), may also authorize otherwise prohibited take and possession, by permit or memorandum of understanding, to certain entities for scientific, educational, or management purposes, and subdivision (b), may authorize by permit, take that is incidental to otherwise lawful activity, subject to certain criteria prescribed by the statute. Finally, by way of example, among others, for species protected under both CESA and FESA, CDFW, pursuant to Fish and Game Code Section 2080.1, may determine that a federal incidental take permit or statement is consistent with CESA and that no further authorization is necessary under the Fish and Game Code.

For a discussion of the potential for state-listed wildlife and plant species to be present in areas that could be affected by restoration projects permitted under the Order, see Section 3.5, *Biological Resources—Terrestrial*.

Fish and Game Code Safe Harbor Agreements

Fish and Game Code Sections 2089.2 through 2089.26 allow CDFW to authorize incidental take of a species listed as endangered, threatened, candidate, or a rare plant, through a Safe Harbor Agreement (SHA) if implementation of the agreement is reasonably expected to provide a net conservation benefit to the species, among other provisions. SHAs are intended to encourage landowners to voluntarily manage their lands to benefit CESA-listed species without subjecting those landowners to additional regulatory restrictions as a result of their conservation efforts. In addition, at the end of the agreement period, participants may return the enrolled property to the baseline conditions that existed at the beginning of the SHA.

Fish and Game Code Designated Fully Protected Species

Fish and Game Code Sections 3511, 4700, 5050, and 5515 designate a number of birds, mammals, reptiles and amphibians, and fish, respectively, as fully protected species. Take and possession is prohibited under the Fish and Game Code and may not be authorized by the Department, except in limited circumstances. For example, the Department may authorize take of a fully protected species by permit for necessary scientific research, including efforts to recover the species.

McAteer-Petris Act

The McAteer-Petris Act was enacted on September 17, 1965, to preserve San Francisco Bay from indiscriminate filling. The law established the San Francisco Bay Conservation and Development Commission as a temporary state agency charged with preparing a plan for long-term use of the bay and regulating development in and around the bay. To this end, the commission prepared the San Francisco Bay Plan.

In August 1969, the McAteer-Petris Act was amended to make the San Francisco Bay Conservation and Development Commission a permanent agency and incorporate the policies of the Bay Plan into state law. The Bay Plan includes findings and policies on San Francisco Bay as a resource and on developing the bay and shoreline. The plan

also contains maps that apply these policies to the bay and shoreline, including the open water, marshes, and mudflats of Suisun Marsh.

The San Francisco Bay Conservation and Development Commission conducts the regulatory and permitting process in accordance with the Bay Plan's policies and maps. As discussed in Section 3.11, *Hydrology and Water Quality*, the Bay Plan is a Coastal Zone Management Act coastal management plan.

Porter-Cologne Water Quality Control Act

The State Water Board, through its nine Regional Boards, regulates waters of the state through the Porter-Cologne Water Quality Control Act (Porter-Cologne Act). Waters of the state are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The Regional Boards may exert jurisdiction over waters of the state regardless of federal jurisdictional status. The Porter-Cologne Act also charges the Water Boards with establishing and protecting beneficial uses of waters of the state. These beneficial uses may include protection for uses of water that support aquatic ecosystems and habitat for special-status species.

State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State

The State Water Board adopted a State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to waters of the state, for inclusion in the forthcoming Water Quality Control Plan for Inland Surface Waters and Enclosed Bays and Estuaries and Ocean Waters of California. The Procedures consist of four major elements: (1) a wetland definition; (2) a framework for determining if a feature that meets the wetland definition is a water of the state; (3) wetland delineation procedures; and (4) procedures for the submittal, review and approval of applications for Water Quality Certifications and Waste Discharge Requirements for dredge or fill activities.

The Salmon, Steelhead Trout, and Anadromous Fisheries Program Act

The Salmon, Steelhead, Trout and Anadromous Fisheries Program Act (Fish and Game Code Sections 6900–6930) was enacted in 1988 after CDFW reported that the natural production of salmon and steelhead in California had declined dramatically since the 1940s, primarily as a result of lost stream habitat on many of the state's streams.

This law declares that it is the policy of the State of California to increase the state's salmon and steelhead resources and directs CDFW to develop a plan and program that strives to double the salmon and steelhead resources (Fish and Game Code Section 6902[a]). The law also establishes a state policy that existing natural salmon and steelhead habitat shall not be diminished further without offsetting the impacts of lost habitat (Fish and Game Code Section 6902[c]).

Delta Reform Act of 2009 and Delta Plan

This topic is discussed in Section 3.11, *Hydrology and Water Quality*.

Natural Community Conservation Planning Act

The Natural Community Conservation Planning Act (Fish and Game Code Sections 2800–2835) details the state's policies for the conservation, protection, restoration, and

enhancement of the state's natural resources and ecosystems. This law identifies conservation planning as an officially recognized policy that can be used to eliminate conflicts between protection of the state's natural resources and the need for growth and development. The law also promotes conservation planning to enhance coordination and cooperation among private interests, agencies, and landowners, and aid in multispecies, multihabitat management.

Where CDFW approves a natural community conservation plan, it may authorize by permit the otherwise prohibited taking of any covered species whose conservation and management is provided for in the plan, including CESA-listed species and fully protected species. Adopted conservation plans that address the Delta and Suisun Marsh are discussed in both this section and Section 3.5, *Biological Resources—Terrestrial*, of this PEIR.

California Fish and Game Code Section 1600

Fish and Game Code Section 1602 states that it is unlawful for any person to "substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake" without first notifying CDFW of that activity. Thereafter, if CDFW determines and informs the entity that the activity will not substantially adversely affect any existing fish or wildlife resources, the entity may commence the activity. If, however, CDFW determines that the activity may substantially adversely affect an existing fish or wildlife resource, the entity may be required to obtain from CDFW a Streambed Alteration Agreement, which will include reasonable measures necessary to protect the affected resource(s), before the entity may conduct the activity or activities described in the notification. (Fish and Game Code Section 1602.)

California Aquatic Invasive Species Management Plan

Developed by CDFW's Invasive Species Program, the California Aquatic Invasive Species Management Plan provides information for state agencies and other entities to use when they collaborate to fight aquatic invasive species. The plan proposes management actions for addressing threats posed by aquatic invasive species in California. It focuses on the nonnative algae, crabs, clams, fish, plants, and other species that continue to invade California's creeks, wetlands, rivers, bays, and coastal waters (CDFG 2008:1).

The California Aquatic Invasive Species Management Plan has the following eight major objectives (CDFG 2008:6):

- Improve coordination and collaboration among the people, agencies, and activities involved with aquatic invasive species.
- Minimize and prevent the introduction and spread of aquatic invasive species into and throughout the waters of California.
- Develop and maintain programs that ensure the early detection of new aquatic invasive species and the monitoring of existing aquatic invasive species.
- Establish and manage systems for rapid response and eradication.

- Control the spread of aquatic invasive species and minimize their impacts on native habitats and species.
- Increase education and outreach efforts to ensure awareness of aquatic invasive species threats and management priorities throughout California.
- Increase research on the baseline biology of aquatic invasive species, the ecological and economic impacts of invasions, and control options to improve management.
- Ensure that state laws and regulations promote the prevention and management of aquatic invasive species introductions.

Each objective is supported by a series of strategic actions. The plan meets federal requirements to develop statewide management plans for nonindigenous aquatic nuisance species under Section 1204 of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (amended as the National Invasive Species Act of 1996). Article 2, Section 64 of the Harbors and Navigation Code authorizes the California Department of Boating and Waterways to manage aquatic weeds that impede the navigation and use of state waterways.

State Wildlife Action Plan

Each state develops a state wildlife action plan to serve as the comprehensive wildlife conservation strategy required for the receipt of federal funds through the State and Tribal Wildlife Grants program. California last updated its plan in 2015 (CDFW 2015). The State Wildlife Action Plan provides a blueprint for the actions necessary to address the highest priorities for conserving California's aquatic, marine, and terrestrial resources. Implementation of this plan relies on making important and helpful conservation information more accessible to resources managers and the public, and on developing lasting partnerships with a broad array of governments, agencies, organizations, businesses, and citizens.

Habitat Restoration and Enhancement Act

The Habitat Restoration and Enhancement Act of 2014 is an expedited permitting process with CDFW for landowners, state and local government agencies, and conservation organizations wanting to implement small-scale, voluntary habitat restoration projects across California. Restoration and enhancement projects approved by CDFW, pursuant to the Act, do not require additional permits from CDFW, such as a Lake or Streambed Alteration agreement or CESA permit.

Habitat restoration or enhancement projects, as defined by the Habitat Restoration and Enhancement Act, are projects with the primary purpose of improving fish and wildlife habitat and meet the eligibility requirements for the State Water Board's Order for Small Habitat Restoration Projects. Projects approved under the Habitat Restoration and Enhancement Act must meet the current size limitations in the State Water Board's Order for Small Habitat Restoration Projects, be consistent with widely recognized restoration practices, and avoid or minimize any incidental impacts.

Regional and Local

The study area encompasses all counties and cities throughout California. Each county and city have local regulations and a general plan with unique goals and policies that guide development and encourage the consideration of aquatic biological resources. County-specific regulations are implemented in accordance with federal and state regulations.

3.6.4 Impacts and Mitigation Measures

Methods of Analysis

Aquatic biological resource impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could impact existing aquatic resources. However, the precise locations and detailed characteristics of potential future individual restoration projects are yet to be determined. Therefore, this aquatic biological resources analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis.

Permanent impacts are considered those that would continue through the life of a project as a result of the environmental conditions caused by restoration projects permitted under the Order (e.g., new infrastructure such as fish screens or cofferdams). Temporary impacts are considered those that would be temporary in nature (e.g., construction-related activities).

The approach to assessing aquatic biological resource impacts was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of Restoration Projects in the Order*, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an impact related to aquatic biological resources is considered significant if the types of projects that would be permitted under the Order would do either of the following:

- Have a substantial adverse effect, either directly or through habitat modifications, on any fish species identified as a candidate, sensitive, or special-status fish species in local or regional plans, policies, or regulations, or by CDFW or USFWS
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites

Impacts related to the following significance thresholds are addressed in Section 3.5, *Biological Resources—Terrestrial*:

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by CDFW or USFWS
- Have a substantial adverse effect on state and federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance
- Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan

Impacts and Mitigation Measures

Table 3.6-1 summarizes the impact conclusions presented in this section for easy reference.

Table 3.6-1
Summary of Impact Conclusions—Biological Resources–Aquatic

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.6-1: Implementing future restoration projects permitted under the Order could result in substantial adverse effects to special-status fish species directly, or indirectly through habitat modifications.	SU	LTSG
3.6-2: Implementing future restoration projects permitted under the Order could result in substantial adverse direct effects on the movement of native resident or migratory fish.	LTS	B

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2020
NOTES: B = beneficial; LTS = less than significant; LTSG = less than significant with implementation of general protection measures

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation

measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Impact 3.6-1: Implementing future restoration projects permitted under the Order could adversely affect special-status fish species directly, or indirectly through habitat modifications.

Effects of Project Construction Activities

Physical Disturbance

In-water aquatic habitat may be physically disturbed during construction of restoration projects permitted under the Order, from activities such as dewatering, excavation, fill, and placement of materials. This disturbance could affect the juvenile and adult life stages of special-status fish species by causing direct injury or mortality, or by displacing fish or disrupting their normal behaviors. The size and extent of in-water construction activities would vary by the restoration objective. However, most of these activities would be discrete, affecting only localized areas.

Juvenile and adult fishes may be able to detect areas of construction disturbance (e.g., changes in sound, pressure, sheer) and move to adjacent areas of suitable habitat, if present and available, as equipment enters the water. The river bottom would only be temporarily disturbed and subject to associated turbidity at a given time by placement or removal of structures (e.g., culverts, bridges, fish screens, ladders, pilings); removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; breaching of tidal habitat; or installation of cofferdams during construction. Therefore, juveniles would be able to move elsewhere in the channel (or upstream or downstream) to avoid direct disturbance and potential injury or death. Juvenile and adult fishes would likely move to adjacent areas of suitable habitat areas before equipment enters the water. In addition, habitat isolation and fish relocation activities would safely remove fish from the area (*Dewatering and Fish Relocation Activities* discussed below) before the start of other water-disturbing activities. Therefore, construction-related impacts on juvenile and adult fishes are unlikely.

Smaller projects, such as placement or removal of structures and bank stabilization projects, would likely affect only a portion of a stream’s or river’s width. By contrast, larger restoration efforts with extensive in-water work (e.g., enhancement of spawning gravels, extensive instream habitat enhancement) may have much larger construction footprints, making them more difficult for special-status fish species to avoid. Instream construction work for larger projects—particularly those involving operation of heavy equipment and removal and placement of materials—would likely cause temporary stress on juvenile and adult special-status fish species, disturbing them and requiring them to avoid and/or relocate from the disturbance area.

Even during construction of projects with a larger footprint, fish that use the locations of proposed habitat modifications should generally be able to avoid these areas, moving away from them temporarily during construction activities. Fish would be more likely to

relocate during lengthier disturbances, such as the repeated addition of gravel to an area or excavation/disturbance of a large area to modify fish habitat. Juvenile fish may experience increased predation risks while they search for new holding/rearing areas.

In-water construction activities would not likely occur as part of multiple other types of project types, such as floodplain and off-channel restoration. Construction work would typically occur during the dry season, when seasonally inundated areas are dry, thus avoiding or minimizing potential in-water impacts for these project types.

Juvenile fishes are expected to avoid areas where equipment would place or excavate material or remove or install in-water structures. Still, some juveniles may attempt to find shelter in the substrate and could be injured or killed by equipment. Instream and off-channel enhancement may require applying gravel directly to the riverbed, grading the material, placing river crossings at some sites, and using heavy equipment in the river. These activities would increase the likely exposure of, and chance of adverse impacts on, listed juveniles in the area.

Juvenile special-status fishes of all species practice avoidance behavior, the areas affected by construction would be small at most sites, and the number of juveniles present in construction areas would be limited given the lack of suitable habitat. Therefore, the number of juveniles that would be injured or killed as a result of physical disturbance is expected to be low.

To reduce the impacts of project construction activities during in-water work, the Order includes the following general protection measures (Appendix E):

- GPM-2: Construction Work Windows
- IWW-2: In-Water Vehicle Selection and Work Access
- IWW-3: In-Water Placement of Materials, Structures, and Operation of Equipment
- IWW-4: In-Water Staging Areas and Use of Barges

Additionally, projects with in-water work would be conducted consistent with the following species protection measures (Appendix F).

- SPM-3: Species Protection Construction Work Windows
- FISH-1: Habitat Disturbance Avoidance and Minimization.
- FISH-2: Habitat Assessment and Surveys
- FISH-3: Fish Capture and Relocation
- FISH-4: Reporting

Based on the analysis presented above for all special-status fish species and consistent with analyses presented in the NMFS Restoration PBOs for anadromous fish species, by implementing these general protection measures and species protection measures during in-water work, restoration projects would avoid or minimize potential impacts of physical disturbance on special-status fish species.

Release and Exposure of Sediments and Turbidity

All types of restoration projects requiring ground disturbance in or adjacent to streams or wetlands could increase turbidity and levels of suspended sediment within the project

worksites and downstream. The resuspension and deposition of instream sediments would be an indirect impact of operating construction equipment and excavating and placing materials in the river. Short-term increases in turbidity and suspended sediment levels during construction may negatively affect fish populations and other aquatic organisms temporarily by reducing the availability of food, reducing feeding efficiency, and increasing the exposure of fishes to sediment released into the water column.

Short-term increases in turbidity could occur during either dewatering or construction, or both. Research with salmonids has shown that high turbidity concentrations can reduce feeding efficiency and food availability, deplete dissolved oxygen in the water column, diminish respiratory function and disease tolerance, and cause fish mortality (Berg and Northcote 1985; Gregory and Northcote 1993; Velagic 1995; Waters 1995). Even small pulses of turbid water could cause multiple species of fish to disperse from established territories (Waters 1995), which could displace fish into less suitable habitat or increase competition and predation, thus reducing their chances of survival.

However, much of this research focused on turbidity levels much higher than those that would likely result from restoration activities permitted under the Order, especially with implementation of the general protection measures. In addition, when small volumes of sediment are added to stream channels infrequently, the streams may not experience dramatic morphological changes (Rogers 2000).

Elevated sediment and turbidity concentrations from the proposed restoration projects would not likely be severe enough to cause the injury or death of listed juvenile fishes. Rather, the anticipated minor levels of turbidity and suspended sediment generated by instream restoration projects permitted under the Order would likely affect fish behavior only temporarily.

Sediment generated by each individual project would likely affect only the immediate footprint of the project site and habitat immediately downstream. For example, studies of sediment impacts from culvert construction determined that the levels of sediment that had accumulated in the streambeds returned to control levels 358–1,442 meters downstream of the culverts (LaChance et al. 2008). Many construction activities for the projects permitted under the Order would be expected to have similar sediment impacts.

Construction-induced turbidity plumes would extend downstream of the in-water activity, affecting the behavior of fish in the area of impact. In-stream activities will have large variation in turbidity concentration and plume size. In-stream construction that may generate the greatest turbidity plumes, such as dredging activities needed for creation of floodplain habitat or wetlands, could create temporary plumes of total suspended sediment that extend up to 1,500 m at concentrations up to 1,100 mg/L (Wilber and Clarke 2001). However, most restoration projects would create much smaller turbidity plumes at lower turbidity concentrations.

Larger restoration efforts that may involve extensive in-water work (e.g., enhancement of spawning gravels, bank stabilization, or wetland restoration) may result in greater turbidity or sedimentation impacts. However, several in-water general protection measures described below, such as cofferdam construction and sediment containment activities, would minimize these potential impacts during construction.

To reduce the impacts of project construction activities during in-water work to minimize the mobilization of sediment, the Order includes the following general protection measures (Appendix E):

- IWW-1: Appropriate In-Water Materials
- IWW-3: In-Water Placement of Materials, Structures, and Operation of Equipment
- IWW-5: Cofferdam Construction
- IWW-11: Sediment Containment during In-Water Pile Driving
- IWW-13: Dredging Operations and Dredging Materials Reuse Plan

Additionally, projects with in-water work would be conducted consistent with the following species protection measures (Appendix F).

- SPM-3: Species Protection Construction Work Windows
- FISH-1: Habitat Disturbance Avoidance and Minimization
- FISH-2: Habitat Assessment and Surveys
- FISH-3: Fish Capture and Relocation
- FISH-4: Reporting

With these general protection measures and species protection measures, downstream sediment impacts of the proposed restoration projects should extend downstream for a distance consistent with the range identified by LaChance et al. (2008) as described above for all special-status fish species and consistent with analyses presented in the NMFS Restoration PBOs for anadromous fish species. In addition, the limited temporal and spatial scale at which many project activities would occur would likely preclude significant sediment-related impacts.

Noise, Motion, and Vibration Disturbance

Several types of restoration projects permitted under the Order could generate noise, motion, and vibration from the use of heavy equipment, including pile driving and/or through the use of explosives for small dam removal.

Hydrostatic pressure waves and vibration generated by pile driving can adversely affect all life stages of fish and other aquatic organisms. Hydrostatic pressure waves may rupture the swim bladders and other internal organs of all life stages of fish and could permanently injure their inner ears and lateral line organs (Hastings and Popper 2005). These injuries could reduce the ability of fish (including special-status fish species) to orient in the water column, capture prey, and reduce the ability of fish to avoid predators (California Department of Transportation (Caltrans) 2009).

Heavy equipment would be expected to operate primarily outside the active channel (or in isolated and dewatered areas) and would be present in the wetted channel only infrequently and for short periods. Thus, noise, motion, and vibration disturbance from the use of this equipment would be infrequent and occur over short durations.

For projects where pile driving is required, there could be periods of time when the underwater sound levels exceed injury and harm thresholds established by NMFS. To avoid direct physical injury, pile driving should be conducted using vibratory or non-impact techniques and during periods when special-status species (or their most

sensitive life stages) are least likely to be present, and be managed (through operational controls) to be lower than a single-strike sound levels of less than 206 decibels (dB) peak (dB^{peak}) and 183 dB (fish less than 2 grams) and 187 dB (fish greater than or equal to 2 grams) sound exposure level (dB^{SEL}) measured at a distance of 10 meters (Fisheries Hydroacoustic Working Group 2008).

To reduce the impacts of project construction activities during in-water pile driving, the Order includes the following general protection measures (Appendix E):

- IWW-9: In-Water Pile Driving Plan for Sound Exposure
- IWW-10: In-Water Pile Driving Methods
- IWW-11: Sediment Containment during In-Water Pile Driving
- IWW-12: Pile-Driving Monitoring

Additionally, projects with in-water work would be conducted consistent with the following species protection measures (Appendix F).

- SPM-3: Species Protection Construction Work Windows
- FISH-1: Habitat Disturbance Avoidance and Minimization
- FISH-2: Habitat Assessment and Surveys
- FISH-3: Fish Capture and Relocation
- FISH-4: Reporting

Consistent with the analyses presented in the NMFS Restoration PBOs, implementing these general protection measures and species protection measures would ensure that restoration projects permitted under the Order would avoid or minimize noise, motion, and vibration impacts on aquatic biological resources. Underwater noise levels would be reduced to below thresholds for injury and the potential for sediment releases would be minimized. Most special-status fish species would be able to avoid interacting with instream machinery by temporarily relocating either upstream or downstream into suitable habitat adjacent to the worksite.

As described in Chapter 2, the use of explosives for removal of a small dam must be justified by site-specific conditions including equipment access difficulties. The use of explosives must occur in dry or dewatered conditions and potential harm to special-status species from the explosives blast and pressure waves must be analyzed. Using explosives is an eligible activity; however, this approach would also require additional review and approval by appropriate regulatory agencies.

Disturbance of Riparian Vegetation

Riparian forest and scrub is an important component of the land/water interface between aquatic and terrestrial ecosystems, contributing to the quality of aquatic habitat for native fish species by providing shade, instream cover, and food to fishes. Potential construction activities (e.g., removing or adding structures, modifying the morphology and topography of streams and banks) may alter bank and riparian habitat through removal of native and nonnative vegetation, excavation, and grading. Numerous other project types, such as restoring off-channel, floodplain, wetland, or riparian habitat, would create additional riparian vegetation that would enhance fish habitat.

To avoid and/or minimize potential impacts on riparian vegetation during project construction activities, the Order includes the following general protection measures (Appendix E):

- VHDR-1: Avoidance of Vegetation Disturbance
- VHDR-2: Native and Invasive Vegetation Removal Materials and Methods
- VHDR-3: Revegetation Materials and Methods
- VHDR-4: Revegetation Erosion Control Materials and Methods
- VHDR-5: Revegetation Monitoring and Reporting
- VHDR-6: Herbicide Use
- VHDR-7: Herbicide Application Planning
- VHDR-8: Herbicide Application Reporting

The general protecting measures identified above, would ensure, to the extent feasible, that disturbed riparian areas would be revegetated with native plant species and mulched with certified weed-free hay. Revegetation and mulching would be timed to maximize survival but would occur within a year after completion of construction work. Restoration projects would result in both the indirect and direct loss of riparian vegetation. An indirect impact would result from creating and maintaining temporary access points to the river and covering vegetation with gravel; the temporary removal of vegetation to enhance floodplains and side channels would result in a direct impact.

Most restoration projects are expected to avoid and/or minimize disturbing riparian vegetation by implementing the proposed general protection measures. In general, the goal of these projects would be to improve habitat conditions for fishes; thus, the projects would be expected to avoid riparian vegetation as practicable. However, there may be limited situations in which avoidance is not possible to meet the restoration objectives. Any loss of streamside riparian vegetation is expected to be small and temporary, given the general protection measures. Removal would be mostly limited to shrubs and smaller trees.

Using herbicides to remove invasive plant species could cause short-term impacts on special-status fish species. These potential indirect impacts include the short-term loss of shading and habitat provided by the invasive plants. To minimize these potential impacts, restoration projects would implement general protection measures that require the use of best practices (e.g., spraying practices) and herbicides and/or surfactants containing labels approving their use within or adjacent to waterways.

Based on the analysis presented above for all special-status fish species, which is consistent with analyses presented in the NMFS Restoration PBOs for anadromous fish species, by implementing the general protection measures above, impacts to riparian vegetation would be avoided and/or minimized.

Release and Exposure of Construction-Related Contaminants

Heavy equipment and construction materials would be required for the construction of several types of restoration projects. Equipment refueling, fluid leakage, and maintenance activities in and near stream channels pose some risk of contamination by toxic chemicals and potential take.

In addition, water that comes into contact with wet cement and other construction materials during project construction could adversely affect water quality and may harm special-status fish species. If not properly contained, contaminants (e.g., fuels, lubricants, hydraulic fluids, construction materials) could be introduced into the water system, either directly or through surface runoff. Contaminants may be toxic to fish or cause altered oxygen diffusion rates and acute and chronic toxicity to aquatic organisms, thereby reducing growth and survival.

To reduce the impacts of project construction activities, the Order includes the following general protection measures (Appendix E):

- WQHM-1: Staging Areas and Stockpiling of Materials and Equipment
- WQHM-2: Storm Water Pollution Prevention Plan
- WQHM-3: Erosion Control Plans
- WQHM-4: Hazardous Materials Management and Spill Response Plan
- WQHM-5: In-Water Concrete Use
- WQHM-6: Accidental Discharge of Hazardous Materials

Consistent with analyses presented in the NMFS Restoration PBOs, these general protection measures would address and minimize the risk of release of pollutants into receiving waters during project construction. Implementing these measures would minimize potential degradation of aquatic habitat and the resulting harm to all special-status fish species. Therefore, the potential impacts of projects permitted under the Order related to the release and exposure of construction-related contaminants would be minimal.

Dewatering and Fish Relocation Activities

Dewatering entails placing a temporary barrier, such as a cofferdam, to isolate the work area; rerouting streamflow around the dewatered area; pumping water out of the isolated work area; relocating fish from the work area; and restoring the project site upon project completion. The life stage of fishes most likely to be exposed to the potential impacts of dewatering would be juveniles. However, the number of juvenile fish present at a given project site may be low. Migrating adult fish may be present, but in most cases, their mobility would enable them to avoid construction areas.

Any fish present during installation of a cofferdam could be injured by the in-water construction activity itself or could become trapped behind the cofferdam. Fish trapped behind a cofferdam would experience degraded water quality (e.g., higher temperatures, less dissolved oxygen). They would also become entrained in or impinged on the pumps used for dewatering or would become stranded after dewatering is complete.

Consistent with analyses presented in the NMFS Restoration PBOs, restoration projects permitted under the Order would minimize the potential impacts of dewatering and relocating fish by implementing the following general protection measures (Appendix E)

and species protection measures (Appendix F), which require best practices for dewatering and fish relocation:

General protection measures:

- IWW-5: Cofferdam Construction
- IWW-6: Dewatering/Diversion Restrictions
- IWW-7: Fish and Aquatic Species Exclusion while Installing Diversion Structures
- IWW-8: Removal of Diversion and Barriers to Flow

Species protection measures:

- SPM-3: Species Protection Construction Work Windows
- FISH-1: Habitat Disturbance Avoidance and Minimization.
- FISH-2: Habitat Assessment and Surveys
- FISH-3: Fish Capture and Relocation
- FISH-4: Reporting

Populations of benthic (i.e., bottom-dwelling) aquatic macroinvertebrates may be temporarily lost or their abundance reduced when creek habitat is dewatered (Cushman 1985). However, the impacts of streamflow diversions and dewatering on aquatic macroinvertebrates would be temporary. Construction would be relatively short-lived, and macroinvertebrates would be expected to recolonize disturbed areas rapidly after re-watering (in about 1–2 months) (Cushman 1985; Thomas 1985; Harvey 1986). In addition, the project-related loss of macroinvertebrates would likely have only a negligible effect on listed fishes; streamflows would be maintained around project worksites, so food from upstream sources (via drift) would be available downstream of the dewatered areas.

Streamflow diversions and dewatering of project work areas are expected to cause the temporary loss, alteration, and reduction of aquatic habitat for juvenile fishes. These sites would be restored before project completion with implementation of general protection measure IWW-8 (Removal of Diversion and Barriers to Flow) and would ultimately be enhanced by the restoration projects. Project-related flow fluctuations outside of dewatered areas should be small, gradual, and short-term, and are not expected to harm special-status fish species.

Impact Conclusion

Special-status fish species may be present in the study area, and the construction of restoration projects permitted under the Order has the potential to disturb habitat for these species. Therefore, this impact would be **potentially significant**.

However, to be eligible for the Order, restoration projects would be required to include all applicable general protection measures (Appendix E).

As described above, implementing the following general protection measures would avoid and/or minimize construction impacts on special-status fish species:

- GPM-2: Construction Work Windows
- GPM-3: Construction Hours

- GPM-4: Environmental Awareness Training
- GPM-5: Environmental Monitoring

In addition, as identified in the preceding impact discussions, general protection measures and species protection measures would be implemented to minimize the following specific impacts on listed fishes:

- *Physical disturbance:* IWW-2 through IWW-4, SPM-1, FISH-1 through FISH-5
- *Mobilization of sediment:* IWW-1, IWW-3, IWW-5, IWW-11, and IW-13, SPM-1, FISH-1 through FISH-5
- *Noise, motion, and vibration disturbance:* IWW-9 through IWW-12, SPM-1, FISH-1 through FISH-5
- *Disturbance of riparian vegetation:* VHDR-1 through VHDR-13
- *Chemical contamination from equipment fluids:* WQHM-1 through WQHM-6
- *Dewatering and fish relocation:* IWW-5 through IWW-8, SPM-1, FISH-1 through FISH-5

Implementing restoration projects permitted under the Order could result in construction-related disturbance and associated impacts on special-status fish species. However, the general protection measures and species protection measures identified above would avoid and/or reduce potential impacts to a **less-than-significant** level.

The only exception would be for the use of explosives for small dam removal.
As described in Chapter 2 and above, in order to be considered a project eligible for the Order, the use of explosives for small dam removal would have to be justified due to site-specific conditions, including equipment access difficulties. Further, the use of explosives must be conducted in dry or dewatered conditions and potential harm to fish from the explosives blast and pressure waves would need to be analyzed. Incorporation of general protection measures and species protection measures identified above would avoid and/or reduce in most cases, however, because the exact details of blasting is yet to be determined for a given project, analysis this type of activity is not possible at this time. As a result, the use of explosives for small dam removal would be a **significant and unavoidable impact**.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Most long-term impacts on aquatic biological resources of implementing the restoration projects permitted under the Order should be beneficial, because the specific purpose of these projects would be to restore or enhance existing conditions. Overall, completing the activities permitted under the Order would be expected to increase the quality and quantity of habitat for special-status fish species:

- Constructing fish passage facilities and/or removing legacy structures would enhance migratory habitat for adult and juvenile fishes.
- Completing bioengineered bank stabilization projects and revegetating with native plants would enhance riparian habitat important for juvenile rearing and food production.

- Enhancing or creating floodplain, wetland, off-channel, instream, and riparian habitat would increase the complexity of habitat on project sites and serve to enhance the habitat available for a range of life stages of special-status fish species.

However, some restoration projects could result in adverse long-term impacts on aquatic biological resources. The beneficial impacts of the restoration projects are described in detail below, followed by a discussion of the potential adverse impacts.

Beneficial Impacts of Restoration Projects

For all types of restoration projects permitted under the Order, the resulting restored and/or enhanced habitat is expected to have beneficial impacts on aquatic resources. The following sections describe the anticipated benefits for each project type.

Stream Crossing and Fish Passage Improvements

Modifying instream barriers for fish passage improvement projects would improve fish passage and increase access to suitable habitat. These projects would result in long-term beneficial impacts by improving passage at sites that are partial barriers or providing passage at sites that are total barriers. In both instances, the project work would improve fish passage and increase access to available habitat.

Reestablishing linkages between migratory habitat in mainstem waters and spawning/rearing habitat in headwaters, including tributaries, would greatly facilitate the recovery of fishes in many regions throughout the study area. Reintroducing special-status fish species into previously unavailable upstream habitat would also likely increase the species' reproductive success, ultimately helping to increase fish population sizes in watersheds where the amount of quality freshwater habitat may be a limiting factor.

Removal of Small Dams, Tide Gates, Flood Gates, and Legacy Structures

Similar to stream crossing and fish passage improvement projects, projects to remove legacy structures would improve fish passage and increase their access to suitable habitat. These projects would result in long-term beneficial impacts by improving movement at sites that are partial barriers or providing passage at sites that are total barriers. Removing man-made structures may also reduce the habitat available for predators, potentially lessening the predation risk for listed fish species.

Bioengineered Bank Stabilization

Bioengineered streambank stabilization projects would reduce ongoing sedimentation from bank erosion, lessen turbidity levels, and improve long-term water quality for fishes. Reducing the amount of sediment delivered to streams would improve fish habitat and survival by increasing the survival of fish embryos and alevins in spawning gravels/beds, reducing injury to juveniles from high concentrations of suspended sediment, and minimizing the loss of quality and quantity of pools from excessive sediment deposition.

Restoration and Enhancement of Off-Channel/Side-Channel Habitat

Instream habitat structure and improvement projects would enable fish to escape from predators. These projects would provide resting cover, increase spawning habitat,

improve upstream and downstream migration corridors, improve pool-to-riffle ratios, and add habitat complexity and diversity. Some structures would be designed to reduce sedimentation, protect unstable banks, stabilize existing slides, provide shade, and create scour pools. Instream habitat structures such as woody material and boulders contribute to habitat diversity and create and maintain foraging, cover, and resting habitat for both adult and juvenile anadromous and resident special-status fish species. Placing instream woody material on the banks of the active channel would create instantly available habitat by creating diverse cover for juvenile rearing.

Restoration activities would improve the quality of spawning habitat over the long term. Spawning habitat would be improved because various types of erosion control would reduce the amount of sediment that would enter the stream in the long term. In addition, augmenting gravels would increase the amount of spawning habitat available.

Water Conservation Projects

Water conservation projects such as offstream storage tanks and ponds, including projects with necessary off-channel infrastructure to reduce low-flow stream diversions, would provide benefits to fish that experience habitat limitations during low-flow periods.

Floodplain Restoration

Projects to restore floodplains would enhance the availability of food and habitat for many species of rearing juvenile fishes. The water that resides in and flows from Central Valley floodplains is rich in plankton, coarse organic matter, and other sources of food for riverine and estuarine fishes and insects. Therefore, floodplains improve the productivity of rivers, promoting healthy and abundant fish populations.

Removal of Pilings and Other In-Water Structures

Like removal of legacy structures, removal of artificial structures may improve fish passage and access to suitable habitat, and may reduce the habitat available for predators, potentially lessening the predation risk for special-status fish species.

Removal of Nonnative Invasive Species and Revegetation with Native Plants

Removing nonnative terrestrial and aquatic invasive species and revegetating with native plants improves aquatic, riparian, and wetland habitat for fish and wildlife in a variety of ways. These types of projects would improve the composition, structure, and abundance of native biological communities important for bank stability, stream shading, the riparian canopy, and understory establishment and diversity; input of large wood and other organic material into streams; and other ecological benefits, all of which are important elements of species habitat and water quality.

This project type also includes removal and/or management of nonnative predatory fish and other nonnative fish and wildlife, as long as the activity is associated with a restoration project. These activities would have the potential to increase the survival of native special-status species, especially in cases where predatory fish and predation are an important stressor to special-status species.

Establishment, Restoration, and Enhancement of Tidal, Subtidal, and Freshwater Wetlands

Like floodplain restoration projects, wetland restoration projects would provide enhanced food and habitat for rearing juvenile fishes. Wetlands are nurseries for juvenile fish and provide habitat for small fishes that use the edges of wetlands to feed and avoid predation by larger fish.

Establishment, Restoration, and Enhancement of Stream and Riparian Habitats

Like native plant revegetation project types, stream and riparian restoration projects would enhance native riparian forests or communities, provide increased cover (large wood, boulders, vegetation, and bank protection structures), and provide a long-term source of all sizes of instream wood.

Adverse Impacts of Operations and Maintenance

As described above, most impacts of constructed facilities and operations and maintenance for restoration projects permitted under the Order would be beneficial. However, temporary impacts could occur during maintenance activities for projects that would leave infrastructure at project sites after construction (e.g., stream crossings and fish passage improvements and water conservation projects) would require operations and maintenance of those structures, which could lead to limited, ongoing adverse impacts on special-status fish species. Such maintenance activities could result in impacts similar to those described above in the *Effects of Project Construction* section, although they would be reduced in magnitude and duration relative to the impacts of project construction. Maintenance activities could include sediment removal within or near the facilities, vegetation removal, and inspection and maintenance of facilities. These activities may lead to temporary mobilization of sediment, ground disturbance, chemical contamination, or vegetation removal. Overall, this impact would be **potentially significant**.

Implementing the general protection measures described in the *Project Construction* section above would reduce or further reduce potential impacts to a **less-than-significant** level.

Impact 3.6-2: Implementing future restoration projects permitted under the Order could result in adverse direct effects on the movement of native resident or migratory fish.

Effects of Project Construction Activities

Project construction activities could temporarily affect fish movement. For example, installing a cofferdam to facilitate construction would have the potential to temporarily impede or delay migrating adults, limiting their ability to reach spawning and/or rearing areas. Installing a cofferdam could also hinder migration of juveniles, potentially exposing them to increased predation and unsuitable aquatic habitat conditions.

Instream construction activities also could impede upstream passage of fishes by causing altered hydrologic conditions, such as temporarily increased velocities. However, because cofferdams typically do not block the entire width of affected

waterways, the movement of juvenile or adult fishes are unlikely to be substantially affected.

Riparian corridors and rivers often serve as the main routes for movement and migration of numerous fish and wildlife species. Thus, the loss, fragmentation, or alteration of riparian and riverine habitats could limit access to habitats for breeding (e.g., seasonal spawning areas for fish), rearing, foraging, and other needs. However, impacts on riparian vegetation from construction activities are expected to be temporary, limiting the impact on fish movement.

Implementing restoration projects permitted under the Order could result in construction-related impacts on fish movement, but the impacts are expected to be minimal and temporary. Therefore, the impact of project construction activities on fish movement would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

The long-term effects of restoration projects permitted under the Order on fish movement are expected to be beneficial or neutral. The specific purpose of all project types would be to restore and enhance existing conditions that contribute to degradation of fish habitat. Removing artificial structures, improving fish passage, restoring habitat, and revegetating with native plants would all provide benefits for the migration of native fishes, either by directly creating new passage or by indirectly creating more suitable habitat, thus providing an improved migratory corridor for fish.

Therefore, impacts on fish movement from construction of facilities and operations and maintenance of restoration projects permitted under the Order would be **beneficial**. The Order does not include any general protection measures applicable to this impact.

3.7 Cultural Resources

3.7.1 Introduction

This section describes cultural resources in the study area and the potential impacts of the types of restoration projects that would be permitted under the Order. (Section 2.6, *Categories of Restoration Projects in the Order*.) Although tribal cultural resources are discussed separately in Section 3.18, this section provides the associated regulatory context because some of the same mitigation measures for reducing impacts on cultural resources also apply to tribal cultural resources.

The environmental setting and evaluation of impacts on cultural resources is based on a review of existing published documents, including city and county general plans; information regarding example projects similar to those permitted under the Order that may be implemented by other agencies; and other information sources listed in Chapter 8, *References*.

No comments specifically addressing cultural resources were received in response to the notice of preparation (NOP). See Appendix B for NOP comment letters.

Key Terms

For this analysis, the term *cultural resource* is defined as follows:

> Indigenous and historic-era sites, buildings, structures, districts, and landscapes, or other evidence associated with human activity considered of value to a culture, a subculture, or a community for scientific, traditional, religious, or other reason. These resources include the following types of CEQA-defined resources: historical resources, archaeological resources, and human remains.

CEQA Guidelines section 15064.5 defines the term *historical resource* as follows:

- A resource in the California Register of Historical Resources (California Register)
- A resource included in a local register of historical resources, as defined in PRC Section 5020.1(k), or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g)
- Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California by the lead agency, provided the lead agency's determination is supported by substantial evidence in light of the whole record

If a lead agency determines that an archaeological site is a historical resource, the provisions of PRC Section 21084.1 and PRC Section 15064.5 apply. If an archaeological site does not meet the criteria for a historical resource contained in the State CEQA Guidelines (PRC Section 15000 et seq.), the site may be treated in accordance with the provisions of PRC Section 21083, pertaining to unique archaeological resources.

The term *indigenous*, rather than *prehistoric*, is used as a synonym for "Native American–related" (except when quoting). *Pre-contact* is used as a chronological adjective to refer to the period before the arrival of Euroamericans in the subject area. "Indigenous" and "pre-contact" are often but not always synonymous: The former term refers to a cultural affiliation and the latter is chronological.

This section also includes the key terms defined below.

- **Architectural Resource.** This resource type includes historic-era buildings, structures (e.g., bridges, canals, roads, utility lines, railroads), objects (e.g., monuments, boundary markers), and districts. Residences, cabins, barns, lighthouses, military-related features, industrial buildings, and bridges are some examples of architectural resources.
- **Archaeological Resource.** This resource type consists of indigenous, or pre-contact, and historic-era archaeological resources:
  - *Indigenous archaeological resources* consist of village sites, temporary camps, lithic scatters, roasting pits/hearths, milling features, petroglyphs, rock features, and burials. Associated artifacts include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil (midden) containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs). Indigenous sites that were occupied into the historic era can have both pre-contact and historic-era artifacts.
  - *Historic-era archaeological resources* consist of town sites, homesteads, agricultural or ranching features, mining-related features, refuse concentrations, and features or artifacts associated with early military and industrial land uses. Associated artifacts include stone, concrete, or adobe footings and walls; artifact-filled wells or privies; and deposits of metal, glass, and/or ceramic refuse.

  If a resource is considered a ruin (e.g., a building lacking structural elements, a structure lacking a historic configuration), it is classified as an archaeological resource.

3.7.2 Environmental Setting

This section describes the cultural resources that could be affected by the types of restoration projects that would be permitted under the Order. The area of analysis covers the entire geographic extent of California and includes many types of cultural resources.

The ethnographic setting, indigenous resources, and historic-era resources are described here to allow analysis at a program level of detail. This description does not preclude the need for or replace any project-level environmental review.

Ethnographic Setting

Beginning in the early 16th century, but primarily during the late 19th and early 20th centuries, Native American lifeways and languages (i.e., ethnographic data) were documented throughout California. Whether provided by professional ethnographers or archaeologists, field personnel from government agencies such as the Bureau of Indian Affairs, soldiers, merchants, settlers, or travelers, ethnographic accounts partly illuminate the traditions, beliefs, and cultures of Native American groups during specific points in time. Synthesized narratives such as the *Handbook of North American Indians,* Volume 8: *California* (Heizer 1978) categorize Native traditions and practices documented at the time in California; however, the complexity of regional diversity should not be overlooked.

At least six primary language families exist in California, and there may be more than 300 different dialects of approximately 100 languages. The “geolinguistic mosaic of the ethnographic period, with a startling diversity of languages and language families” indicates numerous major population shifts and migrations (Golla 2007:71). Ethnographers have also quantified at least 60 greater Indian cultures and as many as 250 specific tribes throughout the state.

Similarities between California’s native populations crossed geographic, climatic, and cultural boundaries. Acorns, where available, were a staple throughout California. Native populations relied on deer, elk, small mammals, birds, and fish, and they used resources to their fullest extent, with little to no waste product. Ethnographically documented communities were generally focused on a central tribe with smaller satellite tribelets, although this characteristic varied by region. Shamanism and ceremonialism played important roles in the lives of most California Native Americans; the specific religious traditions themselves differed between groups. Basketry was widespread, and some southern tribes also manufactured pottery. Hunting, trapping, and fishing technologies were shared across tribal and cultural boundaries, but varied depending on environmental conditions.

Native American fishing techniques along inland waterways included constructing fish weirs or dams across rivers to trap anadromous fish during upstream migration. Weirs were constructed of wood poles, logs, and small stakes to obstruct fish passage up a waterway. Some fish weirs were built and used by small groups, mainly individual families, but communal constructions were also common (Gould 1975). Organized labor teams from many surrounding villages worked cooperatively to collect logs for the construction of a communal fish weir, catch fish, gather firewood, and process the catch. The dam would be in place for approximately 10 days before the group would tear it down. Other methods of fishing included net traps, harpoons, spears, platforms, and clubs (Kroeber and Barrett 1960). Tule balsa canoes and dugout canoes were also used for fishing (Wilson and Towne 1978). Among the other important riverine subsistence species were steelhead, candlefish, lamprey, eel, and trout.

Trade was well developed in California. The use of shell beads as currency was an important economic and cultural practice for many tribes. Food, ornaments, household items, clothing, industrial materials such as obsidian, finished items including canoes, pottery, basketry, and tobacco were used for trade items. Trade networks were well

established, and although it appears that there were not professional traders, central villages served as focal points for trading (Heizer 1978).

Regional differences in Native American beliefs are significant, yet there is a common identity and relationship with the environment. California Native peoples believe that nature is interrelated and immersed with sacred power. Most California tribes tell creation myths that often explain the origins of the earth, human existence, and individual cultural attributes. Stories have often taught morality or defined the establishment of elements. Modern Native American beliefs vary but are rooted in their ancestral land and traditions.

Indigenous Resources and Waterways

Water—whether present in springs, creeks, rivers, lakes, bays, or the ocean—is one of the most important resources necessary for human use and settlement. Water, and access to water, provides sustenance, travel and trade corridors, and traditional boundaries. Indigenous cultural resources are present along waterways throughout California.

Indigenous archaeological resources generally found along California's waterways include permanent or semi-permanent habitation sites, temporary camps or food processing localities, and isolated artifacts. Archaeological materials that can be found at sites along waterways include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil (midden) containing heat-affected rocks, artifacts, or shellfish remains; stone milling equipment (e.g., mortars, pestles, handstones, milling slabs); and battered stone tools, such as hammerstones and pitted stones. Native American human remains can also be found at indigenous archaeological sites. These types of resources are generally not within stream channels; rather, they are located on riverbanks and in surrounding areas.

Other indigenous archaeological site types that could be in or adjacent to waterways are fish weirs and platforms. Flooding and sediment deposition episodes over millennia have buried many of these archaeological sites, resulting in complex archaeological sites with components both at and below the surface.

Historic Setting

The earliest European presence in California came with the Spanish discovery and exploration of the California coast in the mid-16th century. Alta California had been claimed for Spain in 1542 by the Portuguese explorer Juan Cabrilho, who sailed up the Pacific coast as far as Fort Ross. Because of the prosperity of its more southern colonies and the great distances required to travel so far north, Spain largely ceased overland and maritime exploration of Alta California until the 18th century. Spain had originally focused its energy and attention on its southern colonies in New Spain; however, in the 18th century, the increased presence of Russian settlements in the Aleutian Islands and the British acquisition of Canada encouraged Spain to explore and occupy Alta California to prevent Russian and British encroachment from the north.

European expansion into Alta California began when Spanish Mexico instigated the establishment of a string of Franciscan missions throughout the region. The California

mission system had two goals: to Christianize and enculturate the native population of California, and to gain political and social control of the area for the Spanish government in Mexico. Mission San Diego de Alcalá, the first of 21 California missions, was founded in July 1769. Over the next 50 years the mission system was extended farther north. Alongside the missions came a network of military establishments or *presidios* and civilian settlements or *pueblos*. Exploration of California's hinterland focused predominantly on identifying rancho sites to support the mission network and on recapturing runaway Natives.

Although the original Spanish plan for the mission system included secularization, the process did not begin until Mexico gained independence from Spain. Fueled by reports of Franciscan padres degrading the Native peoples and failing to provide food and services to the military, the Mexican government began secularization in mid-1834. The mission lands were to be divided among the Native American neophytes, but only rarely did this actually happen. More often the mission lands were granted to high-ranking Mexican Californian soldiers, politicians, and socialites.

Mexican Californians, or *Californios*, were well known for their hospitality and easygoing lifeways. Early accounts describe ranchos with large households, operated by a sizeable Native American labor force. Most ranchos were intensively involved in the hide-and-tallow trade, supporting huge herds of cattle on their vast landholdings. The cattle were driven to *matanzas*, or slaughter sites, that were usually as close to water transportation as possible for easy transport onto foreign trade vessels. The relationship between the *Californios* and the foreign ships had been active since the early 1820s. The ships imported all manner of trade goods, because little manufacturing of refined goods occurred in Mexican California.

Beginning in the 1830s, Americans began to migrate to California, and many became Mexican citizens. Some married into prominent *Californio* families, and some of these families were eventually granted lands by the governor. Many of these first immigrants became acculturated into Mexican society and politics, including some who went on to become prominent businessmen and landowners.

The discovery of gold in California in 1848 instigated one of the largest migrations in history. Thousands came by land and sea in search of fortunes. Most came to dig for gold, but many came with the foresight that miners needed supplies. Earlier residents of California, including many *Californios* and previous Euroamerican immigrants, capitalized on the new immigrant population.

After the acquisition of California by the U.S. that same year, many *Californios* also struggled to hold on to their vast landholdings. The Treaty of Guadalupe Hidalgo promised that property belonging to the Mexicans would be "inviolably respected," but the new Americans generally believed that California's lands should be public property as a privilege gained with the military victory. The newly arrived immigrants ignored the vague land-grant maps, or *diseños,* that marked the boundaries of each rancho territory. Squatters settled on land officially owned by Mexicans and violence often erupted. Many *Californios* lost substantial amounts of land, despite legal efforts to hold on to it.

Although many claims were confirmed, the Mexican landowners were often bankrupt by the end of the long and costly proceedings.

Mining camps and towns were established almost immediately throughout California's gold-bearing regions, which are generally located along the western foothills of the Sierra Nevada and along the Klamath and Trinity River basins. At the outset, the mining population was made up almost exclusively of single men; but miners needed food and supplies, and people who could provide those goods followed. Ultimately, women and children also relocated to mining communities.

The influx also brought a wide-ranging diversity of cultures and nationalities. California gold mining was very successful; in 1852, California produced more than $81 million worth of gold, 60 percent of the world's production for that year (Clark 1957:223).

Almost immediately after the discovery of gold, investors began talking about the construction of a transcontinental railroad that would connect Eastern goods, money, and services to the new Western enterprises. Before construction of the railroad, however, California's extensive network of inland waterways was crucial for travel to the interior.

Historic-Era Resources and Waterways

Potential historic-era resources within California's river system include submerged vessels. The California State Lands Commission maintains a shipwreck database that identifies approximately 1,550 recorded shipwrecks in the state, about 70 of which are in the river system (California State Lands Commission 2019). The vast majority of these resources are wood-hulled, Gold Rush–era vessels submerged in the Sacramento, American, Feather, Yuba, and San Joaquin Rivers in central California. The title to all abandoned shipwrecks is under the jurisdiction of the California State Lands Commission. Any submerged vessel remaining in state waters for more than 50 years is considered a potential historical resource.

Other historic-era resources often present in California's waterways are mining sites and features that are submerged in or adjacent to the state's streams. Resource types include mining remains, such as tailings piles and river diversions; water conveyance features, such as ditches, flumes, and dams; and community remains, including foundations, dugouts, and refuse deposits located along riverbanks and in the vicinity (Caltrans 2008). Like submerged vessels, many of these other Gold Rush–era resources are concentrated within California's Sierra Nevada foothills but may be present anywhere in the state's waterways.

California's waterways are a patchwork of both highly altered riverine systems and wild and scenic drainages that are undisturbed by modern development. The construction of dams, levees, canals, and reservoirs during modern times—whether for power generation, irrigation, flood control, or transportation—has greatly altered the state's waterways, and with it, much of the surface evidence of the types of pre-contact and historic-era sites described above. Natural processes such as flooding, erosion, and deposition have also altered or destroyed many of the cultural resources found along California waterways.

Regardless of these natural and human-made disturbances, the state's waterways remain abundant with both recorded and unrecorded cultural resources, all of which provide a detailed record of California's rich cultural heritage.

3.7.3 Regulatory Setting

This section discusses federal, state, and regional and local plans, policies, regulations, and laws, and ordinances pertaining to cultural resources.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location.

Federal

National Historic Preservation Act

Historic properties are considered through compliance with the National Historic Preservation Act (NHPA), as amended (U.S. Code Title 54, Section 307103 [54 USC 307103]) and its implementing regulations (54 USC 307103, Code of Federal Regulations Title 36, Section 800 [36 CFR 800], 36 CFR 60, and 36 CFR 63). The NHPA establishes the federal government's policy on historic preservation and the programs, including the National Register of Historic Places (National Register), through which that policy is implemented. Under the NHPA, historic properties include "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the [National Register]" (54 USC 300308).

When a project implemented under the Order requires a federal permit, compliance with Section 106 of the NHPA (Section 106) is also required. Under Section 106, generally, it is the responsibility of the lead federal agency—in this case, USACE—to consider the effects of a proposed undertaking on historic properties. The federal agency must consult with the State Historic Preservation Officer (SHPO), federally recognized Indian tribes, and other interested parties before granting a permit, funding, or other authorization. The agency must also afford the Advisory Council on Historic Preservation and the SHPO a reasonable opportunity to comment on any undertaking that would adversely affect a property eligible for listing in the National Register. Section 101(d)(6)(A) of the NHPA allows properties of traditional religious and cultural importance to an Indian tribe or a Native Hawaiian organization to be determined eligible for inclusion in the National Register.

Under the NHPA, a find is significant if it meets the National Register listing criteria (36 CFR 60.4), as stated below:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:
>
> A. That are associated with events that have made a significant contribution to the broad patterns of our history, or

B. That are associated with the lives of persons significant in our past, or

C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or

D. That have yielded, or may be likely to yield, information important in prehistory or history.

In addition to meeting one of the above criteria, a resource must retain integrity to be considered a historic property. Integrity is measured by the degree to which the resource retains its historical attributes and conveys its historical character, the degree to which the original fabric has been retained, and the reversibility of changes to the resources.

Certain types of resources are usually excluded from consideration for listing in the National Register but can be considered if they meet special requirements in addition to meeting one or more of the National Register listing criteria. The following seven criteria considerations deal with resources usually excluded from listing in the National Register:

- Religious resources
- Moved resources
- Birthplaces and graves
- Cemeteries
- Reconstructed resources
- Commemorative resources
- Resources that have achieved significance within the past 50 years

American Indian Religious Freedom Act

The American Indian Religious Freedom Act of 1978 (42 USC 1996) protects and preserves the right of Native Americans to believe, express, and exercise traditional religious rights and cultural practices, including access to sites of religious importance to Native Americans.

State

The State of California consults on implementation of the NHPA and oversees statewide comprehensive cultural resource surveys and preservation programs. The California Office of Historic Preservation, an office of the California Department of Parks and Recreation, implements the policies of the NHPA statewide. The Office of Historic Preservation also maintains the California Historical Resources Inventory. The SHPO is an appointed official who implements historic preservation programs within the state's jurisdiction.

California Environmental Quality Act

CEQA (California Public Resources Code [PRC] Section 21000 et seq.) is the principal statute governing environmental review of projects occurring in California. CEQA requires lead agencies to determine whether a project would have a significant effect on cultural resources and tribal cultural resources, among other resource types.

The State of California implements provisions of CEQA through its statewide comprehensive cultural resources surveys and preservation programs. Typically, a resource must be more than 50 years old to be considered a potential historical resource. The California Office of Historic Preservation advises recording any resource 45 years or older, because there is commonly a 5-year lag between resource identification and the date that planning decisions are made.

Historical Resources

The State CEQA Guidelines recognize that a historical resource includes all of the following:

- A resource in the California Register of Historical Resources (California Register) (PRC Section 5024.1, Title 14 California Code of Regulations (CCR), Section 4850 et seq.)
- A resource included in a local register of historical resources, as defined in PRC Section 5020.1(k), or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g)
- Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California by the lead agency, provided the lead agency's determination is supported by substantial evidence in light of the whole record (PRC 5024.1, Title 14 CCR, Section 4850 et seq.)

If a lead agency determines that an archaeological site is a historical resource, the provisions of PRC Section 21084.1 and PRC Section 15064.5 apply. If an archaeological site does not meet the criteria for a historical resource contained in the State CEQA Guidelines (PRC Section 15000 et seq.), the site may be treated in accordance with the provisions of PRC Section 21083, pertaining to unique archaeological resources.

Unique Archaeological Resources

As defined in PRC Section 21083.2, a "unique archaeological resource" is an archaeological artifact, object, or site, about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information
- Has a special and particular quality such as being the oldest of its type or the best available example of its type
- Is directly associated with a scientifically recognized important prehistoric or historic event or person

The State CEQA Guidelines note that if an archaeological resource is not a unique archaeological, historical, or tribal cultural resource, the effects of the project on those

cultural resources shall not be considered a significant effect on the environment (PRC Section 15064.5[c][4]).

Tribal Cultural Resources

Impacts on tribal cultural resources also are considered under CEQA (PRC Section 21084.2). PRC Section 21074(a) defines tribal cultural resources as any of the following:

- Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
  - Included or determined to be eligible for inclusion in the California Register
  - Included in a local register of historical resources, as defined in PRC Section 5020.1(k)
- Resources determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of [PRC] Section 5024.1. In applying these criteria, the lead agency would consider the significance of the resource to a California Native American tribe.\

California Register of Historical Resources

The California Register is “an authoritative listing and guide to be used by State and local agencies, private groups, and citizens in identifying the existing historical resources of the State and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change” (PRC Section 5024.1[a]). The criteria for eligibility for the California Register are based on the criteria for listing on the National Register (PRC Section 5024.1[b]). Certain resources are determined by the statute to be automatically included in the California Register, including California properties formally determined eligible for, or listed in, the National Register.

To be eligible for the California Register, a cultural resource must be significant at the federal, state, and/or local level under one or more of the following four criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage

(2) Is associated with the lives of persons important in our past

(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values

(4) Has yielded, or may be likely to yield, information important in prehistory or history

A resource eligible for the California Register must be of sufficient age and retain enough of its historic character or appearance (integrity), to convey the reason for its significance. The California Register consists of resources that are listed automatically

and those that must be nominated through an application and public hearing. The California Register automatically includes the following resources:

- California properties listed in the National Register and those formally determined eligible for the National Register
- California Registered Historical Landmarks from No. 770 onward
- California Points of Historical Interest that have been evaluated by the California Office of Historic Preservation and have been recommended to the State Historical Commission for inclusion in the California Register

The following other resources may be nominated to the California Register:

- Historical resources with a significance rating of Category 3, 4, or 5 (properties identified as eligible for listing in the National Register, the California Register, and/or a local jurisdiction register)
- Individual historic resources
- Historic resources contributing to historic districts
- Historic resources designated or listed as local landmarks, or designated under any local ordinance, such as an historic preservation overlay zone

California Public Resources Code Section 5097

PRC Section 5097.99, as amended, prohibits obtaining or possessing Native American artifacts or human remains that are taken from a Native American grave or cairn. Knowingly or willfully obtaining or possessing Native American artifacts or human remains is a felony punishable by imprisonment. Similarly, unlawful removal of any such items with an intent to sell or dissect or with malice or wantonness is a felony punishable by imprisonment.

California Native American Historic Resource Protection Act

The California Native American Historic Resources Protection Act of 2002 imposes civil penalties, including imprisonment and fines up to $50,000 per violation, on persons who unlawfully and maliciously excavate upon, remove, destroy, injure, or deface a Native American historic, cultural, or sacred site that is listed or may be listed in the California Register.

California Health and Safety Code Section 7050.5

Section 7050.5 of the California Health and Safety Code protects human remains by prohibiting the disinterment, disturbance, or removal of human remains from any location other than a dedicated cemetery. PRC Section 5097.98 (reiterated in State CEQA Guidelines Section 15064.59[e]) also identifies steps to follow if human remains are accidentally discovered or recognized in any location other than a dedicated cemetery.

Regional and Local

The study area encompasses all counties and cities throughout California. Each county and city has local regulations and a general plan with cultural resources goals and

policies that guide development and encourage providing and maintaining open space resources and preserving areas of outstanding cultural value in their communities. Many cities and counties in the study area have goals and policies that promote the preservation of the area's cultural resources—archaeological, architectural, and tribal cultural resources.

3.7.4 Impacts and Mitigation Measures

Methods of Analysis

Cultural resource impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could impact existing historical and archeological resources. However, the precise locations and detailed characteristics of potential future individual restoration projects are yet to be determined. Therefore, this cultural resource analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis.

Permanent impacts are considered those that would continue through the life of a project as a result of the environmental conditions caused by restoration projects permitted under the Order (e.g., new infrastructure such as pumps would be located indefinitely in one location, resulting in the removal of sediment and soils within the facility's footprint). Temporary impacts are considered those that would be temporary in nature (e.g., construction-related activities).

The approach to assessing cultural resources was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of Restoration Projects in the Order*, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*.

Historical Resources

Impacts on historical resources were assessed by identifying the types of restoration projects and activities associated with them that would be implemented under the Order, such as new construction, demolition, or substantial alteration, that would affect resources that have been identified as historical.

Individual properties and districts identified as historical resources under CEQA include those that are significant because of their association with important events, people, or architectural styles or master architects, or for their informational value (California Register Criteria 1, 2, 3, and 4) and that retain sufficient historic integrity to convey their significance. Criterion 4 is typically applied to the evaluation of archaeological resources, and not to architectural resources. Historical resources may include architectural resources and archaeological resources.

Once a resource has been identified as significant, it must be determined whether the impacts of the project would "cause a substantial adverse change in the significance" of the resource (State CEQA Guidelines Section 15064.5[b]). A substantial adverse change in the significance of a historical resource means "physical demolition,

destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of [the] historical resource would be materially impaired" (State CEQA Guidelines Section 15064.5[b][1]).

A historical resource is materially impaired through demolition or alteration of the resource's physical characteristics that convey its historical significance and that justify its inclusion in (or eligibility for inclusion in) the California Register or a qualified local register (State CEQA Guidelines Section 15064.5[b][2]). Therefore, material impairment of a historical resource constitutes a significant impact.

Archaeological Resources

The significance of most pre-contact and historic-era archaeological sites is typically assessed relative to California Register Criterion 4. This criterion stresses the importance of the information potential contained within an archaeological site, rather than the significance of the site as a surviving example of a type or its association with an important person or event.

Archaeological resources may qualify as historical resources under the definition provided in State CEQA Guidelines Section 15064.5(a). Alternatively, they may be assessed under CEQA as unique archaeological resources. "Unique archaeological resources" are defined as archaeological artifacts, objects, or sites that contain information needed to answer important scientific research questions (PRC Section 21083.2).

A substantial adverse change in the significance of an archaeological resource is assessed similarly to such changes to other historical resources; that is, a "substantial adverse change" in significance means the "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of [the] historical resource would be materially impaired" (State CEQA Guidelines Section 15064.5[b][1]).

As stated previously, a historical resource is materially impaired when a project demolishes or materially alters the resource's physical characteristics that convey its historical significance and that justify its inclusion (or eligibility for inclusion) in the California Register or a qualified local register (State CEQA Guidelines Section 15064.5[b][2]). Therefore, material impairment of archaeological resources that are considered historical resources or unique archaeological resources would be a significant impact.

Human Remains

Human remains, including those buried outside of formal cemeteries, are protected under several state laws, including PRC Section 5097.98 and Health and Safety Code Section 7050.5. For the purposes of this analysis, intentional disturbance, mutilation, or removal of interred human remains would be a significant impact.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an impact related to cultural resources is considered significant if the types of projects that would be permitted under the Order would do any of the following:

- Cause a substantial adverse change in the significance of a historical resource pursuant to State CEQA Guidelines Section 15064.5
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5
- Disturb any human remains, including those interred outside of dedicated cemeteries

Impacts and Mitigation Measures

Table 3.7-1 summarizes the impact conclusions presented in this section for easy reference.

Table 3.7-1
Summary of Impact Conclusions—Cultural Resources

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.7-1: Implementing future restoration projects permitted under the Order could cause a substantial adverse change in the significance of a historical resource pursuant to State CEQA Guidelines Section 15064.5.	SU	SU
3.7-2: Implementing future restoration projects permitted under the Order could cause a substantial adverse change in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5.	SU	SU
3.7-3: Implementing future restoration projects permitted under the Order could disturb any human remains, including those interred outside of dedicated cemeteries.	SU	SU

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2020
NOTE: SU = significant and unavoidable

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given

project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Impact 3.7-1: Implementing future restoration projects permitted under the Order could cause a substantial adverse change in the significance of a historical resource pursuant to State CEQA Guidelines Section 15064.5.

Effects of Project Construction Activities

Construction of restoration projects permitted under the Order could involve ground disturbance, vibration, and removal of architectural resources (e.g., agricultural outbuildings, irrigation facilities, power poles, utility lines, piping) and vegetation (e.g., trees, stumps). Constructing these projects also has the potential to introduce new visual elements or modify existing visual elements (e.g., impoundments, tanks, ancillary buildings and structures). However, the exact details, including precise locations, of any such construction activities have yet to be determined. Therefore, it is not known whether implementing the restoration projects permitted under the Order would affect any historical resources.

Construction of new infrastructure or modifications to existing infrastructure (e.g., bridges, culverts, fishways and screens, dams, levees, water conveyance features) could result in significant impacts on historical resources in several ways:

- Construction could introduce new elements to a historic setting associated with historical resources or could physically alter historical resources.
- Ground-disturbing construction activities could alter existing landscapes.
- Vibration generated during construction work could physically damage or alter nearby architectural resources that have the potential to qualify as historical resources.

If construction activities for any of the future restoration projects permitted under the Order were to result in either a direct impact (e.g., physical modification, damage, or destruction) or an indirect impact (e.g., alteration to setting, including visual) on any architectural resources that qualify as historical resources as defined in State CEQA Guidelines Section 15064.5, the impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Constructed facilities and operations and maintenance (O&M) for future restoration projects permitted under the Order could involve ground disturbance, vibration, and modifications to architectural resources (e.g., disturbance to architectural resources could result from vegetation removal or soil/sediment removal within or near the

facilities.) However, the exact details, including precise locations, of any such facilities and operational activities have yet to be determined. Therefore, it is not known whether implementing the restoration projects permitted under the Order would affect any architectural resources.

Constructed facilities and operations of new infrastructure or modifications to existing infrastructure (e.g., bridges, culverts, fishways and screens, dams, levees, water conveyance features) could cause vibration that could physically damage or alter nearby architectural resources. This vibration could result in significant impacts on historical resources, if any such architectural resources qualify as historical resources.

If constructed facilities and O&M for any of the future restoration projects permitted under the Order were to result in either a direct impact (e.g., physical modifications, damage, or destruction) or an indirect impact (e.g., alterations to setting, including visual) on any architectural resources that qualify as historical resources as defined in State CEQA Guidelines Section 15064.5, the impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

Impact Conclusion

Project construction and constructed facilities and O&M for restoration projects permitted under the Order are the types of activities that have the potential to affect historical (i.e., architectural) resources. However, the exact details, including precise locations, of any such activities have yet to be determined. Therefore, it is not known whether implementing the restoration projects permitted under the Order would affect any architectural resources. Factors necessary to identify specific impacts on historical resources include the project's design, footprint, and type; the precise location of construction activities and facilities; and the type and location of operational activities. If any of the future restoration projects permitted under the Order were to affect architectural resources that qualify as historical resources as defined in State CEQA Guidelines Section 15064.5, the impact would be **potentially significant**. As described above, the Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure CUL-1 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure CUL-1: Conduct Inventory and Significance Evaluation of Architectural Resources

Before implementation of any project permitted under the Order, the need for an inventory and significance evaluation of architectural resources in the project area shall be assessed, and, if necessary, based upon the type of restoration activity conducted and potential for built features to be present or disturbed. The assessment should consist of a review of maps and aerial photos to see if existing buildings dams, levees, roads, or other built features are in the CEQA project area. If so, and the age of these features is either unknown or is known to be older than 45 years

old, then an inventory and evaluation should be completed by, or under the direct supervision of, a qualified architectural historian, defined as one who meets the U.S. Secretary of the Interior's Professional Qualifications Standards for Historical History or History. This inventory and evaluation shall include the following:

- Map(s) and verbal description of the project CEQA Area of Potential Effects (C-APE) for cultural resources that delineates both the horizontal and vertical extents of where a project could result in impacts, including both direct and indirect, on cultural resources.
- A records search at the appropriate repository of the California Historical Resources Information System for the C-APE and vicinity (typically areas within 0.25 or 0.5 mile, based on setting) to acquire records on previously recorded cultural resources in the C-APE and vicinity and previous cultural resources studies conducted for the C-APE and vicinity.
- Background research on the history of the C-APE and vicinity for all projects determined to need additional historical architecture assessment.
- If, after review, features of the built environment are determined to be less than 45 years old, a summary statement of their age and references for this determination will be included in the project area description. No further analysis is necessary.
- If historic-era built resources are determined to likely be present, an architectural field survey of the C-APE, unless previous architectural field surveys no more than two years old have been conducted for the C-APE, in which case a new field survey is not necessary. Any architectural resources identified in the C-APE during the survey shall be recorded on the appropriate California Department of Parks and Recreation 523 forms (i.e., site record forms).
- An evaluation of any architectural resources identified in the C-APE for California Register eligibility (i.e., whether they qualify as historical resources, as defined in State CEQA Guidelines Section 15064.5).
- An assessment of potential project impacts on any historical resources identified in the C-APE. This should include an analysis of whether the project's potential impacts on the historical resource would be consistent with the U.S. Secretary of the Interior's Standards for the Treatment of Historic Properties and applicable guidelines.
- A technical report meeting U.S. Secretary of the Interior's Standards for architectural history technical reporting This report will document the mitigation measures taken and any study results, and following CEQA lead agency review and approval, completes the requirements of this mitigation measure.

If potentially significant impacts on historical resources are identified, an approach for reducing such impacts shall be developed before project implementation and in

coordination with interested parties (e.g., historical societies, local communities). Typical measures for reducing impacts include:

- Modifying the project to avoid impacts on historical resources.
- Documentation of historical resources, to the standards of and to be included in the Historic American Building Survey, Historic American Engineering Record, or Historic American Landscapes Survey, as appropriate. As described in the above standards, the documentation shall be conducted by a qualified architectural historian, defined above, and shall include large-format photography, measured drawings, written architectural descriptions, and historical narratives. The completed documentation shall be submitted to the U.S. Library of Congress.
- Relocation of historical resources in conformance with the U.S. Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings.
- Monitoring construction-related and operational vibrations at historical resources.
- For historical resources that are landscapes, preservation of the landscape's historic form, features, and details that have evolved over time, in conformance with the U.S. Secretary of the Interior's Guidance for the Treatment of Cultural Landscapes.
- Development and implementation of interpretive programs or displays, and community outreach.

Mitigation Measure CUL-1 would be implemented to reduce the impacts of restoration projects permitted under the Order. However, because the extent and location of such actions are not known at this time, it is not possible to conclude that the mitigation measure, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. Therefore, this impact would be **significant and unavoidable**.

Impact 3.7-2: Implementing future restoration projects permitted under the Order could cause a substantial adverse change in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5.

Effects of Project Construction Activities

Construction of restoration projects permitted under the Order could involve ground disturbance (e.g., excavation, grading, drilling). However, the exact details, including precise locations, of any such construction activities have yet to be determined. Therefore, it is not known whether implementing restoration projects permitted under the Order would affect any archaeological resources.

Construction of new infrastructure or modifications to existing infrastructure (e.g., bridges, culverts, fishways and screens, dams, levees, water conveyance features) for restoration projects permitted under the Order could partially or completely destroy archaeological resources, resulting in a significant impact.

If construction activities for any of the restoration projects permitted under the Order were to result in an impact on any archaeological resources as defined in State CEQA Guidelines Section 15064.5, the impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Constructed facilities and operations for restoration projects permitted under the Order could involve ground disturbance (e.g., excavation, drilling, grading). However, the exact details, including precise locations, of any such facilities and operational activities have yet to be determined. Therefore, it is not known whether implementing restoration projects permitted under the Order would affect any archaeological resources.

Constructed facilities and operations associated with new infrastructure or modifications to existing infrastructure (e.g., bridges, culverts, fishways and screens, dams, levees, water conveyance features) could include ground-disturbing activities that could result in significant impacts on archaeological resources through partial or complete destruction.

If constructed facilities and O&M for any of the restoration projects permitted under the Order were to result in an impact on any archaeological resources as defined in State CEQA Guidelines Section 15064.5, the impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

Impact Conclusion

Construction activities and constructed facilities and O&M for restoration projects permitted under the Order are the types of activities that have the potential to affect archaeological resources. However, the exact details, including precise locations, of any such activities have yet to be determined. Therefore, it is not known whether implementing restoration projects permitted under the Order would affect any archaeological resources. Factors necessary to identify specific impacts on archaeological resources include the project's design, footprint, and type; the precise location of construction activities and facilities; and the type and location of O&M activities. If any archaeological resources, as defined in State CEQA Guidelines Section 15064.5, were affected by the Order, the impact would be **potentially significant**. As described above, the Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure CUL-2 and CUL-3 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure CUL-2: Conduct Inventory and Significance Evaluation of Archaeological Resources

Before implementation of any project permitted under the Order that includes ground disturbance, an archaeological records search and sensitivity assessment, inventory

and significance evaluation of archaeological resources identified in the C-APE shall be conducted. The inventory and evaluation should be done by or under the direct supervision of a qualified archaeologist, defined as one who meets the U.S. Secretary of the Interior's Professional Qualifications Standards for Archeology, and shall include the following:

- Map(s) and verbal description of the project C-APE for cultural resources that delineates both the horizontal and vertical extents of where a project could result in impacts, including both direct and indirect, on cultural resources.
- A records search at the appropriate repository of the California Historical Resources Information System (CHRIS) for the C-APE and vicinity (typically areas within 0.25 or 0.5 mile, based on setting) to acquire records on previously recorded cultural resources in the C-APE and vicinity and previous cultural resources studies conducted for the C-APE and vicinity. This task can be performed by either the qualified archaeologist or the appropriate local CHRIS center staff.

Outreach to the California Native American Heritage Commission, including a request of a search of the Sacred Lands File for the C-APE, to determine if any documented Native American sacred sites could be affected by the project.

- Consultation with California Native American Tribes pursuant to PRC Section 21080.3 to determine whether any indigenous archaeological resource or tribal cultural resources could be affected by the project. Project proponents shall submit a Sacred Lands File & Native American Contacts List Request to the Native American Heritage Commission (NAHC) at the initial stages of project development (or as early as practicable) to determine if a project would have an impact on Native American cultural resources. The project proponent shall coordinate with the approving Water Board or other CEQA lead agency, if applicable, as soon as possible whenever tribes that are traditionally and culturally affiliated to a project area are identified. Any tribe identified by the NAHC will require notification of the proposed project by the lead agency as soon as practicable during early design. Tribes will be consulted if a request is received after initial notification. Consultation will include discussion regarding project design, cultural resource survey, protocols for construction monitoring, and any other tribal concern. Construction of the project will not commence until the approving Water Board or other CEQA lead agency achieves compliance with the California Environmental Protection Agency Tribal Consultation Protocol (April 2018).
- If the C-APE is in or adjacent to navigable waterways, outreach to the California State Lands Commission to request a search of their Shipwrecks Database, to determine whether any submerged archaeological resources may be present in the C-APE.
- Background research on the history, including ethnography and indigenous presence, of the C-APE and vicinity.

- An archaeological sensitivity analysis of the C-APE based on mapped geologic formations and soils, previously recorded archaeological resources, previous archaeological studies, and Native American consultation.
- If an archaeological study is not warranted based on the above review, a summary of the assessment and justification of the determination will be prepared. If the CEQA lead agency agrees with the determination, no further study is needed.

If a study is warranted, as a result of these archival studies and consultations, an archaeological field survey of the C-APE will be conducted. The field survey shall include, at a minimum, a pedestrian survey. If the archaeological sensitivity analysis suggests a high potential for buried archaeological resources in the C-APE, a subsurface survey shall also be conducted. If previous archaeological field surveys no more than two years old have been conducted for the C-APE, a new field survey is not necessary, unless their field methods do not conform to those required above (e.g., no subsurface survey was conducted but C-APE has high potential for buried archaeological resources). Any archaeological resources identified in the C-APE during the survey shall be recorded on the appropriate California Department of Parks and Recreation 523 forms (i.e., site record forms).

- An evaluation of any archaeological resources identified in the C-APE for California Register eligibility (i.e., as qualifying as historical resources, as defined in State CEQA Guidelines Section 15064.5) as well as whether they qualify as unique archaeological resources, pursuant to PRC Section 21083.2. Such evaluation may require archaeological testing (excavation), potentially including laboratory analysis, and consultation with relevant Native American representatives (for indigenous resources).
- An assessment of potential project impacts on any archaeological resources identified in the C-APE that qualify as historical resources (per State CEQA Guidelines Section 15064.5) and/or unique archaeological resources (per PRC Section 21083.2). This shall include an analysis of whether the project's potential impacts would materially alter a resource's physical characteristics that convey its historical significance and that justify its inclusion (or eligibility for inclusion) in the California Register or a qualified local register.
- A technical report meeting U.S. Secretary of the Interior's Standards for archaeological technical reporting. This report will document the mitigation measures taken and any study results, and, following CEQA lead agency review and approval, completes the requirements of this mitigation measure.

If potentially significant impacts on archaeological resources that qualify as historical resources (per State CEQA Guidelines Section 15064.5) and/or unique archaeological resources (per PRC Section 21083.2) are identified, develop, before project implementation and in coordination with interested or consulting parties (e.g., Native American representatives [for indigenous resources], historical societies [for historic-era resources], local communities) an approach for reducing such impacts. If any such resources are on or in the tide and submerged lands of California, this process

shall also include coordination with the California State Lands Commission. Typical measures for reducing impacts include:

- Modify the project to avoid impacts on resources.
- Plan parks, green space, or other open space to incorporate the resources.
- Develop and implement a detailed archaeological resources management plan to recover the scientifically consequential information from archaeological resources before any excavation at the resource's location. Treatment for most archaeological resources consists of (but is not necessarily limited to) sample excavation, artifact collection, site documentation, and historical research, with the aim to target the recovery of important scientific data contained in the portion(s) of the resource to be affected by the project.
- Develop and implement interpretive programs or displays, and conduct community outreach.

Mitigation Measure CUL-3: Implement Measures to Protect Archaeological Resources during Project Construction or Operation

If archaeological resources are encountered during project construction or operation of any project permitted under the Order, all activity within 100 feet of the find shall cease and the find shall be flagged for avoidance. The lead agency and a qualified archaeologist, defined as one meeting the U.S. Secretary of the Interior's Professional Qualifications Standards for Archeology, shall be immediately informed of the discovery. The qualified archaeologist shall inspect the discovery and notify the lead agency of their initial assessment. If the qualified archaeologist determines that the resource is or is potentially indigenous in origin, the lead agency shall consult with culturally affiliated California Native American Tribes to assess the find and determine whether it is potentially a tribal cultural resource.

If the lead agency determines, based on recommendations from the qualified archaeologist and culturally affiliated California Native American Tribes, that the resource is indigenous, that the resource may qualify as a historical resource (per State CEQA Guidelines Section 15064.5), unique archaeological resource (per PRC Section 21083.2), or tribal cultural resource (per PRC Section 21074), then the resource shall be avoided if feasible. If avoidance of an identified indigenous resource is not feasible, the lead agency shall consult with a qualified archaeologist, culturally affiliated California Native American Tribes, and other appropriate interested parties to determine treatment measures to minimize or mitigate any potential impacts on the resource pursuant to PRC Section 21083.2 and State CEQA Guidelines Section 15126.4. If any such resources are on or in the tide and submerged lands of California, this process shall also include coordination with the California State Lands Commission. Once treatment measures have been determined, the lead agency shall prepare and implement an archaeological (and/or

tribal cultural) resources management plan that outlines the treatment measures for the resource. Treatment measures typically consist of the following steps:

- Determine whether the resource qualifies as a historical resource (per State CEQA Guidelines Section 15064.5), unique archaeological resource (per PRC Section 21083.2), or tribal cultural resource (per PRC Section 21074) through analysis that could include additional historical or ethnographic research, evaluative testing (excavation), or laboratory analysis.
- If it qualifies as a historical resource (per State CEQA Guidelines Section 15064.5) and/or unique archaeological resource (per PRC Section 21083.2), implement measures for avoiding or reducing impacts such as the following:
  - Modify the project to avoid impacts on resources.
  - Plan parks, green space, or other open space to incorporate resources.
  - Recover the scientifically consequential information from the archaeological resource before any excavation at the resource's location. This typically consists of (but is not necessarily limited to) sample excavation, artifact collection, site documentation, and historical research, with the aim to target the recovery of important scientific data contained in the portion(s) of the resource to be affected by the project.
  - Develop and implement interpretive programs or displays.
- If it qualifies as a tribal cultural resource (per PRC Section 21074) implement measures for avoiding or reducing impacts such as the following:
  - Avoid and preserve the resource in place through measures that include but are not limited to the following:
    - Plan and construct the project to avoid the resource and protect the cultural and natural context.
    - Plan greenspace, parks, or other open space to incorporate the resources with culturally appropriate protection and management criteria.
  - Treat the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, through measures that include but are not limited to the following:
    - Protect the cultural character and integrity of the resource.
    - Protect the traditional use of the resource.
    - Protect the confidentiality of the resource.
  - Implement permanent conservation easements or other interests in real property, with cultural appropriate management criteria for the purposes of preserving or using the resource or place.

Mitigation Measures CUL-2 and CUL-3 would be implemented to reduce the impacts of restoration projects permitted under the Order. However, because the extent and

location of such actions are not known at this time, it is not possible to conclude that the mitigation measures, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. Therefore, this impact would be **significant and unavoidable**.

Impact 3.7-3: Implementing future restoration projects permitted under the Order could disturb human remains, including those interred outside of dedicated cemeteries.

Effects of Project Construction Activities

Construction activities by project proponents for restoration projects permitted under the Order could involve ground disturbance (e.g., excavation, grading, drilling). However, the exact details, including precise locations, of any such construction activities have yet to be determined. Therefore, it is not known whether implementing restoration projects permitted under the Order would affect any human remains, with either known or unknown locations, including any associated with archaeological resources.

Construction of new infrastructure or modifications to existing infrastructure (e.g., bridges, culverts, fishways and screens, dams, levees, water conveyance features) for restoration projects permitted under the Order could result in significant impacts on human remains through physical damage or destruction.

If construction activities for restoration projects permitted under the Order were to disturb or damage any human remains, the impact would be **potentially significant**. This Order does not authorize any activity adversely impacting an important historical or archeological resource; disturbing any human remains; or eliminating important examples of the major periods of California history or prehistory, unless the activity is authorized by the appropriate historical resources agencies.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Constructed facilities and operations by project proponents for restoration projects permitted under the Order could involve ground disturbance (e.g., excavation, drilling, grading). However, the exact details, including precise locations, of any such facilities and operational activities have yet to be determined. Therefore, it is not known whether implementing restoration projects permitted under the Order would affect any human remains, either known or unknown, including those associated with archaeological resources.

Constructed facilities and operations associated with new infrastructure or modifications to existing infrastructure (e.g., bridges, culverts, fishways and screens, dams, levees, water conveyance features) could include ground-disturbing activities that could result in significant impacts on human remains through physical damage or destruction.

If constructed facilities and O&M for any of the restoration projects permitted under the General Order were to disturb or damage any human remains, the impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

Impact Conclusion

Construction activities and constructed facilities and O&M by project proponents for restoration projects permitted under the Order are the types of activities that have potential to affect human remains. However, the exact details, including precise locations, of any such activities have yet to be determined. Therefore, it is not known whether implementing restoration projects permitted under the Order would affect any human remains, either known or unknown, including those associated with archaeological resources. Factors necessary to identify specific impacts on human remains include the project's design, footprint, and type; the precise location of construction activities and facilities; and the type and location of operational activities. If any of the restoration projects permitted under the Order were to disturb or damage human remains, the impact would be **potentially significant**. As described above, the Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure CUL-4 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

> ***Mitigation Measure CUL-4: Implement Measures to Protect Human Remains during Project Construction or Operation***
>
> If human remains are encountered during construction or operation and maintenance of any project permitted under the Order, all work shall immediately halt within 100 feet of the find and the lead agency shall contact the appropriate county coroner to evaluate the remains and follow the procedures and protocols set forth in State CEQA Guidelines Section 15064.5(e)(1). If human remains encountered are on or in the tide and submerged lands of California, the lead agency shall also contact the California State Lands Commission. If the coroner determines that the remains are Native American in origin, the appropriate county shall contact the California Native American Heritage Commission, in accordance with California Health and Safety Code Section 7050.5(c) and PRC Section 5097.98. Per PRC Section 5097.98, the project's lead agency shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located is not damaged or disturbed by further development activity until the lead agency has discussed and conferred, as prescribed PRC Section 5097.98, with the most likely descendants and the property owner regarding their recommendations, if applicable, taking into account the possibility of multiple human remains.

Mitigation Measures CUL-2, CUL-3, and CUL-4 would be implemented to reduce the impacts of restoration projects permitted under the Order. However, because the extent and location of such actions are not known at this time, it is not possible to conclude that the mitigation measures, or equally effective measures, would reduce significant impacts to a less-than-significant level in all cases. Therefore, this impact would be **significant and unavoidable**.

3.8 Energy Resources

3.8.1 Introduction

This section discusses energy resources in the study area and evaluates the potential impacts of the types of restoration projects that would be permitted under the Order. This section was prepared pursuant to Section 15126.4(a)(1)(c) and Appendices F and G of the State CEQA Guidelines.

The environmental setting and evaluation of impacts on energy resources is based on a review of existing environmental studies, data, and modeling results; information regarding example projects similar to those permitted under the Order that may be implemented by other agencies; and other information sources listed in Chapter 8, *References*.

No comments addressing energy resources were received in response to the notice of preparation (NOP). See Appendix B for NOP comment letters.

3.8.2 Environmental Setting

The construction of projects consumes energy both directly and indirectly. Energy is also consumed during the operations and maintenance (O&M) of project facilities, such as pumping water into off-stream storage ponds and tanks. This section describes energy consumption for California generally because the study area covers much of the geographic extent of the state.

In California, energy consumption is divided into four primary sectors: transportation, industrial, commercial, and residential. According to the U.S. Energy Information Administration (EIA 2018), of the total energy consumption in California in 2017, transportation consumed 40.3 percent, industrial 23 percent, commercial 18.7 percent, and residential 18 percent. In 2017, natural gas was the largest single energy source consumed in California, at 33 percent.

Table 3.8-1 summarizes California's energy consumption by energy source for 2017. Energy consumption in the study area varies by location but includes residential, agricultural, municipal, industrial, and transportation uses, and natural gas and crude oil energy sources.

3.8.3 Regulatory Setting

This section discusses federal, state, and regional and local plans, policies, regulations, and laws, and ordinances pertaining to energy resources.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location. The federal and state governments regulate power production and energy efficiency measures.

Table 3.8-1
Energy Consumption in California, 2017

Type of Energy	Trillion Btu	Consumption Percentage
Coal	33.7	Less than 1%
Natural gas	2,190.6	28%
Motor gasoline, excluding ethanol	1,720.8	22%
Distillate fuel oil	577.3	7%
Jet fuel	693	9%
Liquefied petroleum gas	55.7	1%
Residual fuel	165	2%
Other petroleum	322.4	4%
Nuclear electric power	187.2	2%
Hydroelectric power	390.3	5%
Biomass	272.2	3%
Other renewables	567.1	7%
Net electricity Imports	48.6	1
Net interstate flow of electricity	659.4	8%
Total	**7,883.3**	**100%**

SOURCE: EIA 2018
NOTE: Btu = British thermal units

Federal

Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission (FERC) is an independent agency that regulates the interstate transmission of energy (electricity, natural gas, and oil). FERC also reviews proposals to build liquefied natural gas terminals and interstate natural gas pipelines, and for licensing of hydropower projects (FERC 2020a).

FERC Order Numbers 888 and 889

California's energy market is regulated by FERC Order Nos. 888 and 889. These orders, issued in 1996 and 1997, respectively, apply to public utilities that own, control, or operate facilities for transmitting electricity in interstate commerce.

Under Order No. 888, the affected public utilities must offer open-access, nondiscriminatory transmission tariffs with minimum terms and conditions of service. The utilities may seek to recover the justifiable stranded costs (the potential losses to electric power utilities as their industry is deregulated [CBO 1998]) of providing open-access transmission services (FERC 2020b).

FERC Order No. 889 requires public utilities to participate in the Open Access Same-Time Information System. This participation is intended to inform current and potential open-access transmission customers regarding available transmission capacity, prices, and other relevant data (FERC 2020b).

Federal Power Act

The Federal Power Act (U.S. Code Title 16, Section 4[e] [16 USC 4(e)]) grants FERC the authority to issue licenses for hydropower projects of any size that fall into any of the following categories:

- Located on navigable waters
- Located on non-navigable waters that are under the jurisdiction of Congress under the Commerce Clause, were constructed after 1935, and affect the interests of interstate or foreign commerce
- Located on public lands or reservations of the United States
- Using surplus water or water power from a federal dam

There are 74 hydropower projects in California pending relicense by FERC (FERC 2020c). Relicensing projects typically incur increased costs for environmental protection and project enhancement, which in turn can increase the costs of power generation. As a result, the power generation and operational flexibility of relicensed projects often decreases. For these reasons, future relicensing efforts have the potential to change the number of operating hydroelectric facilities.

North American Electric Reliability Corporation

The North American Electric Reliability Corporation is an international regulatory authority that develops and enforces standards for power system reliability, and assesses seasonal and long-term energy reliability. The North American Electric Reliability Corporation is subject to FERC oversight (NERC 2020).

Western Electricity Coordinating Council

With delegated authority from the North American Electric Reliability Corporation and FERC, the Western Electricity Coordinating Council is a regional entity that promotes bulk power system reliability and security in the Western Interconnection, which extends across 14 Western U.S. states; Alberta and British Columbia, Canada; northern Baja California, Mexico (WECC 2020). The Western Electricity Coordinating Council participates in the development of reliability standards, then enforces the standards.

Energy Policy Act of 2005

The Energy Policy Act (42 USC 13201 et seq.) addresses topics related to U.S. energy production: energy efficiency; renewable energy; oil and gas; coal; vehicles and motor fuels, including ethanol, electricity, hydropower, and geothermal energy; and climate change technology. For example, the law increases the amount of biofuel that must be mixed with gasoline sold in the United States (EPA 2017).

Federal Fuel Efficiency Standards

The Energy Independence and Security Act of 2007 (Public Law 110-140; 42 USC 7545[o][2]) increased the supply of alternative fuels by setting a Renewable Fuel Standard, which requires the blending of 36 billion gallons of renewable fuel in transportation fuels by 2022. The Energy Independence and Security Act also tightened the Corporate Average Fuel Economy (CAFE) standards that regulate average fuel economy in the vehicles produced by each major automaker. The law required that these standards be increased such that, by 2020, new cars and light trucks would deliver a combined fleet average of 35 miles per gallon (mpg) (EPA 2017).

Since then, several changes to the CAFE standards have occurred:

- In 2009, the standard for passenger cars and light trucks was increased to 35.5 mpg by model year 2016. Guidelines were made stricter, requiring that averages rise approximately 5 percent annually, roughly setting passenger cars at 39 mpg and light trucks at 30 mpg.
- In 2010, CAFE standards were proposed for medium-duty and heavy-duty trucks. Fuel economy improvements were to be 20 percent for tractors and 10 percent for gasoline trucks and diesel trucks by model year 2018.
- In 2011, an agreement was announced with 13 large automakers to increase fuel economy for passenger cars and light trucks to 54.5 mpg.
- A 2016 mid-term review analyzed how the industry was progressing with the new standards in place. Although the industry was found to be making improvements, the mid-term review found the 54.5 mpg projection to be unrealistic. In part, the mix of vehicles on which the projections were based on used more passenger vehicles while the actual market was closer to 50 percent passenger cars and 50 percent trucks and sport utility vehicles.
- In August 2018, the U.S. Environmental Protection Agency and U.S. Department of Transportation proposed the Safer Affordable Fuel-Efficient Vehicle Rules. This proposal would roll back some of the goals from 2012 and freeze the fuel economy goals to the 2021 target of 37 mpg.

State

California Energy Commission

The California Energy Commission (CEC) is the state's primary energy policy and planning agency. CEC is committed to reducing the cost of energy and environmental impacts of energy use while ensuring a safe, resilient, and reliable energy supply. The commission's core responsibilities include advancing state energy policy, achieving energy efficiency, certifying thermal power plants, investing in energy innovation, transforming transportation, developing renewable energy, and preparing for energy emergencies (CEC 2020a).

California Public Utilities Commission

The California Public Utilities Commission (CPUC) regulates privately owned electricity and natural gas companies. CPUC requires hydroelectric power companies to certify their compliance with O&M standards for each generating unit (CPUC 2017). Regulated utilities must obtain a CPUC certificate of Public Convenience and Necessity to construct transmission lines 200 kilovolts and greater, or a Permit to Construct for facilities between 50 and 200 kilovolts. Facilities operated by the California Department of Water Resources are not subject to CPUC oversight.

California Independent System Operator Corporation

The California Independent System Operator is an independent operator of approximately 80 percent of the statewide wholesale power grid, and is responsible for system reliability and scheduling of available transmission capacity (CAISO 2017).

California Renewable Energy Resources Act

The California Renewable Energy Resources Act added and amended various sections of the Fish and Game Code, Public Resources Code, and Public Utilities Code. This law codified California’s commitment to expanding the Renewables Portfolio Standard to include 33 percent renewable power by 2020. Updates to the California Renewables Portfolio Standard were subsequently codified in 2011 (33 percent renewable power by 2020), 2015 (50 percent renewable power by 2030), and 2018 (60 percent renewable power by 2030 and 100 renewable power percent by 2045).

All electricity retail sellers had an interim target between compliance periods to serve at least 27 percent of their load with Renewables Portfolio Standard–eligible resources by December 31, 2017 (CPUC 2020). In general, retail sellers either met or exceeded the interim 27 percent target and are on track to achieve their compliance requirements. California's three large investor-owned utilities collectively served 36 percent of their 2017 retail electricity sales with renewable power. The small and multi-jurisdictional utilities and electric service providers served roughly 27 percent of retail sales with renewables and community choice aggregators collectively served 50 percent of retail sales with renewable power (CPUC 2020). All retail sellers use a mix of renewables portfolio standard resources such as wind, solar photovoltaic, solar thermal, hydroelectricity, geothermal, and bioenergy to meet their renewable procurement targets (CPUC 2020).

In 2015, Pacific Gas and Electric Company served 29.5 percent of its retail customers with renewable energy, while Southern California Edison served its customers with 24.3 percent, and San Diego Gas and Electric Company with 35.2 percent (CPUC 2017).

Title 24 Building Energy Efficiency Standards (2019)

Title 24 of the California Code of Regulations is the California Building Code, which governs all aspects of building construction. The code includes standards mandating the use of energy efficiency measures in new construction. Since they were established in 1977, the building efficiency standards (along with energy efficiency standards for appliances) have helped to reduce the costs of electricity and natural gas for consumers in California. The standards are updated every 3 years to allow consideration of new

energy efficiency technologies. The latest update to Title 24 standards became effective on January 1, 2020. The standards contain energy and water efficiency requirements (and indoor air quality requirements) for newly constructed buildings, additions to existing buildings, and alterations to existing buildings (CEC 2019).

California Integrated Energy Policy

In 2002, the California Legislature enacted Senate Bill 1389. The legislation reconstituted the state's responsibility to develop an integrated energy plan for electricity, natural gas, and transportation fuels. CEC adopts and transmits to the Governor and Legislature a report of findings biannually. Reports have been prepared since 2002.

Most recently, CEC published the draft 2019 Integrated Energy Policy Report in November 2019 (CEC 2019). The report assesses major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors; provides policy recommendations to conserve resources, protect the environment, ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety (CEC 2020b). The report covers such topics as decarbonizing buildings, integrating renewables, energy efficiency, energy equity, integrating renewable energy, updates on Southern California electricity reliability, climate adaptation activities for the energy sector, natural gas assessment, transportation energy demand forecast, and the California Energy Demand Forecast (CEC 2019).

Senate Bill 350

Effective January 1, 2016, Senate Bill 350 raised the Renewables Portfolio Standard for both investor-owned and publicly owned utilities. The law increased the amount of electricity that such utilities must generate and sell to retail customers per year from eligible renewable energy resources, from 33 percent to 50 percent by 2030 (SB 350 2015).

Regional and Local

The study area encompasses multiple counties with multiple cities throughout the entire geographic extent of California. Each county and city has local regulations and a general plan with unique energy generation and transmission policies that guide development. The policies may include reducing per-capita energy consumption, shifting toward use of a greater share of renewable sources of energy, and reducing peak demands.

3.8.4 Impacts and Mitigation Measures

Methods of Analysis

Energy resource impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could impact existing energy resources. However, the precise locations and detailed characteristics of potential future individual restoration projects are yet to be determined. Therefore, this energy resource analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-

level analysis. Potential impacts on energy resources from restoration projects permitted under the Order generally fall into three categories:

- Impacts of construction activities on energy consumption
- Impacts on energy consumption or hydroelectric generation from O&M of constructed facilities, or on pumping as a result of changes in water levels and conveyance
- Potential conflicts with applicable plans, policies, or regulations of local counties that have been adopted for the purpose of improving energy efficiency or reducing consumption of fossil fuels

The approach to assessing energy resources impacts was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of Restoration Projects in the Order*, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods.*

Direct energy consumption includes the use of petroleum, natural gas, or electricity by construction vehicles and equipment and for the O&M of facilities. *Indirect energy consumption* includes energy used for the extraction of raw materials, manufacturing, and transportation associated with manufacturing. Indirect energy use can also be a reduction in the generation of power (e.g., hydroelectric).

Permanent impacts are considered those that would result from indefinite environmental conditions created by projects permitted under the Order (e.g., new infrastructure such as pumps would be located indefinitely in one location, resulting in the permanent need for electricity for the constructed infrastructure). Temporary impacts are considered those that would be temporary in nature (e.g., construction-related energy demands).

Thresholds of Significance

In accordance with Appendices F and G of the State CEQA Guidelines, an impact related to energy resources is considered significant if the types of projects that would be permitted under the Order would do either of the following:

- Cause a substantially inefficient, wasteful, or unnecessary consumption of energy resources during project construction or operation
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency

Pursuant to State CEQA Guidelines Appendix F, *Energy Conservation*, this section also evaluates the following impact topics:

- Potential for an irreversible commitment of energy resources
- Short-term gains versus long-term impacts on energy resources
- Estimated energy consumption attributable to growth inducement by restoration projects permitted under the Order

See Chapter 5, *Other CEQA Considerations,* for additional information regarding significant irreversible environmental changes, and for an analysis of the growth inducement potential of the restoration projects permitted under the Order.

Impacts Not Evaluated Further

The restoration projects permitted under the Order would not likely affect production of crude oil, natural gas, or geothermal energy. The geographic extent of proven oil, natural gas, and geothermal fields is quite large, and these resources can be accessed in many locations. The restoration projects permitted under the Order would affect only a portion of the full geographic extent of these energy fields. The projects also would not preclude ongoing and future exploration and extraction of oil and natural gas resources or development of future geothermal facilities. Therefore, this section does not further evaluate access to oil, natural gas, and geothermal energy resources.

The extent to which the Order would result in any particular action resulting from individual restoration projects is yet determined and as such, impacts are considered at a programmatic level and the reasonable forecasting of effects. For future restoration projects that develop proposals consistent with the Order, and would be expected to result in significant energy costs over the projects' lifetime (i.e., short-term gain versus long-term impacts) would be required to be evaluated in project-level CEQA documents. Therefore, the impact of such costs is not discussed further in this section.

Project-Specific Impacts and Mitigation Measures

Table 3.8-2 summarizes the impact conclusions presented in this section for easy reference.

Table 3.8-2
Summary of Impact Conclusions—Energy Resources

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.8-1: Implementing restoration projects permitted under the Order could result in substantial inefficient, wasteful, or unnecessary long-term consumption of energy resources or changes to hydropower generation.	LTS	LTS
3.8-2: Implementing restoration projects permitted under the Order could conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	LTS	LTS

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2020
NOTE: LTS = less than significant

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Impact 3.8-1: Implementing projects permitted under the Order could result in substantial inefficient, wasteful, or unnecessary long-term consumption of energy or changes to hydropower generation.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order (e.g., culverts, bridges, fish screens, ladders, and pilings; removal of small dams, tide gates, flood gates, and legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; installation of cofferdams during construction) would require both direct and indirect use of energy resources:

- *Direct energy use* would involve using petroleum products and electricity to operate construction equipment, such as trucks or barges, earthmoving equipment, and power tools. For example, excavation and grading for a large restoration project could use gas- or diesel-powered construction equipment.
- *Indirect energy use* would involve consuming energy to extract raw materials, manufacture items, and transport the goods and people necessary for construction activities. For example, workers would commute to the project sites.

Although construction-related energy consumption would be limited to the construction period, these activities would cause irreversible commitments of finite nonrenewable energy resources, such as gasoline and diesel fuel.

Depending on the project, various types of fuel-consuming equipment would be necessary for actions such as excavating, grading, demolishing structures, transporting materials, and transporting construction workers to and from the worksites.

Construction activities for restoration projects permitted under the Order would incorporate all feasible control measures to improve equipment efficiency and reduce energy use, as required by local air pollution control or management districts. These measures may include best management practices to meet the efficiency standards for on-site construction vehicles and exhaust control plans to reduce unnecessary equipment idling. The projects would also implement other policies consistent with state

and local legislation and policies for energy conservation to help reduce energy use during project construction.

For example, constructing a large restoration project (e.g., widening a floodplain) would increase energy consumption. However, the increase would be limited because the work would be temporary and would not require the substantial long-term use of energy.

Construction activities for the restoration projects permitted under the Order would not be expected result in the inefficient, wasteful, or unnecessary use of energy. Therefore, this impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Similar to construction, O&M activities for restoration projects permitted under the Order would require both direct and indirect use of energy resources and irreversible commitments of finite nonrenewable energy resources. However, the effect would occur to a lesser degree. For example, O&M could include such activities as monitoring restoration projects, cleaning fish screens, and occasionally maintaining offstream water conservation projects. In addition, the restoration projects would not change patterns of reservoir releases or substantially alter water surface elevations at existing pumping or generating facilities; thus, they would not affect hydropower generation or power usage.

Routine O&M activities for restoration projects permitted under the Order would not be expected to result in the inefficient, wasteful, or unnecessary use of energy. Therefore, this impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Impact 3.8-2: Implementing restoration projects permitted under the Order could conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order would require both direct and indirect use of energy resources. Such activities would incorporate all feasible control measures to improve equipment efficiency and reduce energy use, as required by local air pollution control or management districts. These measures may include best management practices to meet the efficiency standards for on-site construction vehicles and exhaust control plans to reduce unnecessary equipment idling. The projects would also implement other policies consistent with state and local legislation to help reduce energy use during construction.

Energy standards such as those in the Energy Policy Act of 2005 and Title 24 (the California Building Code) promote strategic planning and building standards intended to reduce the consumption of fossil fuels, increase the use of renewable resources, and enhance energy efficiency. In general, these regulations and policies specify strategies for reducing fuel consumption and increasing fuel efficiency and energy conservation. It is anticipated that construction of restoration projects permitted under

the Order would conform to applicable state and local plans, policies, and regulations related to energy use.

Construction activities for restoration projects permitted under the Order would require land for development (e.g., proposed project site; staging areas; access and haul routes; site preparation; preparation of barrow sites; site restoration and demobilization). These activities could occur on undeveloped land which are scarce, less expensive, and often sought after by various entities meeting various needs (e.g., restoration, mitigation, housing, and alternative energy) and could result in potentially obstructing development or implementation of other state or local plans for renewable energy or energy efficiency. However, impacts associated with the loss of development or implementation of other state or local plans for renewable energy or energy efficiency would be expected to be less than significant as construction activities for restoration projects would be limited to the construction period and would not involve long-term obstruction of undeveloped land.

Therefore, energy use by construction activities for restoration projects permitted under the Order would not likely conflict with any applicable state or local plans, policies, or regulations establishing energy standards and this impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Routine O&M activities for restoration projects permitted under the Order would require direct and indirect use of energy resources similar to the use identified for construction, but to a lesser degree. For example, O&M could include such activities as monitoring restoration projects, cleaning fish screens, and occasionally maintaining offstream water conservation projects.

Restoration projects would incorporate all feasible control measures to improve equipment efficiency and reduce energy use, as required by local air pollution control or management districts. The projects would also implement other policies consistent with state and local legislation to help reduce energy use during O&M activities.

Energy standards such as those in the Energy Policy Act of 2005 and Title 24 (the California Building Code promote strategic planning and building standards intended to reduce the consumption of fossil fuels, increase the use of renewable resources, and enhance energy efficiency. In general, these regulations and policies specify strategies for reducing fuel consumption and increasing fuel efficiency and energy conservation. It is anticipated that operational activities for restoration projects permitted under the Order would conform to applicable state and local plans, policies, or regulations related to energy use.

Restoration projects (e.g., setback levees, water conservation project, etc.) could be located on undeveloped land which are scarce, less expensive, and often sought after by various entities meeting various renewable energy needs (e.g., alternative energy sources such as solar or wind farms). However, the constructed infrastructure would not

be expected to obstruct a state or local plan for renewable energy as renewable projects could be built in other locations throughout the state.

Energy use during the operation of restoration projects permitted under the Order would not likely conflict with applicable state, regional, or local plans, policies, or regulations establishing energy standards. Therefore, this impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

3.9 Geology and Soils

3.9.1 Introduction

This section describes the geologic and seismologic conditions in the study area, as well as soil, and paleontological resources, along with associated potential geologic, seismic, and geotechnical hazards from the types of restoration projects that would be permitted under the Order. (Section 2.6, *Categories of Restoration Projects in the Order*.)

The environmental setting and evaluation of impacts on geologic and soil resources are based on a review of existing published documents; information about example projects similar to the types of restoration projects that may be implemented by other agencies; and other information sources listed in Chapter 8, *References.*

No comments specifically addressing geology and soils were received in response to the notice of preparation (NOP). See Appendix B for the NOP comment letters.

3.9.2 Environmental Setting

This section describes the geology, soils, and paleontological resources that could be affected by the types of restoration projects that would be permitted under the Order.

The general topography and climate and geology (landslides, earthquakes, tsunamis, and volcanic formations) are described for California. The environmental setting for geology, soils, and paleontological resources is then provided by ecoregion (definition of the ecoregions included below).

Topography and Climate

The study area encompasses a large portion of California. Topography in the study area is highly varied and includes four geographic regions: 1,340 miles of coastline, high mountain ranges, flat inland central valley, and deserts (Western Regional Climate Center 2020). Elevations range from 14,494 feet above sea level at the summit of Mount Whitney to 282 feet below sea level in Death Valley, with a mean elevation of approximately 2,900 feet.

Climate in California varies depending on elevation, proximity to the coast, and latitude. Because of these factors, five major climate types are found within the state's borders: the Desert, Cool Interior, Highland, Steppe, and Mediterranean climates. Annual mean precipitation across all climate types in the state is approximately 22.39 inches (DWR 2016), with about 90 percent falling between October 1 and April 30. Rainfall is highly variable throughout the state, however, with the southeast deserts receiving less than 5 inches of precipitation per year and the upper ranges of the north coast receiving more than 100 inches per year.

Geology

California is located on three tectonic plates: the western boundary of the North American continental plate, the oceanic Pacific Plate, and the Gorda Plate. North of the conjunction of these three plates lies the Mendocino Triple Junction, which is the most seismically active place in California. The movement between these three plates and California's distinct climate are responsible for the state's unique topographic

characteristics such as its open flat valleys, expansive mountain ranges, and dramatic coastlines (Harden 1997). Environmental hazards such as earthquakes, landslides, and volcanic formations are largely effected by tectonic dynamics and climate.

Landslides

California's landscape has been shaped and altered throughout the years by constant erosional processes such as landslides and mass wasting. Although the mountain regions are typically more susceptible to landslides, they can occur in areas of low relief such as coastal bluffs, river banks and streambanks, and inland desert areas. Landslides can be caused by the gravitational pull of soil, rock, or a combination of both, or triggered by outside events such as earthquakes or heavy rainfall.

Landslide movements vary in size, style and rate of movement, and type depending on material type, steepness of slopes, sediment type, soil depth, and location. The types of geomorphic expressions of landslides include falls, topples, lateral spreads, slides, and flows:

- *Falls* occur when masses of soil or rock are dislodged from steep slopes and free-fall downslope.
- *Topples* typically occur when the underside of a slope or cliff loses strength (e.g., through erosion) and the upper layer of rock or soil rotates forward and falls over downslope.
- *Lateral spreads* are often caused by liquefaction of sediment due to an earthquake or erosion on gentle slopes and produce fluid-like flow of rock or soil.
- *Slides* occur along a distinct surface and displace masses of sediment beside one or more discrete planes.
- *Flows* occur when material moves down a slope in the form of a fluid.

Each landslide type has different risks and can be generally classified by a geologist or engineer based on the depth and type of material that fails, amount of water involved, rate of movement, and the type of movement involved.

Landslides have three general types of triggering mechanisms: Geological (e.g., weathered materials, material permeability, and weak or sensitive materials), morphological (e.g., seismic activity, fluvial/wind erosion, vegetation loss, and shrink-swell), and anthropogenic (e.g., deforestation, irrigation, reservoir drawdown, and artificial vibration) (USGS 2004). The most common and potentially devastating landslides are caused by water (e.g., intense rainfall, changes in groundwater levels, snowmelt), seismic activity (e.g., earthquakes, shaking-caused dilation of soil materials), and volcanic activity.

In the winter, California experiences a majority of its annual precipitation, especially in its coastal and mountainous areas from severe winter storms. Excess rainfall or snowmelt can significantly alter groundwater levels and surface runoff, which can saturate slopes, leaving them prone to failure. Flooding is often caused by landslides due to similar triggering mechanisms such as intense rainfall, increased runoff, and

excessive groundwater saturation. These events can cause sediment buildup that blocks valleys and stream channels.

The primary regions of California that are prone to landslides are the coastal and mountainous areas (USGS 2004). Mountainous areas are more susceptible because of high levels of seismic activity, generally associated with active faults and volcanoes accompanied by steep slopes and weak sediment types. Uplifted, naturally fragile rocks consisting of poorly consolidated sediments or marine deposits of mudstone or siltstone are highly susceptible to slope failure caused by ground shaking. Additionally, shearing along active fault zones and the folding and faulting of geologic materials during subduction and accretion can weaken earthen materials that are prone to landsliding. Lastly, volcanic activity can cause regionally devastating landslides. As volcanic lava and steam eruptions occur, the snowpack melts at a very high rate, resulting in large-volume rock, soil, and ash flows that can travel rapidly down hillslopes and stream channels and erode the underlying topography. A prime example of this process is the collapse of the volcano Mount Shasta in Northern California approximately 350,000 years ago, which caused a large debris avalanche that resulted in dramatic erosion.

Liquefaction

Liquefaction is the process in which water-saturated sediment temporarily loses its viscosity and acts as a fluid during groundshaking events. During liquefaction, ground shaking causes waterlogged soils to collapse and decreases the overall volume of soil, causing it to temporarily lose strength and become more fluid. This can cause ground deformations and failures, increase lateral earth pressure, and result in a temporary loss of soil-bearing capacity, all of which can damage buildings and other structures. Liquefaction can increase the buoyancy of structures buried in water bodies, potentially causing them to shift and uplift toward the surface. Liquefaction generally results from strong ground shaking caused by earthquakes.

All of the study area is susceptible to liquefaction; however, regions with poorly drained, fine-grained soils (sandy, silty, and gravely soils) are the most susceptible.

Earthquakes

California is one of the most active, geomorphically diverse, scenic locations in the U.S. Millions of years ago, the shift in plate tectonics converted the passive margin of the North American Plate into an active margin of compressional and translational tectonic regimes.

California’s northern, central, and southern coastal areas are more susceptible to earthquakes, but hundreds of identified faults exist within the state’s borders. Based on slip rates within the last 10,000 years, approximately 200 faults are considered potentially hazardous. As such, more than 70 percent of California’s population lives within 30 miles of a fault where high ground shaking could occur within the next 50 years (DOC 2019). Earthquakes are a familiar and unpredictable phenomenon in California, in terms of both location and magnitude.

The San Andreas Fault is one of California’s best known and most notable faults. The fault runs through the state for approximately 800 miles between the convergence of the

Pacific and North American Plates. Its southern terminus starts south of California in the Gulf of California, and runs northwest through the Salton Trough, continuing north until it reaches the Transverse Ranges where it turns east-west. North of the Transverse Ranges, the San Andreas Fault again runs northwest until it cuts off at the Mendocino Triple Junction off the Humboldt County coast. Some of the state's most devastating earthquakes have occurred on the San Andreas Fault, including the 1906 San Francisco earthquake (magnitude 7.7 to 8.3) and the 1857 Fort Tejon earthquake (magnitude 7.9).

While the San Andreas Fault is the cause of significant recent earthquakes, the Cascadia subduction zone (CSZ), located farther north, has a greater capability to create strong ground shaking, vertical land displacement, and tsunamis. The CSZ is a 600-mile-long, north-to-northwest running collection of faults extending from southern British Columbia to the Mendocino Triple Junction. The CSZ has the potential to create large earthquakes with magnitudes of 9.0 or greater every 250–500 years, on average.

Tsunamis and Seiches

Tsunamis are high-magnitude, long sea waves caused by earthquakes, submarine landslides, or other disturbances that displace large volumes of water. Areas along the Pacific coast are the most susceptible to the destructive effects of tsunamis, as major subduction zone earthquakes occur in the Northern and Southern Hemispheres. These earthquakes move the earth's crust at the bottom of the ocean floor, sending large quantities of water into motion and spreading tsunami waves throughout the Pacific Ocean.

California's long coastline and active tectonic structure make it particularly vulnerable to tsunamis and vertical land movement. Tsunamis can also result from submarine landslides that displace large volumes of water. Seismically generated landslides, rock falls, rock avalanches, and the eruption or collapse of island or coastal volcanoes can create subaerial landslide tsunamis; however, they are generally caused by major earthquakes or coastal volcanic activity.

Seismic seiches are standing waves caused when seismic waves from an earthquake travel through a closed or semi-enclosed body of water such as a lake or bay. Seiches can be observed several thousand miles from the location of an earthquake because of the long-period seismic waves created after the earthquake. Small bodies of water (i.e., lakes and ponds) are especially susceptible to seismic seiches.

Volcanoes

Volcanoes are openings in the earth's crust where molten rock from below the surface is expelled in the form of lava. Molten rock below the earth's surface is classified as magma; once it erupts or flows, it is termed lava. In addition to lava, during a volcanic eruption, rock, ash, and gases are released into the atmosphere. Volcanoes are generally formed at the edge of tectonic plates, and as a result, California is home to many active volcanic areas. Some of the most active are found along a volcanic chain that is a result of compressional tectonics along the CSZ within the Cascade Range (located within Regional Board Regions 1, 2, and 3).

The Modoc Plateau is a southern extension of the Columbia River Plateau of eastern Oregon and Washington. Located on the Nevada border between the Warner Mountains and Surprise Valley, the Modoc Plateau extends west to the edge of the southern Cascade Range. Its lava flows are typically more basaltic and less explosive than those along the CSZ. Previous eruptions (that occurred between 200 and 300 years ago) have created a subtler terrain of shield volcanoes and broad lava plateaus.

Long Valley Caldera near Mammoth Mountain (located within Regional Board Region 6) is one of the largest calderas on earth, measuring approximately 20 miles long from east to west, and is included in the Mono-Inyo Craters volcanic chain in eastern California. A caldera is a large depression at the top of a volcanic cone, formed by the collapse of an underlying magma chamber after a major volcanic eruption. After showing signs of activity in the 1980s, the Long Valley area is being closely monitored for earthquake activity to proactively discover early signs of eruptions.

Several areas of California located near fault lines contain hot springs, where geothermal heat heats up groundwater and creates steam, which erupts from large magma chambers. These areas are found in the Coast Ranges (including Geyserville, south of Clear Lake, within Regional Board Region 1) and at the base of the Sierra Nevada (east of Mammoth Lakes, within Regional Board Region 6). The occurrence of geothermal heat is another sign of active volcanism in California.

Active Faults

A fault is a fracture or zone of fractures between two blocks of rock. These fractures allow the blocks to move relative to each other. Movement can occur rapidly (i.e., earthquake) or slowly (i.e., creep) and can range from a few feet to thousands of miles long (USGS 2019). Most faults create repeated displacement over time. A fault zone is a zone of typically braided and subparallel of related faults that may branch and diverge. These zones can vary in width from a few feet to several miles.

Approximately 15,700 known faults are mapped in California, more than 500 of which are active. Under the Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act), a fault is designated as active if it has ruptured in the last 11,000 years. An active fault has the potential for surface rupture; under the Alquist-Priolo Act, a structure to be occupied by humans may not be built over or within 50 feet of an active fault.

Soils

Soil conditions in California are highly variable. California's diverse geologic, topographic, climatic, temporal, and vegetative environments all influence the formation and composition of the state's soils. Unlike California's geologic regions, which are unique to its 11 ecoregions, soils in the state do not have specific characteristics or properties that distinguish them by region. Instead, there is a gradational transition between the characteristics of one soil versus another.

Soil Classification

Soils are classified in various ways, depending on the application of the information. Engineers evaluate and classify soils in regard to the engineering properties of the soil (e.g., Unified Soil Classification System). Soil scientists group soils together based on

their intrinsic properties, geologic origin, and soil behavior based on different conditions. The U.S. Natural Resources Conservation Service (NRCS) uses the U.S. Department of Agriculture's soil taxonomy system to classify soils. This method of classification is based on the chemical, biological, and physical characteristics of soils such as soil color, texture, structure, mineralogy, salt content, and depth. These characteristics are defined in the 2017 USDA Soil Survey Manual, and in *Soils and Geomorphology*, authored by Peter Birkeland (1984).

Maps created by the NRCS, such as the U.S. General Soil Map (STATSGO2) and the Soil Survey Geographic (SSURGO2) digital databases, should be used when evaluating soils affected by a proposed project. These maps and others include detailed information about soils, their physical and chemical properties, and suitability for a variety of uses. For projects with a broad geographical scale, soil associations are generally used to determine the distinctive pattern of soils, relief, and drainage in an area and are grouped by soils that occur together in the landscape named after two or three dominant soil series.

General Soil Hazards

Soil Erosion

Soil erosion is caused by the detachment and entrainment of soil particles, usually as a result of the movement of wind and water. Soils that are high in coarse silt– and fine sand–sized particles and generally low in organic matter are more susceptible to erosion (Donahue et al. 1983). Vegetated slopes or soils covered by larger amounts of vegetation experience less erosion than areas from which vegetation has been removed or reduced. In general, soils in heavily vegetated areas have more surface cover and greater soil structure from plant roots, which reduce the potential for erosion. Disturbed soils or soils with a combination of reduced vegetation and disturbance are more prone to erosion. Steep slopes (e.g., with a greater than 10 percent gradient) have a greater capability for soil erosion caused by water because of their increased runoff velocities.

The erosion rate of a particular soil, without interference from human activity, is called the natural (background) or geologic erosion rate. Accelerated soil erosion is any type of erosion that occurs over the natural erosion rate and is generally the result of human activities (e.g., grazing, timber harvesting, land-disturbing activities). Accelerated erosion is often referred to as anthropic, historic, or man-induced erosion (Toy 1982).

Shrink and Swell

The shrink-and-swell potential for soils is the change in volume associated with moisture content, in which soils shrink when dried and expand when wet. The extent of shrinking and swelling is based on the amount and type of clay in the soil. Montmorillonite, smectite, bentonite, and illite are common clay materials that absorb water and can cause soils to swell by more than 10 percent of their original volume. The volume increase occurs when water molecules are absorbed between clay minerals. The more water is available, the more water is absorbed between the clay minerals, and thus, the greater the swelling capacity becomes. Once the expanded clay dries, the lack of water molecules will cause the soil to shrink, resulting in a volume decrease. This shrink-and-swell cycle can exert pressure on building foundations and infrastructure,

causing damage by removing structural support, and on roads by causing surface cracking and runoff infiltration. Shrinking and swelling can also create soil fissures, which allow deeper penetration of water during wet conditions.

Although they can be found throughout the state, expansive soils are most common along the coast and coastal mountains along the entire length of California.

Paleontological Resources

Paleontology is the study of life forms in past geologic time, specifically through the study of plant and animal fossils. Paleontological resources represent a small, nonrenewable, and impact-sensitive scientific and educational resource. Paleontological resources are sites or geologic deposits that consist of unique and unusual individual fossils or assemblages of fossils, diagnostically or stratigraphically important, and add to the existing body of knowledge in particular areas (e.g., stratigraphically, taxonomically, or regionally).

Fossil remains such as bones, teeth and claws, eggs, embryos, nests, skin, and muscles are found in places where they were originally buried in geologic deposits (rock formations). Fossils can be used to determine the geological events and relative ages of depositional layers to better understand the development of the region and area. The age, abundance, and distribution of fossils depend on the topography of the area and geologic formation in which they occur. In California, these resources (e.g., vertebrate, invertebrate, and plant fossils) are generally found in sedimentary and metasedimentary deposits.

Statewide Oil, Gas, and Geothermal Production

Crude Oil

As of October 2019, California was ranked seventh among crude oil–producing states, behind Texas, North Dakota, New Mexico, Oklahoma, Colorado, and Alaska (EIA 2019). In 2019, California produced 520,000 barrels of crude oil per day. In 2017, California was the fourth-largest producer of crude oil and was the third in oil refining capacity after Texas and Louisiana. The California Department of Conservation’s Division of Oil, Gas, and Geothermal Resources (as of January 2020, known as the Geologic Energy Management Division) reported that the state’s total production for 2018 was 161.8 million barrels per year, a decrease of approximately 7.0 percent from production in 2017 (DOC 2018). The three largest oil production fields in California are the South Belridge, Midway-Sunset, and Kern River oil fields.

Natural Gas

Natural gas produced in California equals about one-tenth of the state’s demand. In California, natural gas is produced and reserved primarily in geologic basins in the northern Central Valley. According to the California Energy Commission, in 2018 California produced 193,219 million cubic feet (MMCF) of dry natural gas, approximately 9 percent of its total consumption of natural gas that year (2,136,907 MMCF). Approximately 97 percent of the natural gas consumed in California was used by the residential (423,915 MMCF), commercial (248,012 MMCF), industrial (766,415 MMCF), vehicle fuel (24,452 MMCF), and electric power sectors (614,722 MMCF).

Because of California's high demand for natural gas, approximately 90 percent of the state's natural gas supply comes from out-of-state major supply basins in locations such as Canada, Texas, New Mexico, Colorado, and Wyoming (Champagna et al. 2019).

Geothermal

Geothermal energy is the production of energy using the internal heat of Earth's crust and is generally associated with volcanic and seismically active regions. California is located within the Pacific "Ring of Fire," a nearly closed arc of intense seismicity and volcanoes around the Pacific Ocean, and accordingly, contains the greatest potential for geothermal electric generation in the United States. California has 43 operating geothermal power plants with an installed capacity of 2,730 megawatts (CEC 2019). In 2018, the state produced 11,528 gigawatt-hours (GWh) of electricity and imported 700 GWh of geothermal power, about 6 percent of the state's total system power. Of California's 58 counties, 46 have lower temperature resources for direct-use geothermal. The largest concentrations of geothermal plants are north of San Francisco in The Geysers Geothermal Resource Area in Lake and Sonoma Counties.

Overview of Ecoregion Approach

The following analysis of geological resources is organized in the context of ecoregions, which are geographic areas that share general geological and topographic characteristics and similar biotic communities. In much of California, physiographic areas and geology are closely associated; although the details may differ, large areas of the state have distinctive characteristics not shared by the adjacent terrain.

The state is divided into 13 separate ecoregions: Coast Ranges, Cascades, Sierra Nevada, Central California Foothills and Coastal Mountains, Central California Valley, Southern California Mountains, Eastern Cascades Slopes and Foothills, Central Basin and Range, Mojave Basin and Range, Klamath Mountains/Central High North Coast Range, Northern Basin and Range, Sonoran Basin and Range, and Southern California/ Northern Baja Coast (Griffith et al. 2016). The key characteristics of each ecoregion are described below.

Coast Ranges

The Coast Ranges Ecoregion extends from the coastal mountains of western Washington to western Oregon and northwestern California, and is about 400 miles long in California. Typical tectonic, sedimentary, and igneous processes along the circum-Pacific orogenic belt influenced and evolved into the Coast Ranges (Page 1966). San Francisco Bay further separates this ecoregion into northern and southern ranges through its location in a structural depression created by the east-west expansion of the San Andreas and Hayward Faults.

In California, the Coast Ranges are composed primarily of Jurassic- to Cretaceous-age (approximately 65–150 million years old) marine sedimentary and volcanic rocks of the Franciscan assemblage. The Franciscan assemblage consists primarily of deformed and metamorphosed greywacke, mudstone, and chert. Alfisols are common in California, with Isomesic soil temperatures occurring along the coast. General

topography in this ecoregion includes high and low marine terraces, sand dunes, and beaches, and landslides and debris slides are common.

Cascades

The Cascades Ecoregion is a forested, mountainous area that stretches from British Columbia, Canada, to Northern California and covers a range of approximately 18,064 square miles (Sorenson 2012) and is part of the Pacific Ring of Fire. Lassen Peak is the most southerly active volcano in the Cascade Range.

The Cascades Ecoregion is bounded to the west by the Klamath Mountains, Willamette Valley, and Puget Lowland Ecoregions; to the north by the North Cascades Ecoregion; and to the east by the Eastern Cascade Slopes and Foothills Ecoregion. This ecoregion contains a large amount of Cenozoic volcanic rock and has elevations ranging from 2,000 to 7,600 feet at the highest peaks with permanent snowfields and glaciers. The Cascade Subalpine/Alpine area of the Cascades Ecoregion contains prominent volcanic peaks at higher elevations. Pleistocene glaciation changed the mountainous topography through time and formed moraines, glacial lakes, and u-shaped glacial canyons (Griffith et al. 2016).

The High Southern Cascade Montane Forest area of the Cascades Ecoregion consists of a smooth volcanic plateau with isolated buttes, cones, and peaks consisting mostly of cryic soils. The Southern Cascade Foothills area consists of volcanic hills and plateaus. The western side of this ecoregion is characterized by long, steep ridges composed of eroded Oligocene to Pliocene volcanic and volcanoclastic rocks covering older Upper Cretaceous and Eocene sedimentary rocks. Soils in this ecoregion are mostly cryic and have frigid temperature regimes, although some contain mesic soil temperatures at lower elevations and to the south, with Andisols and Inceptisols being common.

Sierra Nevada

The Sierra Nevada Ecoregion is a mountainous, extremely dissected, westerly sloping fault block. The eastern portion is heavily glaciated and contains higher mountain ranges than the Klamath Mountains to the northwest. Most of the central and southern parts are underlain by granite. A high fault scarp divides the Sierra Nevada from the Northern Basin and Range and the Central Basin and Range, where the Sierra Nevada reaches its highest elevation. Because of its Pleistocene alpine glaciation, moraines, cirques, and small lakes are common. The ecoregion slopes more gently to the west.

Central California Foothills and Coastal Mountains

The Central California Foothills and Coastal Mountains Ecoregion is characterized primarily by its Mediterranean climate, with hot dry summers and cool moist winters. The ecoregion consists mostly of open low mountains or foothills with scattered irregular plains and narrow valleys.

Central California Valley

The Central California Valley Ecoregion consists of flat, intensively farmed plains and experiences long, hot, dry summers and mild winters. It includes flat valley basins of deep sediment adjacent to the Sacramento and San Joaquin Rivers, in addition to fans and terraces around the edge of the valley. This ecoregion has two major rivers that

flow from opposite ends of the Central Valley into the Sacramento–San Joaquin Delta and San Pablo Bay. Surrounding this ecoregion are other regions that consist of hilly or mountainous topography. More than half of the Central California Valley Ecoregion is cropland, about three-quarters of it irrigated (Griffith et al. 2016).

Southern California Mountains

The Southern California Mountains Ecoregion has a Mediterranean climate of hot, dry summers and moist, cool winters. This ecoregion extends 200 miles and includes coastal and alluvial plains, marine terraces, and some low hills in coastal areas of Southern California. Elevations are higher, with slightly cooler summers and more precipitation than in adjacent ecoregions. Mountains within this range are composed progressively of older rocks from the west to east, which is one of the ecoregion's defining characteristics. This characteristic is emphasized by faults and folds that control the trend and shape of the mountains, valleys, and coastline. Sedimentary rocks are predominantly in the west, and older igneous and metamorphic rocks predominate in the east (Sharp 1994). In parts of this ecoregion, a slope effect causes distinct ecological differences: The south-facing slope receives more precipitation (30–40 inches per year) than the northern slope (15–20 inches) (Griffith et al. 2016).

Eastern Cascades Slopes and Foothills

This ecoregion is found within the rain shadow of the Cascades Ecoregion, and it experiences greater temperature extremes and less precipitation, along with frequent fires. The Eastern Cascades Slopes and Foothills Ecoregion was formed through tectonic uplift and is characterized by its common volcanic cones, plateaus, and buttes. Historically, creeping ground fires burned through accumulated fuel, and devastating crown fires were less common in dry forests.

Central Basin and Range

The Central Basin and Range Ecoregion is a large region that encompasses most of the western U.S.: southern Oregon, eastern California, the southern portions of Arizona and New Mexico, western Texas, and most of Nevada. The ecoregion is approximately 132,498 square miles, with only about 3.7 percent of its area falling within California (Soulard 2012). It contains alternating north-south trending faulted mountains and valley floors through the region.

This ecoregion is distinguished by its rugged desert country, with high topographic relief and subparallel fault-bounded mountain ranges (State Parks 2015). Playas at the lowest elevations in the Lahontan Basin are the terminus or "sink" of rivers that flow east from the Sierra Nevada. The ecoregion also contains California's lowest point of elevation (282 feet below sea level in Death Valley), and the highest point is 14,252 feet above sea level at White Mountain Peak.

There are three separate physiographic areas in California's Basin and Range Ecoregion: the northernmost portion, bounded by the Modoc Plateau and Nevada border; the middle portion, bounded to the north by the Modoc Plateau and to the south by the Sierra Nevada region; and the largest, southernmost portion, bounded to the west by the Sierra Nevada region, to the south by the Mojave Desert, and to the east by

the Nevada border. The region is distinctly cut off by the Garlock Fault to the south. The mountain ranges and intervening valleys are 50–100 miles long and 15–20 miles wide (Sharp 1994). Soils in this region grade upslope from mesic Aridisols to frigid Mollisols.

Mojave Basin and Range

The Mojave Basin and Range Ecoregion stretches across southeastern California, southern Nevada, southwestern Utah, and northwestern Arizona. It is composed of broad basins with scattered mountains that are generally lower, warmer, and drier than in the Central Basin and Range Ecoregion. The ecoregion is bounded on the north by the Central Basin and Range Ecoregion, on the east by the Colorado Plateaus and the Arizona/New Mexico Plateau Ecoregions, on the south by the Sonoran Basin and Range Ecoregion, and on the west by the Southern California Mountains and the Sierra Nevada Ecoregions. The highest elevation in the ecoregion is 7,292 feet at Clark Mountain, with valley bottoms ranging from 2,000 to 4,000 above sea level. The Mojave Desert is bordered by the Garlock Fault to the north, the San Andreas Fault to the southwest, and the southern part of Death Valley fault zone to the east (Walker et al. 2002).

Precambrian to late Cenozoic age rocks are exposed across the ecoregion. The basin's soils mostly comprise Entisols and Aridisols that typically have a thermic temperature regime. Soils are susceptible to wind and water erosion because of heavy human interference.

Klamath Mountains/California High North Coast Range

The Klamath Mountains/California High North Coast Range Ecoregion covers an elongated north-trending area in Northern California and southern Oregon. In California, it consists of several mountain ranges with features such as accordant summit levels, highly dissected old land surfaces, and high-elevation glacial topography. Most precipitation in this ecoregion drains westerly through deeply incised canyons of the Klamath and Trinity Rivers, with the easternmost areas draining toward the east and then south to the Sacramento River. Rocks in this ecoregion range in age from Ordovician to Late Jurassic and comprise greywacke sandstones, mudstones, greenstones, radiolarian cherts, limestone, and igneous intrusive rocks (Irwin 1966). Concentric belts from the east to the west, referred to as the Easter Klamath, Central Metamorphic, Western Paleozoic and Triassic, and Western belts, are responsible for its pattern of distribution.

Northern Basin and Range

The Northern Basin and Range Ecoregion is characterized by its dissected lava plains, rocky uplands, valleys, alluvial fans, and scattered mountain ranges. Aridisols are common within this range. Temperatures tend to be cooler and have more available moisture than in the Central Basin and Range Ecoregion and are higher and cooler than in the Snake River Plain Ecoregion to the northeast in Idaho.

Sonoran Basin and Range

The Sonoran Basin and Range Ecoregion has similar topography to the Mojave Basin and Range Ecoregion. It is characterized by scattered low mountains and contains large tracts of federally owned land. The Sonoran Basin and Range Ecoregion is slightly hotter

than the Mojave Range. Precipitation in this ecoregion during the winter decreases from west to east, with summer precipitation decreasing from the east to west. This ecoregion contains harsh environments for plant growth because of the dominant Aridisols and Entisols with hypothermic soil temperatures and highly aridic soil moisture regimes.

Southern California/Northern Baja Coast

The Southern California/Northern Baja Coast Ecoregion, extending more than 200 miles south into Baja California, contains coastal and alluvial plains, marine terraces, and a few low hills in the coastal area of Southern California.

3.9.3 Regulatory Setting

This section discusses federal, state, and regional and local plans, policies, regulations, and laws, and ordinances pertaining to geological resources and soils.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location.

Federal

U.S. Geological Survey Quaternary Faults

The U.S. Geological Survey (USGS) maintains a database of Quaternary fault and fold parameters (USGS 2019). The database is periodically updated to reflect the latest data available and current understanding of fault behaviors. These fault parameters were used to develop the National Seismic Hazard Maps.

U.S. Geological Survey National Seismic Hazard Maps

USGS publishes probabilistic seismic hazard maps for the 48 conterminous states (USGS 2009). These maps depict contour plots of peak ground acceleration and spectral accelerations at selected frequencies for various ground motion return periods. The maps were developed for a reference site condition with an average shear-wave velocity of about 2,500 feet per second in the top 100 feet. Ground motions in the Sacramento–San Joaquin Delta may be as much as two to four times higher than elsewhere as a result of soft soil amplification.

The USGS National Seismic Hazard Maps are updated periodically and have been adopted by many building and highway codes.

U.S. Geological Survey Landslide Hazard Program

USGS provides information on the causes of ground failure and mitigation strategies to reduce long-term losses from landslide hazards. The information is useful for understanding the nature and scope of ground failures and for improving mitigation strategies.

Federal Regulatory Design Codes for Buildings, Highways, and Other Structures

Federal standards for minimum design regulate the construction of any buildings and other structures and include the following:

- American Society of Civil Engineers Minimum Design Loads for Buildings and Other Structures, ASCE-7-10, 2013
- U.S. Army Corps of Engineers (USACE) (CESPK-ED-G), Geotechnical Levee Practice, SOP EDG-03, 2004
- USACE Design and Construction of Levees, EM 1110-2-1913, 2000
- USACE Engineering and Design, Earthquake Design and Evaluation for Civil Works Projects, ER 1110-2-1806, 2016
- USACE Engineering and Design—Earthquake Design and Evaluation of Concrete Hydraulic Structures, EM 1110-2-6053, 2007
- USACE Engineering and Design—Response Spectra and Seismic Analysis for Concrete Hydraulic Structures, EM 1110-2-6050,1999
- USACE Engineering and Design—Stability Analysis of Concrete Structures, EM 1110-2-2100, 2005
- USACE Engineering and Design—Structural Design and Evaluation of Outlet Works, EM 1110-2-2400, 2003
- USACE Engineering and Design—Time-History Dynamic Analysis of Concrete Hydraulic Structure, EM 1110-2-6051, 2003
- USACE Slope Stability, EM 1110-2-1902, 2003
- U.S. Department of the Interior and USGS Climate Change and Water Resources Management: A Federal Perspective, Circular 1331

These standards establish the minimum design criteria and construction requirements, including design, for concrete and steel structures, levees, buildings, pumping stations, excavation and shoring, grading, and foundations. Standards issued by the state are listed in the following section.

National Earthquake Hazards Reduction Act (U.S. Code Title 42 Section 7704)

In 1977, the U.S. Congress enacted the Earthquake Hazards Reduction Act of 1977 (Public Law 95-124) to "*reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program*." The National Earthquake Hazards Reduction Program was also enacted in 1977, to accomplish the goals of the act. The Earthquake Hazards Reduction Act and National Earthquake Hazards Reduction Program were amended in 1990 to refine the description of agencies' responsibilities, program goals, and objectives. The Earthquake Hazards Reduction Act was amended as the National Earthquake Hazards Reduction Program Act. The four general goals of the National Earthquake Hazards Reduction Program are:

- Develop effective practices and policies to reduce losses of life and property from earthquakes and accelerate their implementation.
- Improve techniques for reducing seismic vulnerabilities of facilities and systems.
- Improve earthquake hazards identification and risk assessment methods, and their use
- Improve the understanding of earthquakes and their effects.

The National Earthquake Hazards Reduction Program Act designates the Federal Emergency Management Agency as the program's lead agency. Other supporting agencies include the National Institutes of Standards and Technology, the National Science Foundation, and USGS.

State

Liquefaction and Landslide Hazard Maps (Seismic Hazards Mapping Act)

The Seismic Hazards Mapping Act of 1990 (Public Resources Code Sections 2690 to 2699.6) was enacted following the Loma Prieta earthquake to reduce threats to public health and safety by identifying and mapping known seismic hazard zones in California. The act directs the California Geological Survey (formerly known as the California Division of Mines and Geology) to identify and map areas prone to earthquake hazards of liquefaction, earthquake-induced landslides, and amplified ground shaking. The maps assist cities and counties in fulfilling their responsibilities for protecting public health and safety.

As of April 2019, more than 100 official seismic hazard zone maps showing areas prone to liquefaction and landslides had been published in California, and more maps are scheduled for publication. Most mapping has been performed in Southern California and the San Francisco Bay Area.

A development permit review is required for sites in the mapped seismic hazard zones. Site-specific geologic investigations and evaluations are carried out to identify the extent of hazards, and appropriate mitigation measures are incorporated in the development plans to reduce potential damage.

Alquist-Priolo Earthquake Fault Zones

The Alquist-Priolo Earthquake Fault Zoning Act (then called the Alquist-Priolo State Special Studies Zone Act) was enacted in 1972 (Public Resources Code Section 2621 et seq.). Similar to the Seismic Hazards Mapping Act, the Alquist-Priolo Act's main purposes are to identify known active faults in California and to prevent the construction of buildings for human occupancy on the surface trace of active faults.

State Regulatory Design Codes for Buildings, Highways, and Other Structures

State standards for minimum design regulate the construction of any buildings and other structures and include the following:

- California Amendments to American Association of State Highway and Transportation Officials Load and Resistance Factor Design Bridge Design Specifications, Fourth Edition, 2008
- California Building Code, 2007 (California Code of Regulations Title 24)
- California Department of Transportation Seismic Design Criteria, latest edition
- California Department of Water Resources Division of Safety of Dams Guidelines for Use of the Consequence-Hazard Matrix and Selection of Ground Motion Parameters, 2002
- California Department of Water Resources Interim Levee Design Criteria for Urban and Urbanizing Area State-Federal Project Levees, 2009

California Building Code

California's minimum standards for structural design and construction are provided in the California Building Code (California Code of Regulations Title 24). The California Building Code provides standards for various aspects of construction, including excavation, grading, and fill. It provides requirements for classifying soils and identifying corrective actions when native soil properties could lead to structural damage (e.g., expansive soils).

Surface Mining and Reclamation Act of 1975

The State Mining and Reclamation Act of 1975 (Public Resources Code Section 2710 et seq.) required the California State Geologist to implement a mineral land classification system to identify and protect mineral resources of regional or statewide significance in areas where urban expansion or other irreversible land uses may occur, thereby potentially restricting or preventing future mineral extraction on such lands. The intent of this law is for this information to be considered in local land use planning activities through the adoption of mineral resource management policies in general plans (Public Resources Code Section 2762). The California State Mining and Geology Board (SMGB) classifies such urban and non-urban lands according to a priority list, or when the board is otherwise petitioned to classify a particular land area.

As mandated by the State Mining and Reclamation Act, the SMGB classifies aggregate mineral resources in the state by applying the Mineral Resource Zone (MRZ) system. The MRZ system maps all mineral commodities within identified jurisdictional boundaries; priority is given to areas where land use compatibility issues may prevent or restrict future extraction of mineral resources, or where mineral resources may be mined during the 50-year period following their classification. The system classifies lands that contain mineral deposits and identifies the presence or absence of substantial sand and gravel deposits and crushed rock source areas (i.e., commodities used as, or in the production of, construction materials).

The State Geologist classifies MRZs in a region based on the following factors:

- **MRZ-1**: Areas where adequate information indicates that no significant mineral deposits are present, or where little likelihood exists for their presence.

- **MRZ-2:** Areas where adequate information indicates that significant mineral deposits are present, or where a high likelihood exists for their presence.
- **MRZ-3:** Areas containing mineral deposits for which the significance cannot be determined from available data.
- **MRZ-4:** Areas where available information is inadequate for assignment of any other MRZ category.

Mining operations and mine reclamation activities must be performed in accordance with laws and regulations adopted by the SMGB, as contained in Section 3500 et seq. of Title 14 of the California Code of Regulations. The California Department of Conservation's Office of Mine Reclamation oversees reclamation requirements.

California Geological Survey

The California Geological Survey assists in the identification and proper use of mineral deposits, and in the identification of fault locations and other geological hazards.

Regional and Local

The study area encompasses multiple counties with multiple cities throughout California. Each county and city has local regulations and a general plan with unique goals and policies that guide development and encourage the consideration of geology, soils, seismicity, and mineral resources. These may include protection of soils, adherence to building codes, and protection of mineral resources.

3.9.4 Impacts and Mitigation Measures

Methods of Analysis

Geological and soil impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could impact geological hazards and soil resources and is dependent on where individual restoration projects would be located relative to known or potential soil resources, geological hazards, and paleontological resources in the study area. However, the precise locations and detailed characteristics of potential future individual restoration projects are yet to be determined Therefore, this geological resources and soils analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis.

Permanent impacts are considered those that would continue through the life of a proposed restoration project as a result of the environmental conditions created by the project (e.g., implementation of channel stabilization and native revegetation that would increase channel bank stability). Temporary impacts are considered those that would be temporary in nature (e.g., construction related activities).

The approach to assessing geological and soil impacts was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of Restoration*

Projects in the Order, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an impact related to geologic, soils, or paleontological resources is considered significant if the types of restoration projects that would be permitted under the Order would do any of the following:

- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault. (Refer to Division of Mines and Geology Special Publication 42)
  - Strong seismic ground shaking
  - Seismic-related ground failure, including liquefaction
  - Landslides
- Result in substantial soil erosion or the loss of topsoil
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse
- Be located on expansive soils, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature

Potential impacts on mineral resources are addressed in Section 3.13 of this PEIR.

Impacts Not Analyzed Further

The types of restoration projects permitted under the Order would not include the use of septic tanks or alternative wastewater disposal because the projects would not increase the demand for wastewater disposal from construction or operation crews or occupied structures. Therefore, impacts related to this threshold of significance are not addressed further.

Impacts and Mitigation Measures

Table 3.9-1 summarizes the impact conclusions presented in this section by proposed project type under the Order for easy reference.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Table 3.9-1
Summary of Impact Conclusions—Geology and Soils

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.9-1: Implementing future restoration projects permitted under the Order could cause direct or indirect adverse effects on people or structures related to risk of loss, injury, or death due to a fault rupture.	LTSM	LTSM
3.9-2: Implementing future restoration projects permitted under the Order could directly or indirectly result in adverse effects on people or structures related to risk of loss, injury, or death due to strong seismic ground shaking.	LTSM	LTSM
3.9-3: Implementing future restoration projects permitted under the Order could directly or indirectly cause adverse effects on people or structures from unstable soil conditions.	LTSM	LTSM
3.9-4: Implementing future restoration projects permitted under the Order could result in substantial soil erosion or loss of topsoil.	LTSG	LTSG
3.9-5: Implementing future restoration projects permitted under the Order could directly or indirectly result in the loss of a unique paleontological resource or geological resource.	SU	SU

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2020

NOTES: LTSG = less than significant with implementation of general protection measures; LTSM = less than significant with mitigation; SU = significant and unavoidable

Impact 3.9-1: Implementing future restoration projects permitted under the Order could cause direct or indirect adverse effects on people or structures related to risk of loss, injury, or death due to a fault rupture.

Effects of Project Construction Activities, Constructed Facilities (Natural or Artificial Infrastructure), and Operations and Maintenance of those Facilities

Construction of restoration projects, constructed facilities (natural or artificial infrastructure), and operations and maintenance of those facilities permitted under the Order could result in significant adverse effects on people or structures from fault rupture. Reconnecting historical stream and river channels, freshwater deltas with floodplains, and historical estuaries to tidal influence by removing, setting back, and breaching levees could improve seismic stability compared to existing conditions; however, fault rupture could damage these structures. Damage to these features could result in their failure, causing flooding in otherwise protected areas. The degree of impact would depend on the location of activities and structures relative to areas with potential for fault rupture.

For example, a restoration project involving hydraulic reconnection, levee setbacks, and floodplain restoration could be located in a seismically active region, near several known active and potentially active faults, and could expose people or structures to potential fault rapture hazards. However, levees would be designed according to federal, state, and local standards, taking into consideration site conditions and geologic hazards.

Construction of facilities such as fish screens, water control structures, stream crossings, offstream storage ponds, and tanks on or adjacent to a known fault could expose them to risks of fault rupture. Damage to the facilities could result in flooding of otherwise protected areas. For example, water control structures or stream crossings placed in areas subject to fault rupture could be damaged during an earthquake, which could lead to flooding in the areas surrounding the structures. The degree of impact would depend on the location of activities and structures relative to areas with the potential for fault rupture.

Impact Conclusion

The specific locations and scale of possible future restoration projects are not yet determined; therefore, the risk of a fault rupture cannot be determined. Factors needed to identify specific impacts include the project’s design, its location relative to underlying soil and geotechnical conditions, and proximity to known earthquake faults. Because restoration projects permitted under the Order could cause direct or indirect adverse effects on people or structures related to the risk due to a fault rupture, this impact would be **potentially significant.** The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board’s issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure GEO-1 and GEO-2 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure GEO-1: Include Geotechnical Design Recommendations

To minimize potential impacts from seismic events and the presence of adverse soil conditions, lead agencies shall ensure that geotechnical design recommendations are included in the design of facilities and construction specifications. Recommended measures to address adverse conditions shall conform to applicable design codes, guidelines, and standards.

Mitigation Measure GEO-2: Comply with the Alquist-Priolo Act

For construction in an Alquist-Priolo Earthquake Fault Zone, a determination must be made by a licensed practitioner (California Certified Engineering Geologist) that no fault traces are present within structures, such as setback levees. The standard of care for such determinations includes direct examination of potentially affected subsurface materials (soil and/or bedrock) by logging of subsurface trenches. Levee structures may also be required to have heavier reinforcement against strong ground motion, in compliance not only with California regulations but, in many cases, with additional federal regulations.

Implementing Mitigation Measures GEO-1 and GEO-2 would reduce potentially significant impacts related to the potential exposure to people and structures to risk of loss, injury, or death due to a fault rupture to a **less-than-significant** level.

Impact 3.9-2: Implementing future restoration projects permitted under the Order could directly or indirectly result in adverse effects on people or structures related to risk of loss, injury, or death due to strong seismic ground shaking.

Effects of Project Construction Activities, Constructed Facilities (Natural or Artificial Infrastructure), and Operations and Maintenance of those Facilities

Construction of restoration projects, constructed facilities (natural or artificial infrastructure), and operations and maintenance of those facilities permitted under the Order could result in a variety of direct or indirect adverse effects on people or structures related to strong seismic ground shaking. Because of the presence of known and active faults found throughout the state, strong ground motion during a seismic event could occur in the study area.

Newly constructed fish screens, water control structures, stream crossings, offstream storage ponds and tanks, or other facilities could be located in areas that expose them to strong seismic groundshaking. Damage to the facilities could result in the flooding of otherwise protected areas. For example, water control structures or stream crossings placed in areas subject to strong seismic groundshaking could be damaged during an earthquake, which could lead to flooding of the areas surrounding the structures. The degree of impact would depend on the locations of the activities and structures relative to areas with the potential for groundshaking.

Some restoration projects permitted under the Order could have beneficial impacts related to seismic ground shaking. For example, a restoration project could stabilize embankment slopes by removing non-native vegetation that is in poor condition and poses safety hazards to surrounding areas in the event of severe seismic shaking. With

removal of the non-native vegetation and implementation of channel stabilization and native revegetation, impacts related to strong seismic shaking would be beneficial by reducing the potential for injuries and increasing channel bank stability.

Impact Conclusion

The specific locations and scale of possible future permitted restoration projects are not known at this time; therefore, the risk associated with strong seismic ground shaking cannot be determined. Because restoration projects permitted under the Order could directly or indirectly result in adverse effects on people or structures related to strong seismic ground shaking, this impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure GEO-3 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure GEO-3: Conduct Individual Restoration Project Geotechnical Investigation and Report

When a restoration project involves potentially significant grading activities and warrants consideration of geotechnical factors and/or constraints (e.g., work on flood control levees, work in areas with certain soil types subject to liquefaction), the project proponent shall conduct and prepare a geotechnical report to address potential issues and concerns. The geotechnical report shall include a quantitative analysis to determine whether excavation or fill placement would result in a potential for damage due to soil subsidence during and/or after construction. Project designs shall incorporate measures to reduce the potential damage to a less-than-significant level. Measures shall include but not be limited to:

- Removal and recompaction of existing soils susceptible to subsidence
- Ground improvement (such as densification by compaction or grouting, soil cementation)
- Reinforcement of structural components to resist deformation due to subsidence

The assessment of subsidence for specific projects shall analyze the individual restoration projects potential for and severity of cyclic seismic loading.
A geotechnical investigation shall also be performed by an appropriately licensed professional engineer and/or geologist to determine the presence and thickness of potentially liquefiable sands that could result in loss of bearing value during seismic shaking events. Project designs shall incorporate measures to mitigate potential damage to a less-than-significant level. Measures shall include but not be limited to:

- Ground improvement (such as grouting or soil cementation)

- Surcharge loading by placement of fill, excavation, soil mixing with non-liquefiable finer-grained materials, and replacement of liquefiable materials at shallow depths
- Reinforcement of structural components to resist deformation due to liquefaction

An analysis of individual restoration projects probable and credible seismic acceleration values, conducted in accordance with current applicable standards of care, shall be performed to provide for a suitable project design. Geotechnical investigations shall be performed, and geotechnical reports shall be prepared in the responsible care of California licensed geotechnical professionals including professional civil engineers, certified geotechnical engineers, professional geologists, certified engineering geologists, and certified hydrogeologists, all of whom practice within the current standards of care for such work.

Mitigation Measure GEO-4: Adhere to International Building Code

Constructed facilities shall be required to adhere to the current approved version of the International Building Code (IBC), and to comply with the IBC for critical structures (e.g., levees).

Implementing Mitigation Measures GEO-3 and GEO-4 would reduce potentially significant impacts that could result in direct or indirect adverse effects on people or structures related to the risk due to strong seismic ground shaking to a **less-than-significant** level.

Impact 3.9-3: Implementing future restoration projects permitted under the Order could directly or indirectly cause adverse effects on people or structures from unstable soil conditions.

Effects of Project Construction Activities, Constructed Facilities (Natural or Artificial Infrastructure), and Operations and Maintenance

Construction of restoration projects, constructed facilities (natural or artificial infrastructure), and operations and maintenance of those facilities permitted under the Order could directly or indirectly expose people or structures to unstable soil conditions, including landslides, expansive soils, subsidence, high organic matter soils, or increased runoff. Expansive soils that express shrink-and-swell cycles are found throughout California; these soils could create unstable foundations for rigid structures by exerting pressure on building foundations or could cause surface cracking and runoff infiltration. Construction activities could expose or reduce vertical distance to expansive clays in ground layers beneath the surface and could cause soil fissures that could exacerbate the problem. Exposing expansive soils to moisture could result in upward heaving, especially differential heaving, which could damage improvements. Highly expansive soils are found throughout the state; however, they are more likely to be found in valley basins containing well-developed soils with high clay content than in more organic rich soils or younger alluvial soils near streams.

During the design and construction of restoration projects, it is important to identify and mitigate expansive soils because the potential for construction on expansive soils to

cause structural problems may not become apparent for many years. For example, floodplain restoration projects permitted under the Order could require constructing new levees to facilitate the removal or breaching of existing levees and the creation of aquatic or riparian habitat. The new levees could be damaged if constructed on unstable soils, potentially exposing the surrounding areas to flooding.

Construction activities and constructed facilities for restoration projects permitted under the Order could be located on soils with high levels of organic matter. Construction on such soils could reduce stability and result in structural problems over time because of instable bearing surfaces. High organic soils generally settle and decrease in volume as organic matter decays. If design and construction of the restoration projects do not account for organic matter, soils with a high organic makeup could degrade structural integrity through the collapse of pore space between molecules or the compaction of saturated silts and sands. Construction activities that would involve placing fill could accelerate subsidence by causing the consolidation of surcharged loads of peat and other unconsolidated sediments, which could lead to differential subsidence after construction and result in distress to the improvements.

Restoration activities permitted under the Order could involve dewatering activities, such as temporary dewatering of a restoration project's construction site, or removal of small dams, which would involve using explosives in dry or dewatered conditions. Subsidence could occur during such activities, with effects similar to the effects of construction on soils with high organic matter, resulting in the collapse of pore space. However, these activities would be short-term and would not likely lead to conditions that would result in subsidence.

Liquefiable sands could be exposed if surficial layers were removed during construction, which would increase the risk of bearing value, soil settlement, and lateral spreading during earthquake-related seismic shaking. This could result in soil liquefaction, in which transient higher pore water pressures in groundwater would cause soils to liquefy. For example, a small dam may be removed in an area where shrink-swell potential is moderate as the result of expansive soils. However, this type of project would not include any habitable structures, nor would it expose people or structures to risks associated with expansive soils.

Restoration projects permitted under the Order could result in beneficial outcomes to the surrounding areas, such as the removal of structures (e.g., legacy structures), which can decrease soil loss and instability. For example, removing an instream legacy structure may potentially increase the area's stability by restoring channel form and preventing further erosion. Another example is a floodplain restoration project that may have beneficial impacts on levee bank stability. Berm construction and levee reconstruction components would reduce the potential for seepage and seepage-related levee failures by reducing hydrostatic exit gradients, and thus increasing bank and soil stability.

Impact Conclusion

To determine the effects of construction activities related to unstable soils, factors such as project design, location relative to underlying soils, and geotechnical conditions would need to be known. Because the potential exists for indirect or direct exposure of

people or structures to adverse effects from unstable soils during restoration projects permitted under the Order, this impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure GEO-3, GEO-6, GEO-7, and GEO-8 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure GEO-5: Conduct Expansive Clay Investigation

In areas where expansive clays exist, a licensed professional engineer or geologist shall perform a hydrogeological/geotechnical investigation to identify and quantify the potential for expansion, particularly differential expansion of clayey soils caused by leakage and saturation beneath new improvements. Measures could include but are not limited to removing and recompacting problematic expansive soils, stabilizing soils, and/or reinforcing the constructed improvements to resist deformation from expansion of subsurface soils.

Mitigation Measure GEO-6: Implement Measures for Waterway Construction Activities

For projects that involve the engineered subsurface structural components (e.g., of surface impoundments, levees, bridge footings/abutments) project design shall provide for protection from leakage to the subsurface. Measures could include but are not limited to rendering concrete less permeable by specifying concrete additives such as bentonite, designing impermeable liner systems, designing leakage collection and recovery systems, and constructing impermeable subsurface cutoff walls.

For restoration projects that could cause subsurface seepage of nuisance water onto adjacent lands, the following measures shall be implemented:

- Perform seepage monitoring studies by measuring the level of shallow groundwater in the adjacent soils, to evaluate baseline conditions. Continue monitoring for seepage during and after project implementation.
- Develop a seepage monitoring plan if subsurface seepage constitutes nuisance water on the adjacent land.
- If it is determined that seepage from the restoration project is responsible for making adjacent lands not usable, implement seepage control measures, such as installing subsurface agricultural drainage systems to avoid raising water levels into crop root zones. Cutoff walls and pumping wells can also be used to mitigate the occurrence of subsurface nuisance water.

Mitigation Measure GEO-7: Implement Measures for Levee Construction and Other Fill Embankment Designs

For projects that involve the construction of setback levees, surface impoundments, and other fill embankments, the project design shall place fill in accordance with

state and local regulations and the prevailing standards of care for such work. Measures could include but are not limited to blending the soils most susceptible to landsliding with soils that have higher cohesion characteristics; installing slope stabilization measures; designing top-of-slope berms or v-ditches, terrace drains, and other surface runoff control measures; and designing slopes at lower inclinations.

Mitigation Measure GEO-8: Assess the Presence of Highly Organic Soils

For projects that would result in a significant or potentially significant risk to structures because of the presence of highly organic soils, the lead agencies shall require a geotechnical evaluation before construction to identify measures to mitigate organic soils. The following measures may be considered:

- Over-excavation and import of suitable fill material.
- Structural reinforcement of constructed works to resist deformation.
- Construction of structural supports below the depth of highly organic soils into materials with suitable bearing strength.

Implementing Mitigation Measures GEO-3, GEO-5, GEO-6, GEO-7, and GEO-8 would reduce potentially significant impacts related to indirect or direct adverse effects on people or structures associated with the risk from unstable soils to a **less-than-significant** level.

Impact 3.9-4: Implementing future restoration projects permitted under the Order could result in substantial soil erosion or loss of topsoil.

Effects of Project Construction Activities

Construction-related activities for restoration projects permitted under the Order could result in substantial soil erosion or the loss of topsoil by disturbing large volumes of soil through excavation, earthmoving, grading, filling, or stockpiling of soil material. These disturbed soils could be more susceptible to wind and water erosion, resulting in the loss of topsoil. Water erosion has a higher potential to occur on steep and/or organic sediment and could occur in many parts of the state.

For example, construction of a setback levee may have temporary and short-term erosion impacts on the soil surface. The removal of topsoil followed by replacement on-site after project construction may temporarily disturb the soil and could expose areas to winter or early storm events. Soil disturbance may also have the potential to result in substantial loss of topsoil due to wind erosion. However, implementation of standard best management practices (e.g., preparing and implementing a storm water pollution prevention plan and complying with the National Pollutant Discharge Elimination System) would reduce soil disturbance.

Impact Conclusion

Because the specific locations and scale of restoration projects permitted under the Order are not yet determined, this impact would be **potentially significant**.

Projects implementing applicable general protection measures (Appendix E) included in the Order would further reduce impacts to geology and soil resources. The following general protection measures may apply to geology and soil resources:

- GPM-15: Revegetate Disturbed Areas
- WQHM-1: Staging Areas and Stockpiling of Materials and Equipment
- WQHM-2: Storm Water Pollution Prevention Plan
- WQHM-3: Erosion Control Plans
- WQHM-4: Hazardous Materials Management and Spill Response Plan
- VHDR-1: Avoidance of Vegetation Disturbance
- VHDR-3: Revegetation Materials and Methods
- VHDR-4: Revegetation Erosion Control Materials and Methods

Implementing the general protection measures identified above would reduce impacts related to substantial soil erosion or loss of topsoil to a **less-than-significant** level.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Routine O&M activities for restoration projects permitted under the Order could result in impacts similar to those described under *Effects of Project Construction Activities.* In general, impacts related to the loss of topsoil (i.e., soil disturbance activities) would occur primarily as a result of construction activities, and the impact would not increase in severity once construction is complete. However, ongoing maintenance activities, such as adjustments to grading or soils composition, could expose soil to increased rates of erosion.

Some restoration projects under the Order would actually reduce soil erosion and result in a positive effect on topsoil and erosion levels. An example is a restoration project involving bioengineered bank stabilization that would improve aquatic and riparian habitat while reducing soil erosion and sedimentation of streams and wetlands by providing a revetment consisting of trees and native plant materials. Restoration projects involving the removal of non-native terrestrial and aquatic invasive species and revegetation with native plant species would also benefit soil health and reduce soil erosion. For this reason, some projects permitted under the Order could be beneficial to soil erosion and topsoil. However, because the potential exists for projects to result in substantial soil erosion or loss of topsoil, this impact would be **potentially significant**.

Implementing the general protection measures listed above would reduce impacts on soil erosion and the loss of topsoil to a **less-than-significant** level.

Impact 3.9-5: Implementing future restoration projects permitted under the Order could directly or indirectly result in the loss of a unique paleontological resource or geological resource.

Effects of Project Construction Activities, Constructed Facilities (Natural or Artificial Infrastructure), and Operations and Maintenance of those Facilities

Construction of restoration projects, constructed facilities (natural or artificial infrastructure), and operations and maintenance of those facilities permitted under the

Order could result in the loss of a unique paleontological or geological resource. Impacts on paleontological resources would be permanent if construction activities would disrupt or destroy fossil remains or sites, or create the loss of information and the potential destruction of nonrenewable paleontological resources.

Impact Conclusion

To determine the effects of construction activities and constructed facilities, paleontological or geological resources would need to be known. Also, restoration projects permitted under the Order could directly or indirectly result in the loss of a unique paleontological resource or geological resource, if projects are located on or near areas where sediment with moderate to high paleontological sensitivity occurs. Because the potential exists for restoration projects permitted under the Order to result in adverse effects on paleontological or geological resources, this impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure GEO-9 and GEO-10 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure GEO-9: Conduct a General Project-Level Analysis

Restoration projects implemented by other public proponents under the Order would be required to do a desktop search on whether the project site would be located in a paleontological sensitive unit. If the project site was determined to be located on a paleontological sensitive unit, then Mitigation Measure GEO-9 (and Mitigation Measure GEO-10, below, as applicable) would be implemented. If restoration projects implemented under the Order fall outside a paleontological sensitive unit, GEO-9 (and Mitigation Measure GEO-10, below) would be not required.

During project development and project-level analysis, a paleontological resource monitoring and recovery plan shall be developed and implemented for all actions determine by the project proponent to be located on a paleontological sensitive unit. The plan shall include protocols for paleontological resources monitoring in areas where construction-related excavation would affect sediment with moderate to high paleontological sensitivity.

The paleontological resource monitoring and recovery plan shall provide guidelines for the establishment of a yearly or biannual monitoring program led by a qualified paleontologist to determine the extent of fossiliferous sediment being exposed and affected by erosion, and determine whether paleontological resources are being lost. If the loss of scientifically significant paleontological resources is documented, then a recovery program should be implemented.

Mitigation Measure GEO-10: Conduct Worker Training

For projects that are determined to have moderate to high paleontological sensitivity, before the start of any ground-disturbing activity (e.g., excavation or clearing), a qualified paleontologist shall prepare paleontological resources sensitivity training materials for use during project worker environmental training or equivalent. This training shall be conducted by a qualified environmental trainer under the supervision of the qualified paleontologist. For restoration projects that involve construction crew phases, additional trainings shall be conducted for new construction personnel. The paleontological resource sensitivity training shall focus on the types of resources that could be encountered within the individual restoration project site and the procedures to follow if they are found. Project proponents and/or project contractors shall retain documentation demonstrating that all construction personnel attended the paleontological resource sensitivity training before the start of work on the site, and shall provide documentation to the project manager upon request.

Mitigation Measures GEO-9 and GEO-10 would be implemented to reduce the impacts related to the loss of a unique paleontological resource or geological resource caused by restoration projects permitted under the Order. However, because the extent and location of such actions are not known at this time (e.g., location, sediment sensitivity of the area, and distance a restoration project might be from a known paleontological or geological resource), it is not possible to conclude that the mitigation measures, or equally effective mitigation measures, would reduce impacts to a less-than-significant level in all cases. Therefore, impacts would be **significant and unavoidable**.

3.10 Hazards and Hazardous Materials

3.10.1 Introduction

This section discusses hazards and hazardous materials in the study area and the potential effects of the types of restoration projects that would be permitted under the Order. (See Section 2.6, *Categories of Restoration Projects in the Order.*) Environmental hazards and risks could result from the accidental release of hazardous materials through routine transport, use, and disposal; work near airports; interference with emergency responsiveness; and exposure to contaminated soil and/or groundwater. Additional potential hazards are evaluated elsewhere in this PEIR:

- Flood risk, flood hazards, water quality, and groundwater impacts—see Section 3.11, *Hydrology and Water Quality*.
- Effects on emergency services in the study area—see Section 3.19, *Utilities and Service Systems and Public Services*.
- Impacts on existing established transit, roadway, bicycle, and pedestrian facilities—see Section 3.17, *Transportation*.
- Exposure to direct or indirect risk associated with wildland fires—see Section 3.20, *Wildfire*.

The environmental setting and evaluation of impacts on hazards and hazardous materials is based on a review of existing published documents, including city and county general plans; information regarding example projects similar to those permitted under the Order that may be implemented by other agencies; and other information sources listed in Chapter 8, *References*.

The general plans and their EIRs address the specific hazards of concern for each particular city and county. Because many types of environmental hazards exist, and not all have the potential to be present throughout the state, each city or county has its own hazards and hazardous materials issues. Some of these issues may differ throughout the state, but some counties may share common hazards and hazardous waste issues. Therefore, each city or county will evaluate hazards at a distinct level of detail.

No comments specifically addressing hazards and hazardous materials were received in response to the notice of preparation (NOP). See Appendix B for NOP comment letters.

3.10.2 Environmental Setting

This section describes the existing hazards and hazardous materials in the study area. Because the Order could be implemented statewide, the environmental setting for hazards and hazardous materials covers all nine regional water quality control board (Regional Board) jurisdictions. The extent to which restoration projects permitted under the Order would include any particular action is not yet determined; therefore, this section presents a generic overview related to hazards and hazardous materials in the study area.

Background and Terminology

Hazardous Materials

Hazardous materials include any hazardous substances, waste, and other substances that in their quantity, concentration, or physical or chemical characteristics pose a significant present or potential threat to human health and safety or to the environment if released into the workplace or the environment (California Health and Safety Code, Section 22501).

Hazardous substances are generally characterized by their chemical and physical properties such as toxicity, ignitability, corrosivity, and reactivity. The State Water Board and Regional Boards have programs that establish water quality objectives to protect the beneficial uses of surface water and groundwater. Existing programs have focused on hazardous substances from landfills, waste disposal sites, fuel storage, and industrial facilities.

Most restoration projects permitted under the Order would involve construction activities. These activities would be specific to each type of project, their location, and other project-specific variables. Materials used for general construction activities could be used for construction of restoration projects; these may include hazardous materials such as fuels, motor oil, solvents, lubricants, and glues. Excavation, dirt moving or removal, or other ground-disturbing activities have the potential to expose buried hazardous materials from prior work done on the site or the adjacent property, or upstream historical contamination sources (e.g., lumber or paper mills, industrial sites, mining sites, or intensive agricultural production going back several decades). Ground disturbing activities could expose contaminated soils created by sediment deposition from prior or current upstream activities.

Because the Order covers the entire state of California, hazardous materials could be present throughout the study area. Contamination and exposure could result from numerous land uses throughout the state such as agricultural, industrial, commercial, landfill development, and military uses. Therefore, the construction and operation of any restoration project permitted under the Order would be governed by federal and state regulations for hazards and hazardous materials, and by county-specific regulations that would comply with the federal and state regulations.

The nine Regional Boards have established ongoing programs, standards, and requirements for water quality to protect surface water and groundwater uses throughout the state. The Regional Boards' boundaries are based on watershed and water quality requirements that are based on watershed climate, topography, geology, and hydrologic differences (State Water Board 2019). Existing programs focus on hazardous substances from landfills, waste disposal sites, fuel storage, and industrial facilities to protect persons and the environment from environmental and health hazards.

Various hazardous materials are present throughout the study area. Typical hazardous materials from industry and other entities range from fuels and solvents to radioactive materials. Numerous fuels, chemicals, and other hazardous materials are also transported via roadways and railways throughout the state. Generally, materials found on construction sites that could be considered hazardous include fuels, motor oil,

grease, various lubricants, solvents, soldering equipment, and glues. Furthermore, construction-related excavation may expose hazardous materials buried during prior use of the site or adjacent property.

Because the specific construction-related and operational activities to which the Order would apply are not yet determined, the following analysis discusses general hazardous waste site impacts associated with restoration projects. These include accidental discharge of a reportable quantity of a hazardous material, sewage, or unknown material; concrete sealants and runoff; vehicle fuels and lubricants (e.g., hydraulic fluid, fuel, oil, and grease); and excavation materials, and effects on stockpile, storage, and staging areas.

Disease Vectors

A “disease vector” is a carrier of disease organisms. The vector may be purely mechanical, as when houseflies spread enteric organisms; or it may be biological, wherein the disease organism multiplies or undergoes change within the vector, as when viruses develop in mosquitoes.

In California, the West Nile virus, St. Louis encephalitis, and western equine encephalomyelitis are the three most important viral mosquito-borne diseases. The viruses that cause these diseases are maintained in nature through a mosquito-bird-mosquito cycle. Typically, water bodies with poor circulation, continual slow-changing water levels, higher temperatures, and higher organic content produce greater numbers of mosquitoes. Most adult mosquitoes remain close to their point of origin, and their ability to travel is heavily dependent on physical phenomena such as wind. Some mosquitoes feed on mammals and other animal hosts, and others feed on fruits and plant nectars.

County vector control districts provide mosquito and other vector control.

Fire Protection and Hazards

All of the study area is subject to some degree of fire risk. However, certain specific features make some areas more hazardous than others. See Section 3.19, *Utilities and Service Systems and Public Services*, and Section 3.20, *Wildfire*, respectively, for discussions of fire protection impacts and wildfire risk and hazards.

Flooding

For a discussion of flood risk and flood hazards, see Section 3.11, *Hydrology and Water Quality*.

3.10.1 Regulatory Setting

This section discusses federal, state, and regional and local plans, policies, regulations, and laws, and ordinances pertaining to hazards and hazardous materials.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location.

Federal

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (U.S. Code Title 42, Section 9601 et seq. [42 USC 9601 et seq.]) enacted prohibitions and requirements for closed and abandoned hazardous waste sites. CERCLA also established the liability of persons responsible for releases of hazardous waste at these sites, and created a trust fund to provide for cleanup when no responsible party could be identified. The Superfund Amendments and Reauthorization Act of 1986 amended CERCLA to add new enforcement authorities and governance of hazardous substances. Title III of the Superfund Amendments and Reauthorization Act authorized the Emergency Planning and Community Right-to-Know Act.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) (42 USC 6901 et seq.) was enacted in 1974 as the first step in regulating the potential health and environmental problems associated with disposal of solid hazardous and nonhazardous waste. The Hazardous and Solid Waste Act (1984) amended the RCRA to address gaps in the area of highly toxic wastes. The 1986 RCRA amendments enabled the U.S. Environmental Protection Agency (EPA) to address environmental problems that could result when underground tanks store petroleum and other hazardous substances. RCRA also set forth a framework for management of nonhazardous solid wastes.

RCRA Section 3006 provides EPA with the authority to authorize state hazardous waste programs. Once authorized, the state program operates in lieu of the federal program, although EPA retains enforcement authority even after a state program has been authorized.

Toxic Substances Control Act

The Toxic Substances Control Act of 1976 (15 USC 2601 et seq.) regulates and controls harmful chemicals and toxic substances in commercial use. This law gives EPA the ability to track the 75,000 industrial chemicals currently produced in, imported into, and disposed of in the United States, and can require reporting or testing of those that may pose an environmental or human health hazard. Specific chemicals regulated under the Toxic Substances Control Act include polychlorinated biphenyls (PCBs), asbestos, radon, and lead-based paint.

Federal Insecticide, Fungicide, and Rodenticide Act

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 USC 136 et seq.) provides for the regulation of pesticide distribution, sale, and use. All pesticides distributed or sold in the United States must be registered (licensed) by EPA. Before EPA may register a pesticide under FIFRA, the proposed proponent must show that, among other things, using the pesticide according to specifications “will not generally cause unreasonable adverse effects on the environment.” FIFRA imposes pesticide labeling requirements; controls when and under what conditions pesticides can be applied, mixed, stored, loaded, or used; specifies when fields can be reentered after application; and identifies when crops can be harvested. Under FIFRA, registrations and

product labeling may restrict uses of pesticides. As a part of pesticide registration, EPA classifies the product or some uses of the product as “restricted use” if they may cause unreasonable adverse effects even when used as directed on the product labeling. Restricted-use pesticides are limited to use by certified pesticide applicators.

Clean Air Act

Regulations under the Clean Air Act (Title 40, Part 68 of the Code of Federal Regulations [40 CFR 68]) are designed to prevent accidental releases of hazardous materials. The regulations require facilities storing a threshold quantity or greater of listed regulated substances to develop a risk management plan, including hazard assessments and response programs to prevent accidental releases of listed chemicals. Section 112(r)(5) of the Clean Air Act discusses the regulated substances. These substances are listed in 40 CFR 68.130.

Clean Water Act

The Spill Prevention, Control, and Countermeasure program, established as part of the Clean Water Act, is designed to prevent or contain the discharge or threatened discharge of oil into navigable waters or adjoining shorelines. Under the Clean Water Act, a facility must prepare a written spill prevention, control, and countermeasure plan if the facility stores oil that would pose a threat to navigable waters if released (40 CFR 112). The Spill Prevention, Countermeasure, and Control rule applies if a facility has any of the following:

- A single aboveground oil storage tank with a capacity greater than 660 gallons
- Total petroleum storage (including aboveground storage tanks, oil-filled equipment, and drums) greater than 1,320 gallons
- Underground storage capacity greater than 42,000 gallons

Section 402(p) of the Clean Water Act established the National Pollutant Discharge Elimination System, a framework for regulating contaminants in stormwater discharges.

Oil Pollution Act of 1990

Under the Oil Pollution Act, certain facilities that store and use oil—either onshore or offshore—and that could reasonably be expected to cause substantial harm to the environment must prepare plans to respond to a worst-case discharge of oil and to a substantial threat of such a discharge to navigable waters. The response plans must be implemented if such a release occurs.

Safe Drinking Water Act

In 1974, the Safe Drinking Water Act was enacted to protect public health by regulating the nation’s public drinking water supply. This law authorizes EPA to set national health-based standards to protect against both naturally occurring and human-made contaminants that may be found in drinking water. EPA, state regulatory agencies, and water systems managers work together to make sure that these standards are met.

The Safe Drinking Water Act was amended in 1986 and 1996. The law requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and

groundwater wells. EPA protects groundwater sources of drinking water, in part through the Underground Injection Control Program. This program regulates the substances (including hazardous and radioactive substances) that can be injected or placed into the ground above or below a drinking water source.

Prevention of Chemical Accidents

CFR Part 68 sets forth the list of regulated substances and thresholds; the petition process for adding or deleting a substance from this list; the requirements that owners or operators of stationary sources must meet to prevent accidental releases; and the state accidental-release prevention programs approved under Section 112(r) of the Clean Air Act. The California Accidental Release Prevention Program is the state's adaption of this federal regulation. The list of federally regulated flammable substances and their threshold quantities is available from the United States Environmental Protection Agency, https://www.epa.gov/sites/production/files/2013-11/documents/appendix-a-final.pdf.

Worker Safety

The U.S. Occupational Safety and Health Administration's Hazard Communication Standard (29 CFR 1910.1200) requires that workers be informed of the hazards associated with the materials they handle. In the workplace, manufacturers must appropriately label containers, material safety data sheets must be available, and employers must properly train workers. Workers at hazardous waste sites must receive specialized training and medical supervision according to the Hazardous Waste Operations and Emergency Response regulations (29 CFR 1910.120).

State

Hazardous Waste Control Law

The Hazardous Waste Control Law empowers the California Department of Toxic Substances Control (DTSC) to administer the state's hazardous waste program and implement the federal program in California. This law includes regulations on underground storage tanks. DTSC manages the regulation and permitting of businesses that handle hazardous materials and waste.

Health and Safety Code Sections 25500 and 25531

Section 25500 of the Health and Safety Code regulates business and area plans related to the inventory, handling, and release or threatened release of hazardous materials. Section 25531 implements the federal regulations under the Clean Air Act for the prevention of accidental releases of regulated substances, with certain state-specific amendments.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act, described in Section 3.11.3, *Regulatory Setting*, of Section 3.11, *Hydrology and Water Quality*, requires that the state's waters be maintained at the highest reasonable quality. It authorizes the Regional Board to supervise cleanup efforts at spill sites that have affected groundwater. This law (codified

in the Water Code) allows the Regional Boards to impose requirements on specific discharges that are more stringent than the statewide requirements.

In addition, the California Highway Patrol and California Department of Transportation regulate container types and issue licenses to transport hazardous waste on public roads.

California Hazardous Substance Account Act

The California Hazardous Substance Account Act (Health and Safety Code, Division 20, Chapter 6.8), the state's equivalent to CERCLA, was adopted in 1999. This law requires past and present owners and operators to assume liability for the remediation of hazardous waste sites in California. The regulations also provide the following:

- Response authority for releases of hazardous substances, including spills and hazardous waste disposal sites
- Compensation for medical expenses and lost wages or business income resulting from injuries caused by exposure to releases of hazardous substances
- Funds for the State of California to assure payment of its 10 percent share of the costs mandated pursuant to Section 104(c)(3) of CERCLA (42 USC 9604[c][3])

Like the 1996 CERCLA amendments, the California Land Reuse and Revitalization Act of 2004 was enacted to encourage site cleanup (Health and Safety Code Sections 25395.60 to 25395.105). This law encourages the development and redevelopment of urban properties, and provides processes that ensure remediation to protect public health, safety, and the environment. The law also relieves innocent owners, bona fide prospective purchasers, and owners of property adjacent to contaminated sites of the liabilities and responsibilities that should be borne by those who caused or contributed to the contamination.

Section 25356.1 of the Health and Safety Code requires DTSC or the Regional Board to prepare or approve a remedial action plan for any site where hazardous substances were released to the environment if the site is listed as a Superfund site. The Regional Board makes decisions regarding cleanup and abatement goals and objectives for the protection of water quality (see Water Code Section 13307).

Government Code Section 65962.5, Cortese List

The provisions in Section 65962.5 of the California Government Code are commonly referred to as the "Cortese List," after the legislator who authored and enacted the legislation. The list, or a site's presence on the list, has bearing on the local permitting process, and on compliance with CEQA. The list is developed with input from the California Department of Public Health, State Water Board, California Department of Resources Recycling and Recovery (CalRecycle), and DTSC.

Hazardous Waste Program

The State of California is authorized to administer a hazardous waste program equivalent to the federal RCRA program. Generation, transportation, treatment, storage, and disposal of characteristic and listed hazardous wastes are regulated under the Health and Safety Code, Sections 25100 to 25250.28.

As part of the regulation of hazardous wastes, Health and Safety Code Sections 25250 through 25250.28 regulate PCBs in used oil and prohibit recycling or reuse of used oil if the oil contains PCBs at a level of 5 parts per million or greater.

California Solid Waste

Solid waste in California is regulated under California Code of Regulations Title 14, Division 7, and Title 27, Division 2. These regulations establish minimum standards for the handling and disposal of solid wastes. Both the State Water Board and CalRecycle have oversight and approval authority over local enforcement agencies that permit and take enforcement action on solid waste management facilities. Public Resources Code Sections 43200–43219, 43020, 43020.1, 43021, 43030, 43101, and 43103 created and govern the local enforcement agencies.

Control of Pesticides

Similar to EPA's FIFRA program, the California Legislature enacted the Food and Agriculture Code to promote and protect the agricultural industry, and to protect public health, safety, and welfare. Sections 11401–14155 of the Food and Agriculture Code regulate pest control operations, application of pesticides, and applicators, and restrict the use of some pesticides.

Water Code

Water Code Division 7, Chapter 5 requires the State Water Board and DTSC to establish policies and procedures for investigating, remediating, and abating the effects of a discharge of a hazardous substance that creates or threatens to create contamination, pollution, or a nuisance. The policies and procedures must be consistent with the policies and procedures established under Health and Safety Code Section 25355.7. The policies and procedures are established in State Water Board Resolution No 92-49.

State Board Resolution No. 92-49

The State Water Board adopted Resolution No. 92-49, Policies and Procedures for Investigation and Cleanup and Abatement of Discharges, under Water Code Section 13304. This resolution establishes policies and detailed procedures for investigating and remediating discharges (releases) that cause or threaten to cause soil or water pollution or a nuisance when waste or fluid migrates from waste management units. The resolution also requires coordination among other agencies including DTSC, EPA, and local governments.

Certified Unified Program Agencies

The Unified Program (CalEPA 2020) consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of multiple environmental and emergency response programs. The California Environmental Protection Agency and other state agencies set the standards for their programs, and local governments implement the standards. These local implementing agencies are called certified unified program agencies. For each county, certified unified program agencies regulate and oversee the following:

- Hazardous materials business plans

- California accidental release prevention plans or federal risk management plans
- The operation of aboveground storage tanks and underground storage tanks
- Universal waste and hazardous waste generators and handlers
- On-site treatment of hazardous waste
- Inspections, permitting, and enforcement
- Proposition 65 reporting
- Emergency response

Regional and Local

The study area encompasses all counties and cities throughout California. Each county and city has local regulations and a general plan with unique goals and policies that guide development and encourage the consideration of hazards and hazardous materials. County-specific regulations are implemented in accordance with federal and state regulations.

3.10.2 Impacts and Mitigation Measures

Methods of Analysis

Hazard and hazardous material impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could impact existing hazards and hazardous materials. However, the precise locations and detailed characteristics of potential future individual restoration projects are not yet determined. Therefore, this hazards and hazardous materials analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis.

Permanent impacts are considered those that would continue through the life of a project as a result of the environmental conditions caused by restoration projects permitted under the Order (e.g., new infrastructure that would require routine maintenance activities). Temporary impacts are considered those that would be temporary in nature (e.g., construction-related activities).

The approach to assessing hazards and hazardous materials impacts was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of Restoration Projects in the Order*, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an impact related to hazards and hazardous materials is considered significant if the types of projects that would be permitted under the Order would do any of the following:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials

- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school
- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment
- For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, result in a safety hazard or excessive noise for people residing or working in the project area
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan (including those located in or near state responsibility areas or land classified as very high Fire Hazard Severity Zones [FHSZ]) or result in inadequate emergency access)
- Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires

In addition, a significant impact would occur if the types of restoration projects that would be permitted under the Order would:

- Create vector habitat that would pose a significant public health hazard

The following potential impacts of future restoration projects permitted under the Order are evaluated elsewhere in this PEIR:

- Potential for increased flood risk and flood hazards—see Section 3.11, *Hydrology and Water Quality*.
- Potential for an increase in wildfire risk in high fire hazard severity zones and for information state responsibility areas or lands classified as very high FHSZ—see Section 3.20, *Wildfire*.

Impacts and Mitigation Measures

Table 3.10-1 summarizes the impact conclusions presented in this section for easy reference.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the

jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Table 3.10-1
Summary of Impact Conclusions—Hazards and Hazardous Materials

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.10-1: Implementing future restoration projects permitted under the Order could involve the routine transport, use, or disposal of hazardous materials that, if accidentally released, could create a hazard to the public or the environment, or that could be located within one-quarter mile of a school.	LTSG	LTS
3.10-2: Ground-disturbing activities for construction of future restoration projects permitted under the Order could encounter previously unidentified contaminated soil and/or groundwater, potentially exposing construction workers, the public, and the environment to risks associated with hazardous materials.	LTSM	LTS
3.10-3: Future restoration projects permitted under the Order could be implemented within 2 miles of an airport, resulting in a safety hazard.	SU	SU
3.10-4: Implementing future restoration projects permitted under the Order could interfere with emergency response access or with an adopted emergency response or evacuation plan (including those located in or near state responsibility areas or land classified as very high FHSZ) or result in inadequate emergency access.	LTSM	LTS
3.10-5: Implementing future restoration projects permitted under the Order could expose people or structures, either directly or indirectly, to a significant loss, injury, or death due to wildland fires.	LTSM	LTSM
3.10-6: Implementing future restoration projects permitted under the Order could create vector habitat that would pose a significant public health hazard.	LTSM	LTSM

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2020

NOTES: LTS = less than significant; LTSG = less than significant with general protection measures; LTSM = less than significant with mitigation; SU = significant and unavoidable

Impact 3.10-1: Implementing future restoration projects permitted under the Order could involve the routine transport, use, or disposal of hazardous materials that, if accidentally released, could create a hazard to the public or the environment, or that could be located within one-quarter mile of a school.

Effects of Project Construction Activities

Construction of future restoration projects permitted under the Order would likely require limited quantities of hazardous materials commonly used during construction activities (e.g., fuels for equipment, oils, hydraulic fluids, solvents, cleaners, sealants, lubricants, and herbicides). The types and quantities of hazardous materials would vary by construction site and type of restoration project. If improperly used, stored, handled, transported, or disposed of, hazardous materials could be accidentally released, which could expose construction workers, the public, and the environment (including soil, groundwater, or surface water) to contamination. Furthermore, during the construction of projects requiring equipment that would use fuel, oil, and/or coolant, accidental spills could occur while equipment is refueled, or equipment could be upset, resulting in the release of fuel, oil, and/or coolant into the surrounding environment.

For example, a school may be present within one-quarter mile of the construction of a floodplain restoration project and project construction activities could result in the accidental release of hazardous materials.

Because the locations of future restoration projects that would be permitted under the Order are not yet determined, it is possible that a project site could be within one-quarter mile of an existing or proposed school. As a result, construction of restoration projects permitted under the Order could expose school occupants and school site users to the effects of accidental spills of hazardous materials. Therefore, this impact would be **potentially significant**.

The Order includes the following general protection measures to reduce this impact (see Appendix E):

- GPM-6: Work Area and Speed Limits
- GPM-7: Environmentally Sensitive Areas and/or Wildlife Exclusion
- GPM-10: Equipment Maintenance and Materials Storage
- GPM-11: Material Disposal
- GPM-12: Fugitive Dust Reduction
- GPM-14: Project Cleanup after Completion
- WQHM-1: Staging Areas and Stockpiling of Equipment
- WQHM-2: Storm Water Pollution Prevention Plan
- WQHM-4: Hazardous Materials Management and Spill Response Plan
- WQHM-5: In-Water Concrete Use
- WQHM-6: Accidental Discharge of Hazardous Materials
- IWW-1: Appropriate In-Water Materials
- IWW-2: In-Water Vehicle Selection and Work Access
- IWW-3: In-Water Placement of Materials, Structures, and Operation of Equipment
- IWW-6: Dewater/Diversion Restrictions

- IWW-13: Dredging Operations and Dredging Materials Reuse Plan
- VHDR-6: Herbicide Use

Implementing these general protection measures would reduce the impact on the public or the environment of an accidental release of hazardous materials, or from the location of construction activities within one-quarter mile of a school, to a **less-than-significant** level.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

The natural or infrastructure facilities constructed for restoration projects permitted under the Order could require operations and maintenance (O&M) work. Activities that may be required to support successful restoration establishment include conducting mechanical and chemical weed control; installing fencing and signage; adjusting grading or soils composition; and installing and operating monitoring equipment such as groundwater wells, flow gauges, depth gauges, cameras, and stakes. The potential impacts of these activities would be expected to be similar to those discussed above for initial project construction. However, the impacts would be reduced in scope because equipment use for maintenance activities would be expected to be smaller in scale and more spread out over time than during project construction. In addition, the general protection measures listed above would still be implemented once a facility is constructed. Therefore, operational impacts would be **less than significant**.

Impact 3.10-2: Ground-disturbing activities for construction of future restoration projects permitted under the Order could encounter previously unidentified contaminated soil and/or groundwater, potentially exposing construction workers, the public, and the environment to risks associated with hazardous materials.

Effects of Project Construction Activities

Certain restoration projects permitted under the Order would have ground-disturbing construction activities (e.g., stream crossing and fish passage improvements; removal of small dams, tide gates, flood gates, and legacy structures; bioengineered bank stabilization; and restoration and enhancement of off-channel/side-channel habitat). These ground-disturbing activities (e.g., excavation, clearing of the land for preparation of site, grading, cut and fill) could cause the release of previously unidentified contaminated soil and/or groundwater that could expose construction workers, the public, and the environment to hazardous materials.

For example, a restoration project to establish, restore, and enhance tidal, subtidal, and freshwater wetlands could require grading (e.g., excavating breaks in levees, dikes, and/or berms) and plowing or disking for preparation of seed beds. Such project construction may have a potentially significant impact related to hazards to human health from exposure to existing on-site hazardous materials. Off-channel/side-channel restoration projects that reconnect or create side channels, alcoves, oxbows, ponds, off-channels, and floodplains could result in the removal or breaching of levees and dikes and the excavation of channels and pond.

In addition, sediments excavated during dredging activities may contain hazardous materials, which could expose construction workers to health and safety risks. For example, dredged sediments from the San Francisco Bay can be contaminated with a variety of pollutants, such as mercury other metals, polychlorinated biphenyl, Polycyclic aromatic hydrocarbons, and compounds found in pesticides and herbicides (SFEI 2018).

The DTSC Hazardous Waste and Substances Sites (Cortese) List is a reporting document used by the State, local agencies, and/or project proponents to comply with CEQA requirements in providing information about the location of hazardous materials release sites. The information on the Cortese List is site-specific, and would be used for evaluation of environmental impacts for individual projects. The Cortese List cannot be effectively consulted until the specific location of individual projects and the activities that could disturb known hazardous waste and substances sites are known.

Construction activities from these project types may have potentially significant impacts related to the potential exposure of construction workers, the public, and the environment to existing on-site hazardous materials.

Therefore, this impact would be **potentially significant**.

The general protection measures listed for Impact 3.10-1 would be followed to reduce the impacts of ground-disturbing activities for restoration projects permitted under the Order related to the release or exposure to previously unidentified contaminated soil and/or groundwater that could expose construction workers, the public, and the environment to risks from hazardous materials.

In addition, as part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measures HAZ-1, HAZ-2, and HAZ-3 would be required when applicable to a given project. Implementation of these mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure HAZ-1: Prepare and Implement a Health and Safety Plan and Provide Qualified Oversight of Fill Removal Related to Earthmoving Activities

The following measures shall be implemented before and during construction of any restoration project permitted under the Order:

- A health and safety plan for the project shall be developed and implemented. This plan shall clearly notify all workers of the potential to encounter hazardous materials during ground-disturbing work and other construction activities. The plan shall identify proper handling and disposal procedures for contaminants expected to be on-site and shall provide maps and phone numbers for local hospitals and other emergency contacts. Construction workers shall comply with all protocols outlined in the health and safety plan throughout project implementation.

- Any hazardous materials being stored in the project area and not needed for construction activities shall be removed and disposed of at appropriately permitted locations before construction. A qualified professional (e.g., geologist or engineer) shall oversee fill excavation activities and work in potential project areas that contain abandoned underground storage tanks requiring removal, to properly identify any contaminated soils that may be present. Excavation of underground storage tanks must comply with county ordinances and policies. If contaminated soils are found, Mitigation Measure HAZ-2 shall be implemented.
- Removal of underground storage tanks associated with the restoration project shall include measures to ensure their safe transport and disposal. Remediation actions, if necessary, shall be defined in consultation with the local Regional Board and implemented during construction.

Mitigation Measure HAZ-2: Notify Appropriate Federal, State, and Local Agencies If Contaminated Soils Are Identified, and Complete Recommended Remediation Activities

The following measures shall be implemented before construction of any restoration project permitted under the Order if contaminated soils are found on the project site:

- The appropriate federal, state, and local agencies shall be notified if evidence of previously undiscovered soil or groundwater contamination (e.g., stained soil, odorous groundwater) is encountered during construction activities. Any contaminated areas shall be cleaned up in accordance with the recommendations of the Regional Board, DTSC, or other appropriate federal, state, or local regulatory agencies.
- A site plan shall be prepared for the remediation activities appropriate for the proposed land uses, including excavation and removal of on-site contaminated soils, and needed redistributions of clean fill material on the study area. The plan shall include measures to ensure the safe transport, use, and disposal of contaminated soil and building debris removed from the site. If ground-disturbing activities encounter contaminated groundwater, the construction contractor shall report the contamination to the appropriate agencies, dewater the area, and treat the groundwater to remove the contaminants before discharge into the sanitary sewer system. The construction contractor shall comply with the plan and applicable federal, state, and local laws. The plan shall outline specific procedures for handling and reporting of hazardous materials, and for disposing of hazardous materials removed from the site at an appropriate off-site facility.

Mitigation Measure HAZ-3: Notify Appropriate Federal, State, and Local Agencies If Accidental Discharges of Hazardous Materials

Following an accidental discharge of a reportable quantity of a hazardous material or an unknown material, the appropriate federal, state, and local agencies shall be notified. Any contaminated areas shall be cleaned up in accordance with the recommendations of the Regional Board, DTSC, or other appropriate federal, state, or local regulatory agencies.

Implementing Mitigation Measures HAZ-1, HAZ-2, and HAZ-3 and the applicable general protection measures would reduce the impact related to potential discovery of previously unidentified contaminated soil and/or groundwater to a **less-than-significant** level.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Ground-disturbing activities may occur after restoration projects permitted under the Order have been constructed. Operational activities would involve installing monitoring equipment (e.g., groundwater wells, flow gauges, depth gauges, cameras, stakes, and similar equipment). However, the ground-disturbing activities would be limited and would occur in the same areas as when the facilities were constructed. Therefore, operational activities would not be expected to encounter previously unidentified contaminated soil and/or groundwater that could expose construction workers, the public, and the environment to risks associated with hazardous materials. This impact would be **less than significant.**

Impact 3.10-3: Future restoration projects permitted under the Order could be implemented within 2 miles of an airport, resulting in a safety hazard or excessive noise.

Effects of Project Construction Activities, Constructed Facilities (Natural or Artificial Infrastructure), and Operations and Maintenance of those Facilities

Construction of restoration projects, constructed facilities (natural or artificial infrastructure), and operations and maintenance of those facilities permitted by the Order could be located within 2 miles of an airport. Projects within 2 miles of an airport have the potential to create a safety hazard for construction workers, people in the surrounding area, and airport operations as a result of the reflection of light, glare, noise or other distractions associated with construction activities. Construction would generally occur during daylight hours; however, in rare cases, some activities, expedited projects, and projects where the construction schedule is nearing the flood season may require continuous daytime and nighttime work. Because the exact locations of projects that would be permitted by the Order are not yet determined, it is possible that some projects could be constructed within 2 miles of an airport.

Constructed facilities (e.g., restoration projects to expand floodplains) could attract waterfowl or alter migration patterns or the local movement patterns of birds, thus presenting risks to aircraft by altering avian pathways and putting them within airport flight paths.

Routine O&M activities for restoration projects permitted under the Order could occur within 2 miles of an airport. Such activities (e.g., use of lights for a constructed fish screen) could produce light, glare, noise or other distractions; however, the light, glare, and noise would most likely be minimal and would conform to the requirements of the local airport land use plan. (See Section 3.2, *Aesthetics,* and Section 3.14, *Noise*, include further information on potential noise, light and glare impacts.)

The level of significance of a potential impact of a restoration project permitted under the Order would depend, in large part, on its proximity to an airport land use plan or on

whether it would be within 2 miles of a public or private airport. The necessary factors to identify airport safety risks include the location of the project relative to an airport. Because the potential would exist for restoration projects to create safety hazards by placing people at construction sites near airports, and to result in increased collisions between aircraft and wildlife near an airport or airport land use plan, this impact would be **potentially significant**.

To reduce the impacts of restoration projects permitted under the Order that would be located within 2 miles of a public or private airport, the Order includes the following general protection measure (see Appendix E):

- GPM-4: Construction Hours

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure HAZ-4 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

> ***Mitigation Measure HAZ-4: Establish Airport Operation Area Buffer Zones***
>
> Restoration projects permitted under the Order shall avoid creating hazardous wildlife attractants within a distance of 10,000 feet of a designated Airport Operations Area.

Hazardous wildlife attractants generally refer to large tracts of open, undeveloped land that provide added margins of safety and noise mitigation. These areas, constructed or natural (e.g., poorly drained locations, detention/retention ponds, roosting habitats on buildings, landscaping, odor-causing rotting organic matter, disposal operations, wastewater treatment plants, agricultural or aquaculture activities, surface mining, or wetlands), can provide wildlife with ideal locations for feeding, loafing, reproduction, and escape.

Mitigation Measure HAZ-4 would be implemented to reduce the impacts of restoration projects permitted under the Order. However, because the extent and locations of future restoration projects are yet to be determined, it is not possible to conclude that the mitigation measure, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. Therefore, this impact would be **significant and unavoidable.**

Impact 3.10-4: Implementing future restoration projects permitted under the Order could interfere with emergency response access or with an adopted emergency response or evacuation plan (including those located in or near state responsibility areas or land classified as very high FHSZ) or result in inadequate emergency access.

Effects of Project Construction Activities

Future restoration projects permitted under the Order could be located in areas where their construction could physically interfere with adopted emergency response plans or evacuation plans, or result in inadequate emergency access. Projects often use heavy

equipment, the operation of which may temporarily disrupt existing transportation and circulation patterns in the project area. Impacts could include direct disruption of traffic flows and street operations. For example, street closures or lane blockages could reduce the number of travel lanes and require rerouting of traffic. Traffic levels could increase during transportation and relocation of construction materials. As a result, construction activities for future restoration projects permitted under the Order could temporarily increase emergency response times, interfere with adopted emergency response or evacuation plans, or result in inadequate emergency access. Some waterside restoration projects permitted under the Order may use barges to transport construction materials, workers, and equipment, which would reduce impacts on water-related response times.

Because the locations of restoration projects that would be permitted under the Order are yet to be determined, impacts related to emergency response or evacuation plans, or inadequate emergency access would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board' issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure HAZ-5 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure HAZ-5: Coordinate with Applicable Federal, State, and Local Agencies and Districts

Before construction, project proponents implementing restoration projects permitted under the Order shall coordinate with the appropriate federal, state, and local government agencies, districts, and emergency response agencies regarding the timing of construction projects that would occur near the project sites. Specific measures to mitigate potentially significant impacts shall be determined during the interagency coordination, and shall include measures to achieve the following performance standards:

- Reduce potential traffic impacts so that no more than 30 trucks per hour will be added to any road (e.g., by scheduling construction truck trips and designating alternate haul routes to disperse truck trips).
- Reduce potential traffic safety impacts (e.g., by employing flaggers to manage traffic flow at conflict locations).
- Provide outreach and community noticing (e.g., via the web, utility bill inserts, and other methods) for locations where multiple projects will create construction traffic simultaneously.

The level of significance of a potential impact of a restoration project permitted under the Order related to interference with emergency response access or adopted emergency response or evacuation plans would depend, in large part, on the project's size and proximity to a populated area. Construction-related interference with emergency response, evacuation plans, and adopted emergency response would be

temporary. In addition to Mitigation Measure HAZ-5, other feasible, equally effective mitigation measures are available, such as maintaining alternative property access; providing advance notification to local police, fire, and emergency service providers of the timing, location, and duration of activities that could affect emergency vehicle movement; and installing traffic control devices to maintain safe driving conditions. Implementing Mitigation Measure HAZ-5, or equally effective mitigation measures, would reduce impacts on emergency response access or adopted emergency response and evacuation plans to a **less-than-significant** level.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Routine O&M of constructed facilities (whether natural or infrastructure) is not anticipated to interfere with emergency response access or adopted emergency response or evacuation plans. Furthermore, project proponents implementing the Order would comply with all federal, state, and local regulations and policies to help reduce impacts related to emergency response access and adopted emergency response or evacuation plans. Therefore, this impact would be **less than significant**.

Impact 3.10-5: Implementing future restoration projects permitted under the Order could expose people or structures, either directly or indirectly, to a significant loss, injury, or death due to wildland fires.

Effects of Project Construction Activities, Constructed Facilities (Natural or Artificial Infrastructure), and Operations and Maintenance of those Facilities

Construction of restoration projects, constructed facilities, (natural or artificial infrastructure), and operations and maintenance of those facilities permitted under the Order could be constructed and operated in areas where their construction and operation could pose a threat to people and structures because of wildfires. The study area involves the entire state of California; therefore, restoration projects could be located in areas with moderate to high fire risk areas, or in areas where vegetation is present. Construction equipment and vehicles could come into contact with vegetated areas, potentially igniting dry vegetation by accidental discharge of sparks, resulting in fire.

Restoration projects permitted under the Order could be located in areas where their operation could pose a threat to people or structures because of wildland fires. Because the locations of future restoration projects permitted under the Order are yet to be determined, it is possible that facilities could be constructed in areas where vegetation is present in or near infrastructure, equipment, and O&M vehicles. As a result, the potential exists for dry vegetation to accidentally ignite, causing a fire. This impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board' issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure FIRE-1 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure FIRE-1: Develop and Implement a Fire Prevention Plan

See Section 3.20.4, *Impacts and Mitigation Measures*, in Section 3.20, *Wildfire*.

Implementing Mitigation Measure FIRE-1 would reduce the impact of exposure to wildland fires to a **less-than-significant** level.

Impact 3.10-6: Implementing future restoration projects permitted under the Order could create vector habitat that would pose a significant public health hazard.

Effects of Project Construction Activities, Constructed Facilities (Natural or Artificial Infrastructure), and Operations and Maintenance of those Facilities

Construction of restoration projects, constructed facilities (natural or artificial infrastructure), and operations and maintenance of those facilities permitted under the Order could create new vector habitat that would pose a significant public health hazard. Mosquitoes require standing water to complete their growth cycles, and any body of standing water that remains undisturbed for multiple days represents a potential mosquito breeding site.

Also, while major construction activities would typically be implemented during the dry season (May through October) some construction activities might be required during the wet season (November through April). Construction sites typically use best management practices to control the stormwater leaving a site. However, stagnant water could be present in these areas, creating potential mosquito habitat. For example, standing water could remain on-site after a storm until it evaporates, potentially remaining for multiple days and helping to create mosquito habitat.

The potential for vector-related public health hazards (mosquitoes) could continue during ongoing operation of future restoration projects that result in new areas of standing water. Mosquitoes require standing water to complete their growth cycles, and any body of standing water that remains undisturbed for multiple days creates a potential mosquito breeding site. For example, restoration projects permitted under the Order could involve the setting back of a levee, off-stream storage ponds, etc., that could create new areas of standing water that would support mosquito habitat.

Construction-related and operational activities for restoration projects permitted under the Order could result in vector habitat that would pose a significant public health hazard. However, the specific locations and scale of potential future permitted restoration projects are yet to be determined. Therefore, the risk associated with the creation of vector habitat cannot be determined. The factors necessary to identify specific impacts include the project's design and footprint, the duration of construction, and the type and precise locations of the activities and facilities themselves.

Because the potential exists for the construction and operation of restoration projects to create vector habitat that could pose a significant public health hazard, this impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board' issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure HAZ-6 would be required

when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure HAZ-6: Prepare and Implement a Vector Management Plan

The following measures shall be implemented by restoration projects permitted under the Order to prevent public health hazards posed by vector habitat as applicable (e.g., restoration projects that result in standing water and are located near populated areas):

- Freshwater habitat management shall include management of water control structures, vegetation management, mosquito predator management, drainage improvements, and other best management practices. The agency implementing the restoration project shall coordinate with the California Department of Fish and Wildlife and local mosquito and vector control agencies regarding these strategies and specific techniques to help minimize mosquito production.
- Permanent ponds shall be maintained to increase the diversity of waterfowl yet decrease the introduction of vectors through constant circulation of water, vegetation control, and periodic draining of ponds.
- The project shall avoid ponding in tidal marsh habitat or in areas within the waterside of setback levees. Restoration projects shall be designed with methods to reduce mosquito breeding.

Implementing Mitigation Measure HAZ-6 would reduce the impact related to public health hazards from new vector habitat to a **less-than-significant** level.

3.11 Hydrology and Water Quality

3.11.1 Introduction

This section describes existing physical conditions and current approaches to managing surface water, groundwater, water quality, and water supplies in the study area, as well as potential impacts of the types of restoration projects that would be permitted under the Order.

The environmental setting and evaluation of impacts on hydrology and water quality are based on a review of existing environmental studies, data, and modeling results; other information regarding example projects similar to the Order that may be implemented by other agencies; and other information sources listed in Chapter 8, *References*.

Comments addressing hydrology received in response to the notice of preparation (NOP) addressed effects on floodplain structure, groundwater processes, and floodplain ecohydrology; permit jurisdiction; protection of water resources; and dredging. The following comments addressing hydrology were received in response to the NOP:

- The EIR should discuss the effects of restoration projects permitted under the Order on floodplain structure.
- The EIR should discuss the effects of restoration projects permitted under the Order on groundwater elevations and groundwater recharge.
- The EIR should discuss the effects of restoration projects permitted under the Order on floodplain ecohydrology
- The EIR should take permit jurisdiction into consideration.
- The EIR should analyze protection of water resources.
- The EIR should discuss the effects of dredging for restoration projects permitted under the Order.

See Appendix B for the NOP comment letters.

3.11.2 Environmental Setting

The supply and management of water resources vary throughout California depending on population, economic, and environmental needs. The study area includes the entire geographic extent of California. The study area includes approximately 630 miles of coastal beaches, 1,100 miles of coastline, 1,600,000 acres of lakes, over 200,000 miles of rivers and streams, and 1,300,000 acres of bays and estuaries.

The State Water Board has jurisdiction throughout California. Created by the California Legislature in 1967, the State Water Board protects water quality by setting statewide policy, coordinating and supporting Regional Board efforts, and reviewing petitions that contest Regional Board actions. The nine Regional Boards exercise rulemaking and regulatory activities for each of the nine water quality control regions (basins).

This section describes the Regional Boards' boundaries and provides an overview of water resources in California, including surface and groundwater resources and water quality.

Description of Regional Boards

Regional Board 1—North Coast

The North Coast Region encompasses watersheds that drain into the Pacific Ocean from the California-Oregon state line southerly to the southern boundary of the watershed of the Estero de San Antonio and Stemple Creek in Marin and Sonoma Counties, including the Lower Klamath Lake and Lost River Sub-Basins. This region is divided into two natural drainage basins: the Klamath River Basin (which includes both the Lower Klamath Lake and Lost River Sub-basins) and the North Coastal Basin. The North Coast Region encompasses approximately 19,400 square miles and includes 340 miles of scenic coastline and remote wilderness areas, as well as urban and agricultural areas. The region covers all of Del Norte, Humboldt, Trinity, and Mendocino Counties, major portions of Siskiyou and Sonoma Counties, and small portions of Glenn, Lake, Modoc, and Marin Counties (North Coast Regional Water Board 2018).

The North Coast Region is characterized by distinct temperature zones. Along the coast, the climate is moderate and foggy, with minimal temperature variation. However, inland temperatures range widely and vary seasonally, with temperatures sometimes exceeding 100 degrees Fahrenheit (°F).

Precipitation is greater in the North Coast Region than in any other part of California, and floods can be a hazard. Surface water and groundwater resources are abundant in this region. The coastline includes coastal water such as estuaries, lagoons, and coastal wetlands. Although the North Coast Region constitutes only about 12 percent of the area of California, it produces about 41 percent of the state's annual runoff. This runoff contributes to flow in surface water streams, storage in lakes and reservoirs, and replenishment of groundwater.

Regional Board 2—San Francisco Bay

The San Francisco Bay Region includes numerous watersheds, from large ones like the Alameda Creek watershed (which encompasses 700 square miles and includes two counties and seven cities) to small watersheds such as the 1.1-square-mile Codornices Creek watershed along the Berkeley/Albany border (San Francisco Bay Regional Water Board 2017). All watersheds in this region ultimately drain to San Francisco Bay or, in coastal areas, to the Pacific Ocean. The Sacramento and San Joaquin Rivers, which enter the bay system through the Sacramento–San Joaquin Delta (Delta) at the east end of Suisun Bay, contribute almost all the freshwater inflow to San Francisco Bay; however, many small rivers and streams also convey freshwater to the bay system.

The San Francisco Bay Region is 4,603 square miles and characterized by its dominant feature, 1,100 square miles of the 1,600-square-mile San Francisco Bay, the largest estuary on the West Coast of the United States, where freshwater from California's Central Valley mixes with the saline waters of the Pacific Ocean (San Francisco Bay Regional Water Board 2017). The bay marks the natural topographic separation

between the northern and southern coastal mountain ranges. The coastline includes coastal water such as estuaries, lagoons, and coastal wetlands. The San Francisco Bay Region includes all or major portions of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties. The region also includes coastal portions of Marin and San Mateo Counties, from Tomales Bay in the north to Pescadero and Butano Creeks in the south.

The San Francisco Bay Conservation and Development Commission (BCDC) conducts the regulatory and permitting process in accordance with the San Francisco Bay Plan (Bay Plan) within this region.

Regional Board 3—Central Coast

The Central Coast Region encompasses watersheds draining to the Pacific Ocean from Pescadero Creek south to the southeastern boundary of the Rincon Creek watershed. The Central Coast Regional Board has jurisdiction over a 300-mile-long by 40-mile-wide section of the state's central coast. Its geographic area encompasses all of Santa Cruz, San Benito, Monterey, San Luis Obispo, and Santa Barbara Counties, as well as the southern third of Santa Clara County and small portions of San Mateo, Kern, and Ventura Counties (Central Coast Regional Water Board 2019). Included in the region are urban areas such as the Monterey Peninsula and the Santa Barbara coastal plain; prime agricultural lands such as the Salinas, Santa Maria, and Lompoc Valleys; National Forest lands; extremely wet areas like the Santa Cruz Mountains; and arid areas like the Carrizo Plain. The coastline includes coastal water such as estuaries, lagoons, and coastal wetlands. The Central Coast Region is generally arid except for the Santa Cruz Mountains, but averages three times as much annual precipitation (12,090,000 acre-feet) as the Los Angeles Region, while having one-seventh the population (1.2 million versus 8 million).

Regional Board 4—Los Angeles

The Los Angeles Region includes the coastal watersheds and drainages that flow to the Pacific Ocean between Rincon Point on the western Ventura County coast and the eastern Los Angeles County line, as well as the drainages of Anacapa, San Nicolas, Santa Barbara, Santa Catalina, and San Clemente Islands (Los Angeles Regional Water Board 2014). The region also includes all coastal waters within 3 nautical miles of the continental and island coastlines. The coastline includes coastal water such as estuaries, lagoons, and coastal wetlands. The eastern regional boundary, formed by the Los Angeles County line, departs somewhat from the watershed divide; consequently, the Los Angeles and Santa Ana Regions share jurisdiction over watersheds along their common border.

The Los Angeles Region is approximately 4,447 square miles and encompasses most of Ventura and Los Angeles Counties, as well as very small portions of Kern and Santa Barbara Counties. Differences in topography are responsible for large variations in temperature, humidity, precipitation, and cloud cover throughout the region. With mild rainy winters and warm dry summers, the coastal plains and islands are noted for their subtropical Mediterranean climate. On the other hand, the inland slopes and basins of the Transverse Ranges are characterized by more extreme temperatures and little

precipitation. Precipitation in the region generally occurs as rainfall, although snowfall occurs at higher elevations. Most precipitation occurs during just a few major storms (Los Angeles Regional Water Board 2014).

Regional Board 5—Central Valley

The Central Valley Region covers the entire area included in the Sacramento and San Joaquin River drainage basins. Surface waters from the two drainage basins meet and form the Delta, which ultimately drains to San Francisco Bay. The basins are bounded by the crests of the Sierra Nevada on the east and the Coast Ranges and Klamath Mountains on the west. They extend approximately 400 miles from the California-Oregon border southward to the headwaters of the San Joaquin River. The Sacramento and San Joaquin River basins cover approximately 60,000 square miles, approximately one-fourth of the state's total area and more than 30 percent of its irrigable land. The principal streams in the Sacramento River basin are the Sacramento River and its larger tributaries: the Pit, Feather, Yuba, Bear, and American Rivers to the east; and Cottonwood, Stony, Cache, and Putah Creeks to the west. Major reservoirs and lakes include Shasta Lake, Lake Oroville, Folsom Lake, Clear Lake, and Lake Berryessa. The principal streams in the San Joaquin River basin are the San Joaquin River and its larger tributaries: the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno Rivers. Major reservoirs and lakes include Pardee, New Hogan, Millerton, McClure, Don Pedro, and New Melones.

The Central Valley Region includes all or parts of 37 of California's 58 counties: Modoc, Shasta, Siskiyou, Lassen, Plumas, Tehama, Butte, Glenn, Colusa, Lake, Sutter, Yuba, Sierra, Nevada, Placer, Yolo, Napa, Solano, Sacramento, El Dorado, Amador, Alpine, Calaveras, San Joaquin, Contra Costa, Stanislaus, Tuolumne, Merced, Mariposa, Madera, Kings, Fresno, Tulare, Kern, and very small portions of San Benito, San Luis Obispo, and Ventura Counties (Central Valley Regional Water Board 2018).

The Sacramento and San Joaquin Rivers furnish roughly 51 percent of California's water supply (Central Valley Regional Water Board 2018). Two major water projects, the federal Central Valley Project (CVP) and the State Water Project (SWP), deliver water from the Delta to Southern California, the San Joaquin Valley, the Tulare Lake Basin, and the San Francisco Bay Area, and within the Delta boundaries.

Regional Board 6—Lahontan

The Lahontan Region encompasses all watersheds within the boundaries of California that drain to the Great Basin. The Lahontan Region has historically been divided into the North and South Lahontan Basins at the boundary between the Mono Lake and East Walker River watersheds (Lahontan Regional Water Board 2016). Jurisdiction extends from California's northern border to the northern Mojave Desert and includes all of California's eastern border east of the Sierra Nevada crest. The region is approximately 570 miles long and has a total area of 39,210 square miles. The Lahontan Region includes all of Mono and Inyo Counties and parts of Modoc, Lassen, Sierra, Nevada, Placer, Alpine, Kern, San Bernardino, and Los Angeles Counties.

The Lahontan Region includes the highest and lowest points in the contiguous United States (Mount Whitney and Death Valley, respectively). The topography of the

remainder of the region is diverse. The Lahontan Region also has a variety of climates. The region is generally in a rain shadow; however, precipitation can be high—up to 70 inches annually—at higher elevations. Most precipitation in the mountainous areas falls as snow. Desert areas receive relatively little annual precipitation (less than 2 inches in some locations), but this can be concentrated and lead to flash flooding. Recorded temperature extremes in the Lahontan Region range from -45°F at Boca in the Truckee River watershed to 134°F in Death Valley.

Regional Board 7—Colorado River

The Colorado River Region encompasses all watersheds within the boundaries of California that drain to the Colorado River. The Colorado River Region covers approximately 13 million acres (20,000 square miles) in southeastern California. It includes all of Imperial County and portions of San Bernardino, Riverside, and San Diego Counties. This region is bounded for 40 miles on the northeast by Nevada; on the north by the New York, Providence, Granite, Old Dad, Bristol, Rodman, and Ord mountain ranges; on the west by the San Bernardino, San Jacinto, and Laguna mountain ranges; on the south by Mexico; and on the east by the Colorado River and Arizona. A significant geographical feature of the region is the Salton Trough, which contains the Salton Sea and the Coachella and Imperial Valleys. Much of the agricultural economy and industry of the region is located in the Salton Trough.

The region has the driest climate in California (Colorado River Regional Water Board 2019), with mild winters and hot summers. Temperatures range from below freezing to more than 120°F. Frost occurs in the Colorado River valleys and the Salton Trough. Snow falls in the region's higher elevations, with mean seasonal precipitation in the upper San Jacinto and San Bernardino Mountains ranging from 30 to 40 inches (Colorado River Regional Water Board 2019). Typical mean seasonal precipitation in the desert valleys is 3.6 inches at Indio and 3.2 inches at El Centro (Colorado River Regional Water Board 2019). Precipitation in the entire area occurs mostly from November through April, and in August and September, but its distribution and intensity are often sporadic. Local thunderstorms can contribute all of the average seasonal precipitation at one time, or only a trace of precipitation may be recorded at any locale for the entire season.

Regional Board 8—Santa Ana

In very broad terms, the Santa Ana Region is a group of connected inland basins and open coastal basins drained by surface streams flowing generally southwestward to the Pacific Ocean (Santa Ana Regional Water Board 2019). The coastline includes coastal water such as estuaries, lagoons, and coastal wetlands. Major bodies of water in this region include Anaheim and Newport Bays, the Santa Ana and Jacinto Rivers, and Lake Elsinore.

The Santa Ana Region is the smallest of the state’s nine regions (2,800 square miles) and is located in Southern California, roughly between Los Angeles and San Diego. The Santa Ana Region covers parts of southwestern San Bernardino County, western Riverside County, and northwestern Orange County. Although small, the region’s

4 million residents (1993 estimate) make it one of the most densely populated regions (Santa Ana Regional Water Board 2019).

The climate of the Santa Ana Region is Mediterranean: generally dry in the summer with mild, wet winters. The average annual rainfall in the region is about 15 inches, most of it occurring between November and March. Much of the area would be near-desert were it not for the influence of modern civilization (Santa Ana Regional Water Board 2019).

Regional Board 9—San Diego

The San Diego Region encompasses all watersheds that drain to the Pacific Ocean from the southern border of the Santa Ana Region's jurisdictional limits to the southern border of California (San Diego Regional Water Board 2016). The San Diego Region forms the southwest corner of California and occupies approximately 3,900 square miles.

This region encompasses most of San Diego County and parts of southwestern Riverside and Orange Counties. The western boundary of the San Diego Region consists of the Pacific Ocean coastline, which extends approximately 85 miles north from the United States and Mexico border. The coastline includes coastal water such as estuaries, lagoons, and coastal wetlands. The northern boundary is formed by the hydrologic divide that starts near Laguna Beach and extends inland through El Toro and easterly along the ridge of the Elsinore Mountains into the Cleveland National Forest. The eastern boundary is formed by the Laguna Mountains and other lesser-known mountains in the Cleveland National Forest. The southern boundary of the San Diego Region is formed by the United States/Mexico border.

The San Diego Region's coastal climate is generally mild. Temperatures average about 65°F and precipitation averages 10–13 inches. Proceeding inland, as elevations increase, average temperatures decline to 57°F in the Laguna Mountain area and precipitation increases to more than 45 inches in the Palomar Mountain area. Most precipitation falls during November through February. Variations in temperature and rainfall are larger in the inland portions (San Diego Regional Water Board 2016).

Overview of California Water Resources

Variability and uncertainty are the dominant characteristics of California's water resources. Precipitation is the primary source of California's water supply. Precipitation varies greatly from year to year, by season, and geographically throughout the state. Most snowfall and rainfall occur in the mountains in the northern and eastern areas of the state, and most water is used in the central and southern valleys and along the coast. In addition, the state's ecosystem and its agricultural and urban water users have variable demands with respect to water quantity, quality, timing, and place of use. In any given year, one of two threats often exist: The state's water systems may not have enough water to meet all water demands during droughts, or an excess of water causes floods (DWR 2013).

The amount and variability of precipitation, as well as temperature, differ dramatically between California's northern and southeastern regions. As such, statewide average information does not truly depict regional conditions and often overgeneralizes California's water conditions. Wet, average, and dry conditions presented for the entire

state are not often universally the same for individual regions. It is common during the same winter that the amount of winter precipitation varies from wet to above average in one part of the state, and that it varies from below average to dry in another part. The amount, types, and intensity of precipitation can also vary within each region in a given year and from year to year. This climatic variability compounds the difficulties of reducing flood risk, sustaining ecosystems, and enhancing water supply reliability (DWR 2013).

In an average water year (such as 2010), California receives about 200 million acre-feet (MAF) of water from precipitation and imports from Colorado, Oregon, and Mexico. Approximately 50–60 percent of this total supply is used by native vegetation; evaporates to the atmosphere; provides some of the water for agricultural crops and managed wetlands (referred to as “effective precipitation”); or flows to Oregon, Nevada, the Pacific Ocean, or salt sinks, such as saline groundwater aquifers and the Salton Sea. The remaining 40–50 percent, identified as dedicated or developed water supplies, is distributed among urban and agricultural uses for protecting and restoring the environment, or as storage in surface water and groundwater reservoirs for later use. In any year, some of the dedicated supply includes water used multiple times (reused water) and water that is held in storage from previous years. Ultimately, about one-third of the dedicated supply flows to the Pacific Ocean or to other salt sinks, in part to meet environmental water requirements for designated Wild and Scenic Rivers and other environmental requirements and objectives (DWR 2013).

The historical record also shows that California has frequently experienced long, multi-year droughts, as well as extremely wet years that coincide with substantial flooding (Hanak et al. 2011). Extended, intense droughts and more extreme floods will likely occur more frequently in the future because of climate change. From 2007 through early 2017, California experienced 9 years of below-average runoff and only 2 years out of 11 where precipitation has been above the long-term average. California’s recent 5-year drought has reinforced the understanding of the harmful effects of sustained dry periods on ecosystem health and the correlation between Delta exports and overall state water supply reliability. In stark contrast, historically high combined rainfall and snowpack in late 2016 and early 2017 called into question the capacity of flood management systems to accommodate future precipitation extremes.

To cope with this hydrologic variability and manage floods during wet years, federal, state, and local agencies have constructed a vast interconnected system of surface reservoirs, aqueducts, and water diversion facilities over the last 100 years. These projects work together to make water available at the right places and times and to move floodwaters. In the past, this system has allowed California to meet most of its agricultural and urban water management objectives, and flood management objectives (DWR 2013).

Hydrologic Resources

Surface Waters

For the purposes of the analysis in this PEIR, surface waters include streams, lakes, ponds, coastal waters, lagoons, and estuaries, or are found in floodplains, dry lakes, desert washes, wetlands, and other collection sites. Water bodies modified or

developed by humans, including reservoirs and aqueducts, are also considered surface waters. Surface water resources are diverse because of variations in tectonics, topography, geology/soils, climate, precipitation, and hydrologic conditions. Overall, California has the most diverse range of watershed conditions in the U.S., with varied climatic regimes ranging from Mediterranean climates with temperate rainforests in the north coast region to desert climates containing dry desert washes and dry lakes in the southern central region.

The water year (WY) is defined as starting on October 1 of the preceding year and ending on September 30 of the water year. The lowest statewide runoff on record is 15.5 MAF in WY 1977; the highest is 201.7 MAF in WY 1983 (USGS 2019). California has more than 60 major stream drainages and more than 1,000 smaller but still significant drainages that drain coastal mountains and inland mountainous areas. High snowpack levels and resultant spring snowmelt yield high surface runoff and peak discharge in the Sierra Nevada and Cascade Mountains that feed surface flows, fill reservoirs, and recharge groundwater. Federal, state, and local engineered water projects, aqueducts, canals, and reservoirs serve as the primary conduits of surface water sources to areas with limited surface water resources. Most of the surface water stored is transported for agricultural, urban, and rural residential needs to the San Francisco Bay Area and to cities and areas extending to southern coastal California. Surface water is also transported to southern inland areas, the Imperial Valley, and Central Valley areas.

Groundwater

Most runoff from snowmelt and rainfall flows down mountain streams into low-gradient valleys and either percolates into the ground or is discharged to the sea. This percolating flow is stored in alluvial groundwater basins that cover approximately 40 percent of the state (DWR 2003). Groundwater recharge occurs more readily in areas underlain by coarse sediments, primarily in mountain base alluvial fan settings. As a result, most of California's groundwater basins are located in broad alluvial valleys flanking mountain ranges, such as the Cascade Range, Coast Ranges, Transverse Ranges, and Sierra Nevada.

California's 250 major groundwater basins serve approximately 30 percent of the state's urban, agricultural, and industrial water needs, especially in the southern portion of the San Francisco Bay Area, the Central Valley, the greater Los Angeles area, and inland desert areas where surface water is limited. On average, more than 15 MAF of groundwater is extracted each year in the state, of which more than 50 percent is extracted from 36 groundwater basins in the Central Valley.

Water Quality

Land uses have a great effect on surface water and groundwater water quality in California. Both nonpoint- and point-source discharges of pollutants degrade surface water quality.

Nonpoint-source pollution is defined as not having a discrete or discernible source and is generated from land runoff, precipitation, atmospheric deposition, seepage, and hydrologic modification (EPA 2021). Nonpoint-source pollution includes runoff containing pesticides, insecticides, and herbicides from agricultural areas and

residential areas; acid drainage from inactive mines; bacteria and nutrients from septic systems and livestock; volatile organic compounds (VOCs) and toxic chemicals from urban runoff and industrial discharges; sediment from timber harvesting, poor road construction, improperly managed construction sites, and agricultural areas; and atmospheric deposition and hydromodification. In contrast, point-source pollution is generated from identifiable, confined, and discrete sources, such as a smokestack, sewer, pipe or culvert, or ditch.

These pollutant sources are regulated by the U.S. Environmental Protection Agency (EPA) and State Water Board through the Regional Boards. Many of the pollutants discharged from point sources are the same as for nonpoint sources, including municipal (bacteria and nutrients), agricultural (pesticides, herbicides, and insecticides), and industrial pollutants (VOCs and other toxic effluent).

Groundwater pollution or contamination is caused by the following sources:

- Naturally occurring or man-made chemicals that are discharged onto the land surface and percolate through to groundwater resources below.
- Flow into groundwater reservoirs through improperly sealed well casings.
- Leaking underground storage tanks.
- Failed underground pipelines.

Unintended backflow into wells can also occur when plumbing and pumping systems are not properly protected against backflow. Many of the sources of pollution and their toxic constituents are similar to those associated with surface water pollution. The most common groundwater pollutants are generated from nonpoint sources of salt, nitrite, pesticides, industrial effluent, and pathogens. Salt and nitrite contamination is the most common groundwater pollution and affects 10–15 percent of California's wells, mostly through various agricultural activities (Harter 2003). Recent long drought periods in the state have resulted in overdraft of groundwater aquifers as needs for water have increased in areas with limited surface water flow. Over-pumping increases the concentration of mineral salts in the depleted aquifer and could make the groundwater source unusable for drinking water and other beneficial uses.

Cyanobacterial harmful algal blooms (cyanoHABs), a water quality topic of concern, have been increasing since 2003 (Lehman et al. 2005). Increased occurrences of *Microcystis* cyanoHABs has been linked with increases in water temperatures which enables the growth rate of *Microcystis* to become competitive relative to other members of the phytoplankton community (Berg and Sutula 2015). A temperature threshold of 19 degrees Celsius (°C) has been identified as necessary to trigger growth of *Microcystis* in the Delta (Lehman et al. 2013), whereas temperatures of 25°C and above have been hypothesized to play a role in explaining its interannual variability (Lehman et al. 2018). Whereas water temperature appears to be a trigger for growth, other factors such as nutrient availability and high irradiance are necessary to sustain its growth and lead to the development of a bloom. In other words, once growth of *Microcystis* has been triggered, it cannot attain high enough growth rates to accumulate biomass and become dominant unless it can 1) maintain itself at the surface of the water column where

irradiance is high and 2) there is an ample supply of nutrients available in the water column at the start of the bloom (Visser et al. 2005). At any time during a bloom, if the nutrient supply is depleted or the water mixing rate increases such that the time *Microcystis* can spend at the surface becomes limited, cells may become stressed, and growth may slow down. An additional factor that will retard growth of *Microcystis* is exposure to saline water. This is evident when water containing *Microcystis* colonies is advected from the San Joaquin River into the lower Sacramento River or Suisun Bay; salinities in those regions are not conducive to growth resulting in the colonies breaking apart and blooms dissipating (Lehman et al. 2008). When *Microcystis* cells become sufficiently stressed, due to any environmental factor (e.g., light, nutrients, temperature, salinity), the colonies will settle out of the water column and the bloom will terminate (Visser et al. 1995).

Sedimentation

Sediment is considered a major pollutant according to EPA and the State Water Board and is a key total maximum daily load (TMDL) constituent that determines the impairment and 303(d) listing of impaired water bodies in a number of watersheds and river basins. Sediment is an issue for all nine Regional Boards, with water bodies of all types being affected. Sediment is of concern for many rivers and streams, estuaries, and bays and harbors. Approximately 61 percent of the North Coast Region drains to rivers and streams that are impaired by too much sediment (North Coast Regional Water Board 2017). In addition, several areas along the California coast have coastal regional sediment management plans to resolve sediment imbalance issues within their regions.

High sediment loads are harmful to beneficial uses, water quality, and aquatic habitats used by plant, amphibian, and fish communities. Erosion is influenced by various factors such as geology and soils, topography, climate, and land use practices. Sedimentation occurs when fine materials erode and are transported to a watercourse or water body, potentially increasing turbidity or resulting in elevated levels of total dissolved solids and total suspended solids. Erosion and sedimentation occur naturally but are substantially influenced by land management and land-disturbance activities.

Naturally occurring or background erosion and sedimentation are generally caused by several processes. The weathering of bedrock or saturation of soils in erosion-prone areas causes landslides, earthflows, debris flows, and other mass wasting–related processes, and lateral channel migration results in bank erosion. Channel downcutting and incision are also contributing factors. Precipitation, runoff, and wind on bare soil surfaces result in surface erosion.

Anthropogenic (related to human activity) causes of erosion and sedimentation are related to land management and land use; among these causes are timber harvesting, road building, construction activities, agriculture and grazing, and recreation. Timber harvesting, agriculture, mining, and other land-disturbing activities often result in scarification of the ground surface. The resulting areas of bare soil are susceptible to higher levels of surface runoff that could result in raindrop, sheet, and rill erosion; fluvial erosion, including from rills and gullies; and landslides. Poor road construction elements (such as undersized stream crossing culverts, long sections of undrained road surfaces and ditches leading directly to streams, and cut-and-fill road construction on steep

slopes) could generate large amounts of erosion in the form of surface erosion, gully erosion, and landsliding.

Erosion at construction sites can deliver sediment to streams and water bodies. Most erosion from construction sites is caused by rainfall, surface runoff, and wind on exposed bare soil areas, resulting in surface erosion and fluvial erosion (gullying). In California, the State Water Board (through the Regional Boards) requires storm water pollution protection plans (SWPPPs) for construction sites with more than 1 acre of disturbed soil area. The SWPPP provides best management practices that are intended to effectively control erosion and sedimentation by intercepting and dispersing concentrated flows and reducing soil detachment and transport.

Agricultural and ranching activities can also result in high levels of erosion and sedimentation. Agricultural sediment pollution is generated by surface runoff over tilled and fallow or retired croplands, and by irrigated croplands. Erosion and sedimentation from rangelands and dairy farming are generated from surface runoff on overgrazed and exposed pasturelands or rangelands and trampling of streambanks and sensitive areas.

Elevated turbidity can negatively affect fish populations by reducing their feeding success (finding prey) and causing respiratory distress (clogged gills). Fine sediment also fills the interstices of gravel and cobble stream bottoms that are important feeding and spawning habitats for California's threatened and listed fish species, such as coho salmon, Chinook salmon, steelhead trout, Lahontan and Paiute cutthroat trout, and Little Kern golden trout. Sedimentation can also impair important food sources, reduce habitat complexity, and cause the infilling of pools, thereby reducing cover from predators and increasing stream temperatures. Pollutants, such as bacteria and toxic chemicals, can attach to suspended sediment and settle onto the bottom of the streams or water bodies and, at high contaminant levels, can render surface water sources unusable and seriously degrade fish habitat.

Sedimentation also has severe effects on drinking water quality, the suitability of water for irrigation, and recreational uses. High sediment levels in drinking water can result in bad smell and taste, turbidity, suspended sediment, and toxic pollutants attached to suspended sediment particles. Irrigation waters can have serious impacts from sedimentation as pumps become clogged or impaired and dispersal systems become impaired. Sedimentation of streams and water bodies can reduce their recreational quality and usability for boating, sport fishing, and swimming; increase the number of boating and swimming accidents because of poor water clarity; and threaten public health through exposure to elevated levels of toxic chemicals, nutrients, and bacteria attached to suspended sediment in the water.

3.11.3 Regulatory Setting

This section discusses federal, state, and regional and local plans, policies, regulations, laws, and ordinances pertaining to hydrology and water quality.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration project requirements, depending on the project location.

Federal

Federal Emergency Management Agency–Related Laws and Regulations

The Federal Emergency Management Agency (FEMA) establishes and maintains minimum federal standards for floodplain management in the United States and its territories. The agency has a major role in managing and regulating floodplains. FEMA establishes minimum requirements for local communities' management of floodplain areas, which are defined as lowland and relatively flat areas adjoining inland and coastal waters that are subject to flooding.

FEMA also helps develop the Flood Insurance Rate Maps, which delineate the Special Flood Hazard Areas (SFHAs) and the risk premium zones applicable to the community for flood insurance purposes. An SFHA is defined as the area that will be inundated by the flood event having a 1 percent chance of being equaled or exceeded in any given year. The 1 percent annual chance flood is also referred to as the "base flood" or the "100-year flood" (FEMA 2020). "Development" is defined in the Code of Federal Regulations Title 44, 59.1(c). Per 44 Code of Federal Regulations and is any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

Floodplain Management Regulations

As described above, FEMA requires local communities to adopt and enforce floodplain management regulations that meet or exceed federal regulations for SFHAs to be eligible to participate in the National Flood Insurance Program (NFIP). SFHAs are subject to floodplain management regulations, including building limitations, and the mandatory purchase of flood insurance.

Federal floodplain regulations are set forth primarily in Code of Federal Regulations Title 44, Part 60.3 (40 CFR 60.3) and 44 CFR 65.12. These regulations are intended to address the need for effective floodplain management and provide assurance that the cumulative effects of floodplain encroachment do not cause a rise of more than 1 foot in the water surface elevation after the floodplain has been identified on the Flood Insurance Rate Map. Local flood ordinances can set a more stringent standard. The absence of a detailed study or floodway delineation places the burden on the project proponent to perform an appropriate engineering analysis to prepare hydrologic and hydraulic analyses consistent with FEMA standards. These analyses are then used to evaluate the proposed project "*with all other existing and anticipated development*" (44 CFR 60.3). Defining future anticipated development is difficult. The purpose of this requirement is to avoid inequitable encroachments into the floodplain.

Projects that would cause an increase in water surface elevations are subject to the provisions of 44 CFR 65.12, "*Revision of flood insurance rate maps to reflect base flood elevations caused by proposed encroachments*." Under this regulation, the project proponent either must demonstrate that the project would not affect the base flood elevation (i.e., elevate the surface water level from a flood with a 1 percent chance of equaling or exceeding that level in any given year) as identified on the Flood Insurance Rate Map, or must obtain a Conditional Letter of Map Revision before the project

receives a permit for construction. If the project would not affect the base flood elevation, it can be approved by the floodplain administrator for the community without receiving FEMA approvals or a Conditional Letter of Map Revision. However, the floodplain administrator can require a Conditional Letter of Map Revision if the project is believed to be sufficiently complex to warrant FEMA's review. The minimum federal regulatory requirement related to encroachments into the floodway is defined by 44 CFR 60.3(d)(3):

> *Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.*

This regulation applies only to encroachments into the floodway. When such an encroachment may occur, the appropriate FEMA effective hydraulic model for the area should be used to evaluate the impacts of and mitigation options for the encroachment. A "FEMA effective hydraulic model" is a computer model that has met the requirements of NFIP regulations and is authorized for use in mapping flood hazards.

Levee Design and Maintenance Requirements

For levees to be accredited by FEMA, and to allow communities to participate in the NFIP's Preferred Risk programs, evidence must be provided that adequate design and operations and maintenance (O&M) systems are in place to provide reasonable assurance of protection from the base flood (1 percent annual chance of exceedance or 100-year flood). These requirements are outlined in 44 CFR 65.10.

U.S. Army Corps of Engineers–Related Laws and Regulations

This discussion presents an overview of the U.S. Army Corps of Engineers' (USACE's) regulatory responsibilities that apply to navigable waters and construction within the ordinary high-water mark or other waters of the United States. In addition, USACE constructs flood control and risk management projects, monitors O&M work for those projects, and provides emergency response to floods.

Flood Control Act of 1917

The Flood Control Act of 1917 was enacted in response to costly floods that occurred in the Sacramento Valley and elsewhere in the United States between 1907 and 1913. The law authorized the formation of the federal/state Sacramento River Flood Control Project, which includes various levees, weirs, control structures, bypass channels, and river channels in the Delta and its watershed. The 1917 law was modified and extended by the Flood Control Acts of 1928, 1936, and 1941.

Flood Control Act of 1936

The Flood Control Act of 1936 established a nationwide policy that flood control on navigable waters or their tributaries is in the interest of the general public welfare, and is therefore a proper activity of the federal government, in cooperation with state and local

entities. The Flood Control Act of 1936, its amendments, and subsequent legislation specify the details of federal participation. Projects are either specifically authorized through legislation by Congress or through a blanket funding authority for small projects.

Operations and Maintenance of Flood Control Projects

Routine O&M activities for federal project levee structures and facilities are discussed in 33 CFR 208.10. According to these regulations (33 CFR 208.10 [5]):

> *No improvement shall be passed over, under, or through the walls, levees, improved channels or floodways, nor shall any excavation or construction be permitted within the limits of the project right-of-way, nor shall any change be made in any feature of the works without prior determination by the District Engineer of the Department of the Army or his authorized representative that such improvement, excavation, construction, or alteration will not adversely affect the functioning of the protective facilities.*

This regulation is the basis for requiring a permit before any construction at federal project levees. Types of alterations and modifications typically covered by a Section 208 permit include bridges, pump houses, stairs, pipelines, bike trails, and power poles. Major modifications or improvements to levees require approval through a Section 408 permit process (described below).

Clean Water Act

The Federal Water Pollution Control Act Amendments of 1972, also known as the Clean Water Act (CWA), established the institutional structure for EPA to regulate discharges of pollutants into the waters of the United States, establish water quality standards, conduct planning studies, and provide funding for specific grant projects. Congress has amended the CWA several times since 1972.

EPA has delegated to most states the authority to administer many provisions of the CWA. In California, the State Water Board has been designated by EPA to develop and enforce water quality objectives and implementation plans.

Section 303

Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the United States. The three major components of water quality standards are designated users, water quality criteria, and antidegradation policy. Section 303(d) of the CWA requires states and authorized Native American tribes to develop a list of water quality–impaired segments of waterways. The list includes waters that do not meet water quality standards necessary to support the beneficial uses of a waterway, even after point sources of pollution have installed the minimum required levels of pollution control technology. The list includes only waters impaired by “pollutants” (clean sediments, nutrients such as nitrogen and phosphorus, pathogens, acids/bases, temperature, metals, cyanide, and synthetic organic chemicals [EPA 2017]), not those impaired by other types of “pollution” (e.g., altered flow, channel modification).

CWA Section 303(d) also requires states to maintain a list of impaired water bodies so that a total maximum daily load (TMDL) can be established. A TMDL is a plan to restore

the beneficial uses of a stream, or to otherwise correct impairment. It establishes the allowable pollutant loadings or other quantifiable parameters (e.g., pH, temperature) for a water body, thereby providing the basis for establishing water quality–based controls. The calculation for establishing TMDLs for each water body must include a margin of safety to ensure that the water body can be used for the purposes designated by the state. The calculation also must account for seasonal variations in water quality (EPA 2017).

Water quality criteria are designed to protect beneficial uses. Ambient surface water quality may be judged against national and state water quality criteria and specific numeric objectives.

Section 401

In California, Section 401 water quality certification is the responsibility of the Water Boards, which certify that an activity is consistent with state-issued water quality control plans, called basin plans. Section 401 requires federal agencies to obtain certification from the state or Native American tribes before issuing permits that would increase pollutant loads to a water body. The certification is issued only if such increased loads would not cause or contribute to exceedances of water quality standards.

Section 402

Section 402 of the CWA established the National Pollutant Discharge Elimination System (NPDES) permit program to regulate point-source and nonpoint-source discharges of pollutants into waters of the United States. An NPDES permit sets specific limits for discharges of pollutants into waters of the United States and establishes monitoring and reporting requirements, as well as special conditions. The Regional Boards typically issue NPDES permits for a 5-year period. The NPDES permits are issued for long-term discharges, including discharges from wastewater treatment plants, and temporary discharges, such as discharges during construction activities. The State Water Board has adopted a Statewide Permit for Stormwater Discharges Associated with Construction Activity (Construction General Permit, Order 2009-0009-DWQ) for construction sites where 1 or more acres of soil would be disturbed. The Construction General Permit requires, among other actions, the implementation of mandatory best management practices, including pollution/sediment/spill control plans, training, sampling, and monitoring for non-visible pollutants.

Section 404

Section 404 of the CWA establishes programs to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. Under Section 404, any person or public agency proposing to locate a structure, excavate, or discharge dredged or fill material into waters of the United States, or to transport dredged material for the purpose of dumping it into ocean waters, must obtain a permit from USACE. The extent of waters of the United States is defined in 33 CFR 230.3(s) and clarified in USACE Regulatory Guidance Letters. Section 404(b)(1) guidelines provide environmental criteria and other guidance used in evaluating proposed discharges of dredged materials into waters of the United States.

Rivers and Harbors Act of 1899

The Secretary of the Army, on the recommendation of the Chief of Engineers, may grant permission for the temporary occupation or use of any seawall, bulkhead, jetty, dike, levee, wharf, pier, or other work built by the United States (U.S. Code Title 33, Part 408 and Section 14 of the Rivers and Harbors Act of 1899). This permission is granted by an appropriate real estate instrument in accordance with existing regulations. This regulation requires parties other than USACE seeking to modify federal project levees to obtain a permit. Types of alterations that typically require a Section 408 permit are major modifications such as degradations, raisings, and realignments of levees, and installation of structures that span levees, such as bridges.

Sections 9 and 10 of the Rivers and Harbors Act of 1899 authorize USACE to regulate the construction of any structure or work within navigable waters. The Rivers and Harbors Act also authorizes USACE to regulate the construction of infrastructure or modifications affecting the course, location, condition, or capacity of navigable waters. USACE's jurisdiction under the Rivers and Harbors Act is limited to "navigable waters," or waters subject to the ebb and flow of the tide shoreward to the mean high-water mark that may be used to transport interstate or foreign commerce. USACE must consider the following criteria when evaluating projects within navigable waters:

- The public and private need for the activity
- Reasonable alternative locations and methods
- Beneficial and detrimental effects on the public and private uses to which the area is suited

Central Valley Project Improvement Act

The Central Valley Project Improvement Act (CVPIA), enacted by Congress in 1992, amended the authorization of the Central Valley Project to include fish and wildlife protection, restoration, and mitigation as project purposes of the CVP having equal priority with irrigation, domestic uses, and power generation. The CVPIA is discussed in further detail in Section 3.6, *Biological Resources—Aquatic.*

Coastal Zone Management Act

Congress recognized the importance of meeting the challenge of continued growth in the coastal zone by enacting the Coastal Zone Management Act (CZMA) in 1972. The CZMA, administered by the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management, provides federal incentives for states to manage and protect their coastal resources.

The CZMA outlines two national programs, the National Coastal Zone Management Program and the National Estuarine Research Reserve System. The Coastal Zone Management Program encourages states to prepare coastal zone management programs that meet specified requirements and submit them to the Office of Ocean and Coastal Resource Management for approval. In exchange for an approved program, the state becomes eligible for federal funding assistance, among other things. The overall objectives of the CZMA are to "*preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone.*"

The CZMA requires project proponents for federal permits and licenses and federal agencies proposing activities in the coastal zone that may affect coastal resources to obtain certification that the project is consistent with the state's coastal zone management program.

California has an approved coastal zone management program. The California Coastal Commission is the lead state agency responsible for implementing and enforcing the program. The coastal zone established by the Coastal Zone Management Act does not include San Francisco Bay, where development is regulated by the BCDC. In February 1977, the U.S. Department of Commerce approved the Commission's coastal management program for the San Francisco Bay segment of the California coastal zone. The Commission's coastal management program is based on the provisions and policies of the McAteer-Petris Act (discussed under State regulations), the Suisun Marsh Preservation Act of 1977, the San Francisco Bay Plan, the Suisun Marsh Protection Plan, and the Commission's administrative regulations.

Coordinated Operations Agreement

The SWP and CVP use a common water supply in the Delta. The State Water Board places conditions on the SWP's and CVP's associated water rights individually and jointly to protect the beneficial uses of water in the Sacramento Valley and the Delta estuary. The Coordinated Operations Agreement (Public Law 99-546), signed in 1986, defines the SWP and CVP facilities and their water supplies; sets forth procedures for coordination of operations; identifies formulas for sharing joint responsibilities for meeting standards; sets up a framework for the exchange of water and services between the SWP and CVP; and provides for periodic review of the agreement.

Executive Order 11988, Floodplain Management, and Executive Order 13690, Establishing a Federal Flood Risk Management Standard

Under Executive Order 11988 (1977), all federal agencies are charged with floodplain management responsibilities when planning or designing federally funded projects, or when considering permit applications for which a federal agency has review and approval authority. These responsibilities include acting to reduce the risks of flood losses, including adverse impacts on human safety, health, and welfare. Federal agencies are also responsible for restoring the natural and beneficial values of floodplains. If a proposed action is located within a floodplain, measures should be identified to minimize flood hazards, and floodplain mitigation requirements should be incorporated into the proposed action.

Executive Order 13690 (2015) revised Executive Order 11988. Executive Order 13690 directed the development of a new Federal Flood Risk Management Standard; required the use of an expanded floodplain for some federal investments; directed federal agencies, where possible, to use natural or nature-based approaches (considering ecosystem functions); and established the policy of the United States to improve the resilience of communities and federal assets against the impacts of flooding, recognizing the risks posed by climate change.

Executive Order 11990, Protection of Wetlands

This executive order directs federal agencies to provide leadership and act to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in implementing civil works.

Endangered Species Act—Biological Opinions on the Long-Term Operations of the Central Valley Project and State Water Project

The U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) released their biological opinions (BOs) on the long-term operations of the CVP and SWP in 2008 and 2009, respectively (USFWS 2008; NMFS 2009). The 2008 USFWS BO and 2009 NMFS BO included Reasonable and Prudent Alternatives to avoid jeopardy to fish species. The Reasonable and Prudent Alternatives included conditions for revised water operations, habitat restoration and enhancement actions, and fish passage actions.

Lawsuits challenged the NMFS and USFWS BOs under the Endangered Species Act (FESA) and the Administrative Procedure Act concerning the effects of the CVP and SWP on endangered fish species. Because the 2008 and 2009 BOs have been upheld by the Ninth Circuit Court of Appeals, they contain the most recent estimate of potential changes in water operations that could occur in the near future.

In August 2016, the U.S. Bureau of Reclamation (Reclamation) requested re-initiation of FESA Section 7 consultation with USFWS and NMFS on the long-term operation of the CVP and SWP. This consultation is expected to update the system-wide operating criteria for the long-term operation consistent with Section 7 requirements, to investigate the potential of including new conservation measures for listed species, and to review the existing Reasonable and Prudent Alternative actions included in the 2008 USFWS BO and 2009 NMFS BO to determine their continued substance and efficacy in meeting the requirements of FESA Section 7. However, the requirements in the 2008 USFWS BO and 2009 NMFS BO continue to affect the operational criteria for the CVP and SWP.

On August 2, 2016, Reclamation (the lead federal agency) and the California Department of Water Resources (DWR) (the applicant) jointly requested the re-initiation of FESA consultation on the coordinated long-term operation of the CVP and SWP. USFWS accepted the re-initiation request on August 3, 2016.

On January 31, 2019, Reclamation transmitted its biological assessment to USFWS. The biological assessment identified the purpose of the action as "*…to continue the coordinated long-term operation of the CVP and SWP to maximize water supply delivery and optimize power generation consistent with applicable laws, contractual obligations, and agreements; and to increase operational flexibility by focusing on nonoperational measures to avoid significant adverse effects.*"

USFWS finalized its BO on the coordinated operations of the CVP and SWP on October 21, 2019. USFWS evaluated the impact of CVP/SWP water operations on imperiled species including delta smelt and 15 terrestrial species that could be affected. The proposal includes habitat management measures in the Delta and entrainment management related to water exports in the South Delta. Ultimately, USFWS has

concluded that Reclamation's proposed operations will not jeopardize threatened or endangered species or adversely modify their designated critical habitat.

Federal Antidegradation Policy

The Secretary of the Interior established the first antidegradation policy in 1968. In 1975, EPA included the antidegradation requirements in the Water Quality Standards Regulation (40 CFR 130.17, 40 CFR 55340–55341). The requirements were included in the 1987 CWA amendment in Section 303(d)(4)(B). The federal antidegradation policy requires states to develop regulations to allow an increase in pollutant loadings or changes in surface water quality only in the following cases:

- Existing surface water uses are maintained and protected, and established water quality requirements are met.
- If a project cannot maintain water quality requirements, water quality is maintained to fully protect "fishable/swimmable" uses and other existing uses.
- In Outstanding National Resource Waters, "States may allow some limited activities which result in temporary and short-term changes in water quality" (Water Quality Standards Regulations) but would not affect existing uses or special use that makes the water an Outstanding National Resource Water.

Federal Safe Drinking Water Act

The Safe Drinking Water Act was originally enacted by Congress in 1974, to protect public health by regulating the nation's public drinking water supply. The Safe Drinking Water Act authorizes EPA to set national health-based standards for drinking water to protect against both naturally occurring and human-made contaminants that may be found in drinking water. The law, amended in 1986 and 1996, requires many actions to protect drinking water and its sources, including rivers, lakes, reservoirs, springs, and groundwater wells.

Implementation of the CALFED Bay-Delta Record of Decision

In the CALFED Bay-Delta Program (CALFED) Record of Decision issued August 28, 2000, Reclamation and other federal and state agencies committed to implementing a long-term plan to restore the Bay-Delta (CALFED 2000). This plan consists of many elements: storage, conveyance, ecosystem restoration, levee integrity, watersheds, water supply reliability, water use efficiency, water quality, water transfers, and science. The Implementation Memorandum of Understanding, also signed August 28, 2000, continued the operational decision-making process that had evolved through the CALFED process. The record of decision identified numerous programs, including the Environmental Water Account to protect fish in the Bay-Delta estuary through environmentally beneficial changes to SWP/CVP operations at no loss of uncompensated water costs to the SWP and CVP water users. This project expired in 2009; however, specific provisions may be considered in future operations.

National Toxics Rule

EPA established the National Toxics Rule in 1992 to provide ambient water quality criteria for priority toxic pollutants to protect aquatic life and human health in accordance with CWA Section 303.

Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act designates qualifying free-flowing river segments as wild, scenic, or recreational. The law establishes requirements applicable to water resource projects affecting wild, scenic, or recreational rivers within the National Wild and Scenic Rivers System, as well as rivers designated on the National Rivers Inventory.

Under the Wild and Scenic Rivers Act, a federal agency may not assist the construction of a water resources project that would have a direct and adverse effect on the free-flowing, scenic, and natural values of a wild or scenic river. If the project would affect the free-flowing characteristics of a designated river or unreasonably diminish the scenic, recreational, and fish and wildlife values present in the area, such activities should be undertaken in a manner that would minimize adverse impacts and is consistent with the management plan for the affected wild and scenic river, as administered by the managing federal agency for designated rivers (U.S. Forest Service, Bureau of Land Management, National Park Service, or U.S. Fish and Wildlife Service), often in partnership with local communities. CWA section 404 permitting processes also require that permitted activities not impact the designated river's wild and scenic values and "outstandingly remarkable" resources. State and local ordinances may further protect nationally designated wild and scenic rivers or reaches of designated rivers.

Trinity River Mainstem Fishery Restoration

This topic is discussed in Section 3.6, *Biological Resources—Aquatic*.

Bay-Delta Accord of 1994

The Bay- Delta Accord, signed in 1994, established interim Bay-Delta standards supported by both the State and federal governments and allowed the federal government to return primary control over Bay-Delta water management to the State. It committed water users to provide money and water to improve the Bay-Delta ecosystem, and in return guaranteed a 3-year reprieve from additional species protection requirements. In addition, the accord started a long-term planning process to find comprehensive solutions to the environmental and water supply problems in the Bay-Delta. The CALFED Bay-Delta program, a collaborative State/federal effort, was tasked to identify a package of projects and programs to restore the Bay-Delta's ecosystem and improve water supply reliability and water quality.

State

Central Valley Flood Protection Board

The Central Valley Flood Protection Board (CVFPB), previously known as The Reclamation Board, was created in 1911. Its purpose was to help manage flood risks in the Central Valley on a system wide basis through the development of a comprehensive flood control plan for the Sacramento and San Joaquin Rivers, and to act as the

nonfederal sponsor for federal flood control projects in the Central Valley. The CVFPB has jurisdiction throughout the Sacramento and San Joaquin Valleys, which is synonymous with the drainage basins of the Central Valley and includes the Sacramento–San Joaquin Drainage District.

An encroachment permit from the CVFPB is required for every proposal or plan of work that:

(1) Is located between or in the vicinity of any project levees.

(2) Is located within a CVFPB easement.

(3) Is located within a designated floodway that has been adopted by the CVFPB.

(4) Is located within 30 feet of a non-leveed regulated stream listed in California Code of Regulations Title 23, Division 1, Article 8, Table 8.1.

(5) May have a negative effect on any adopted plan of flood control.

Title 23 of the California Code of Regulations and the Water Code provide guidance to DWR and the CVFPB on enforcement of appropriate standards for flood control projects in the Central Valley. These codes authorize DWR and the CVFPB to enforce standards for erecting, maintaining, and operating levees, channels, and other flood control works within their jurisdictions.

Delta Protection Act of 1959

The Delta Protection Act (Water Code Sections 12200–12205) was enacted in 1959 for the protection, conservation, development, control, and use of the waters in the Delta for the public good. This law was enacted at the same session in which the Legislature enacted the Burns-Porter Act, financing the initial facilities of the State Water Resources Development System (now known as the SWP). The Delta Protection Act of 1959 required the SWP, in conjunction with the federal CVP, to provide salinity control and an adequate water supply for the users of water in the Delta.

Delta Protection Act of 1992

The Delta Protection Act (Public Resources Code Sections 29700–29716) includes a series of findings and declarations regarding the quality of the Delta environment and emphasizes the national, state, and local importance of protecting the Delta's unique resources. The law mandated a state-level planning effort to address the needs of Delta communities. The Delta Protection Commission was made a permanent state agency in 2000 because a need for continued planning and management was identified.

McAteer-Petris Act

The McAteer-Petris Act, enacted on September 17, 1965, was enacted to preserve San Francisco Bay from indiscriminate filling. The law established the BCDC as a temporary state agency charged with preparing a plan for the long-term use of the bay and regulating development in and around the bay. To this end, BCDC prepared the San Francisco Bay Plan (Bay Plan).

In August 1969, the McAteer-Petris Act was amended to make BCDC a permanent agency and to incorporate the policies of the Bay Plan into state law. The Bay Plan includes findings and policies on San Francisco Bay as a resource and on developing the bay and shoreline. In addition to the findings and policies, the Bay Plan contains maps that apply these policies to the bay and shoreline, including the open water, marshes, and mudflats of Suisun Marsh. BCDC conducts the regulatory and permitting process in accordance with the Bay Plan policies and maps. The San Francisco Bay Plan is a CZMA coastal management plan.

Delta Reform Act of 2009 and Delta Plan

The mission of the Delta Stewardship Council is to promote the coequal goals of water supply reliability and ecosystem restoration in a manner that protects and enhances the unique values of the Delta as an evolving place (Water Code Section 85054). The council has a legally enforceable management framework for the Delta and Suisun Marsh called the Delta Plan, which applies best available science to further the coequal goals.

The Delta Stewardship Council was granted specific regulatory and appellate authority by the Legislature under the 2009 Delta Reform Act over certain actions that take place in the Delta or Suisun Marsh, in whole or in part. The council exercises that authority by developing and implementing the Delta Plan and its accompanying regulations.

According to the Delta Reform Act, state or local agencies approving, funding, or carrying out projects, plans, or programs, upon determining that their project is a “permitted action” subject to regulations of the Delta Plan, must certify the consistency of the project with the Delta Plan policies (Water Code Section 85225).

California Water Rights

California has a dual system for water rights: Both the riparian doctrine and the prior-appropriation doctrine apply. Riparian rights result from the ownership of land bordering a surface water source and are normally senior in priority to most appropriative rights. Owners with riparian water rights may use natural flows directly for beneficial purposes on adjoining lands without a permit from the State Water Board.

The State Water Board oversees water rights and water quality functions in California. It issues permits and licenses for appropriating water from surface and subterranean streams flowing through known and definite channels. The California courts have jurisdiction over the use of infiltrating groundwater, riparian use of surface waters, and the appropriative use of surface waters from diversions begun before 1914. Restoration projects permitted under the Order need additional approval from the State Water Board for new or modified water rights.

Urban Water Management Planning Act

The Urban Water Management Planning Act (Water Code Sections 10610–10657) requires all urban water suppliers that have more than 3,000 service connections, or that use more than 3,000 acre-feet of water annually, to submit an urban water management plan to DWR every 5 years and update the plan on or before December 31 in years ending in 5 and 0. Senate Bill (SB) 318 (2004) is the 18th and most recent amendment to the original bill, enacted in 1983, requiring preparation of urban water

management plans. Amendments to SB 318 have focused on ensuring that the urban water management plan emphasizes and addresses drought contingency planning, water demand management, reclamation, desalination and groundwater resources.

California Safe Drinking Water Act

The California Safe Drinking Water Act (Health and Safety Code Sections 4010–4039.6) authorizes the California Department of Public Health to establish maximum contaminant levels that are at least as stringent as those required by USEPA under the federal Safe Drinking Water Act (as discussed in Section 3.10.3, *Regulatory Setting*, in Section 3.10, *Hazards and Hazardous Materials*). The California Department of Public Health has established maximum contaminant levels for contaminants that may occur in public water systems, including all substances for which federal maximum contaminant levels exist, and may have adverse health effects. Operators of public water systems in California must meet federal and state drinking water standards.

California Surface Water Treatment Rule

The California Surface Water Treatment Rule satisfies three specific requirements of the Safe Drinking Water Act for surface waters by:

- Establishing criteria for determining when filtration is required.
- Defining minimum disinfection levels.
- Addressing certain bacteria, viruses, turbidity, and heterotrophic plate count by setting a treatment technique.

The Surface Water Treatment Rule applies to all drinking water supply activities in California. The California Department of Public Health oversees implementation of this rule.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) established the State Water Board and divided the state into nine regions, each overseen by a Regional Board. The nine Regional Boards have primary responsibility for the coordination and control of water quality within their respective jurisdictional boundaries. Under the Porter-Cologne Act, water quality objectives are limits or levels of water quality constituents or characteristics established for the protection of beneficial uses.

The Porter-Cologne Act requires the Regional Boards to establish water quality objectives while acknowledging that water quality may be changed to some degree without unreasonably affecting beneficial uses. Designated beneficial uses, together with the corresponding water quality objectives, and an antidegradation policy also constitute water quality standards under the federal Clean Water Act. The water quality objectives provide requirements for water quality control.

If USACE determines that only non-federal waters are present in the restoration project area, then no federal CWA permit would be required. Regardless of federal jurisdiction, however, the project will require a permit, or waste discharge requirements (WDRs), for impacts to any waters of the state. The WDRs would be issued by the appropriate Regional Board or, for statewide or multi-regional projects, by the State Water Board.

Under the Porter-Cologne Act, discharges to all waters of the state, including all wetlands and other waters of the state (including but not limited to isolated wetlands), are subject to state regulation.

A discharger whose project disturbs one or more acres of soil, or disturbs less than 1 acre but is part of a larger common plan of development that in total disturbs 1 or more acres, must obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities, Construction General Permit Order No. 2009-009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, and disturbances to the ground such as stockpiling or excavation; however, it does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a storm water pollution prevention plan (SWPPP).

Water Quality Control Plans

Under the Porter-Cologne Act, waters of the state fall under jurisdiction of the State Water Board and the nine Regional Boards. “Waters of the state” means any surface water or groundwater, including saline waters, within the boundaries of the state (Water Code Section 13050[e]). The State Water Board and Regional Boards have been delegated federal authority to implement the requirements of the federal CWA in California, including issuing NPDES permits, under the Porter-Cologne Act. However, the requirements of the Porter-Cologne Act are even broader than those of the CWA. The Porter-Cologne Act requires the Regional Boards to prepare and periodically update water quality control plans, also known as basin plans. Each basin plan establishes water quality objectives sufficient to ensure that the designated beneficial uses of surface water and groundwater are reasonably protected, and actions to control nonpoint and point sources of pollution.

Any person who discharges or proposes to discharge any waste that could affect the quality of the waters of the state must file a “report of waste discharge” with the appropriate Regional Board. “Waste” includes any and all waste substances associated with human habitation, of human or animal origin, or from any producing, manufacturing, or processing operation (Water Code Section 13050[d]). Upon receipt of a report of waste discharge, the Regional Board may issue “waste discharge requirements” designed to ensure compliance with applicable water quality objectives and other requirements of the basin plan.

A public review process is conducted every 3 years to identify and prioritize the actions needed to address water quality concerns and maintain the effectiveness of the basin plan. Amendments to basin plans may include site-specific water quality objectives for a single constituent, basin-wide control programs for a suite of potential pollutants, and/or policy recommendations and strategies for addressing emerging contaminants and/or climate change.

State Water Resources Control Board Statement of Policy with Respect to Maintaining High Quality of Waters in California

In 1968, the State Water Board adopted a policy (Resolution No. 68-16, frequently referred to as the "Anti-degradation Policy") that if water quality is better than the

adopted water quality requirements of the State Water Board, the higher water quality shall be maintained until it is demonstrated that the change in water quality will be consistent with maximum benefit to the people of the state, will not unreasonably affect present and anticipated beneficial uses, and will not result in water quality less than prescribed in adopted policies. The policy also stated that any activity that discharges or proposes to discharge wastes to waters with higher water quality than specified in adopted policies must implement best practicable treatment or must provide that a pollution or nuisance will not occur and that the highest water quality consistent with the maximum benefit to the people of the state will be maintained.

In July 1990, the State Water Board issued an administrative procedures update to the Regional Boards, describing procedures for findings that would allow degradation of water quality if balanced against the benefit to the public of the activity that caused the water quality degradation. The administrative procedures update stated that the findings should indicate the pollutants that will lower water quality, the socioeconomic and public benefit of the action, and the beneficial uses affected.

Water Quality Criteria for Toxics

The *Policy for Implementing Toxic Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* is referred to as the State Implementation Policy. This state policy for water quality control was adopted by the State Water Board on March 2, 2000 and became effective by May 22, 2000. The policy applies to discharges of toxic pollutants into the inland surface waters, enclosed bays, and estuaries of California subject to regulation under the state Porter-Cologne Act (Division 7 of the Water Code) and the federal Clean Water Act. Such regulation may occur by issuing National Pollutant Discharge Elimination System permits, or through other relevant regulatory approaches. This policy establishes:

- Provisions for implementing priority pollutant criteria promulgated by EPA through the National Toxics Rule (40 CFR 131.36) (promulgated December 22, 1992 and amended May 4, 1995) and through the California Toxics Rule (40 CFR 131.38) (promulgated May 18, 2000, and amended February 13, 2001), and for priority pollutant objectives established by Regional Water Quality Control Boards in their water quality control plans.
- Monitoring requirements for 2,3,7,8-TCDD equivalents.
- Chronic toxicity control provisions.

In addition, the policy includes special provisions for certain types of discharges and factors that could affect the application of other provisions in the policy.

The California Toxics Rule is applicable to all state waters, as are the EPA advisory National Recommended Water Quality Criteria.

State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State

The State Water Board adopted the *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* (Discharge Procedures),

for inclusion in the forthcoming *Water Quality Control Plan for Inland Surface Waters and Enclosed Bays and Estuaries and Ocean Waters of California,* effective May 28, 2020. The Discharge Procedures consist of four major elements: (1) a wetland definition; (2) a framework for determining whether a feature that meets the wetland definition is a water of the state; (3) wetland delineation procedures; and (4) procedures for the submittal, review, and approval of applications for water quality certifications and waste discharge requirements for dredged or fill activities.

The Discharge Procedures, formerly known as the *Wetland Riparian Area Protection Policy,* have been renamed to communicate that the procedures apply to discharges of dredged or fill material to all waters of the state, not just wetlands.

Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA) was enacted in September 2014. The SGMA establishes a new structure for locally managing California's groundwater in addition to the existing groundwater management provisions established by Assembly Bill (AB) 3030 (1992), SB 1938 (2002), and AB 359 (2011), as well as SBX7 6 (2009). The SGMA includes the following key elements:

- Provides for the establishment of a groundwater sustainability agency (GSA) by one or more local agencies overlying a designated groundwater basin or sub-basin identified in DWR Bulletin 118-03
- Requires all DWR Bulletin 118 groundwater basins found to be of "high" or "medium" priorities to prepare groundwater sustainability plans (GSPs)
- Provides for the proposed revisions, by local agencies, to the boundaries of a DWR Bulletin 118 basin, including the establishment of new sub-basins
- Authorizes DWR to adopt regulations for the development of GSPs and review the GSPs for compliance every 5 years
- Requires DWR to establish best management practices and technical measures for GSAs to develop and implement GSPs
- Provides regulatory authority to the State Water Board for developing and implementing interim GSPs under certain circumstances (such as lack of compliance with development of GSPs by GSAs)

The SGMA defines sustainable groundwater management as "the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results." Undesirable results are defined as any of the following effects:

- Chronic lowering of groundwater levels
- Significant and unreasonable reduction of groundwater storage
- Significant and unreasonable seawater intrusion

- Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies
- Significant and unreasonable land subsidence that substantially interferes with surface land uses
- Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water

Based on the basin priority definitions included in DWR's California Statewide Groundwater Elevation Monitoring program in June 2014 and confirmed in January 2015, the SGMA required that GSPs be formed by 2020 or 2022. GSPs were required by 2020 for medium- and high-priority basins identified as subject to critical overdraft conditions. GSPs must be completed for all other high- and medium-priority basins by 2022. Sustainable groundwater operations must be achieved within 20 years after completion of the GSPs.

Assembly Bill 3030: Groundwater Management Act (2002)

The Groundwater Management Act (Water Code Sections 10750–10756; AB 3030) provides a systematic procedure for an existing local agency to develop a groundwater management plan. This law provides agencies with the powers of a water replenishment district to raise revenue to pay for facilities to manage the basin (extraction, recharge, conveyance, quality).

Many agencies have adopted groundwater management plans in accordance with AB 3030. AB 3030 allows certain defined existing local agencies to develop a groundwater management plan for groundwater basins.

State Water Board Comprehensive Response to Climate Change

On March 7, 2017, the State Water Board adopted Resolution No. 2017-0012, Comprehensive Response to Climate Change. This resolution identified the potential for the use of recycled water to reduce greenhouse gas emissions if the recycled water replaces existing or future, higher carbon water supplies. Where feasible, recycled water should be treated to meet appropriate water safety standards for the intended use to meet local water supply needs. Resolution No. 2017-0012 directed staff to coordinate with the Regional Boards to make annual reporting of recycled water data a requirement of waste discharge permits and water reclamation requirements, and to work with the State Water Board's Division of Information Technology to develop an online data entry system to track the use of recycled water.

Regional and Local

The study area encompasses multiple counties and cities throughout California. Each county and city has local regulations and a general plan with policies related to hydrology and water quality. These may include goals and policies related to water service, water resources, stormwater, and groundwater. Local entities may also have mapped flood hazard areas, in addition to those mapped by FEMA, and local ordinances may regulate activities in those areas.

3.11.4 Impacts and Mitigation Measures

Methods of Analysis

Hydrology and water quality impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could impact existing hydrology and water quality. However, the precise locations and detailed characteristics of potential future individual restoration projects are yet to be determined. Therefore, this hydrology and water quality analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis.

Permanent impacts are considered those that would continue through the life of a project as a result of the environmental conditions caused by restoration projects permitted under the Order (e.g., removal of a small dam that could change existing water flows). Temporary impacts are considered those that would be temporary in nature (e.g., construction-related activities).

The approach to assessing hydrology and water quality impacts was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of Restoration Projects in the Order*, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an impact related to hydrology and water quality is considered significant if activities permitted by the Order would do any of the following:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
  - Result in substantial on- or off-site erosion or siltation;
  - Substantially increase the rate or amount of surface runoff in a manner which would result in on or off-site flooding;
  - Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
  - Impede or redirect flood flows

- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan

Impacts and Mitigation Measures

Table 3.11-1 summarizes the impact conclusions presented in this section for easy reference.

Table 3.11-1
Summary of Impact Conclusions—Hydrology and Water Quality

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.11-1: Implementing restoration projects permitted under the Order could result in the release of pollutants into surface water and/or groundwater that could violate water quality standards or waste discharge requirements, substantially degrade water quality, or obstruct implementation of a water quality control plan.	LTSG	LTSG
3.11-2: Implementing restoration projects permitted under the Order could substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that a project may impede sustainable groundwater management of the basin or obstruct implementation of a sustainable groundwater management plan.	LTS	LTS
3.11-3: Implementing restoration projects permitted under the Order could substantially alter the existing drainage pattern of a site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces in a manner that could substantially increase the rate of runoff; create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems; or impede or redirect flood flows.	LTS	LTS

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2020
NOTES: LTS = less than significant; LTSG = less than significant with implementation of general protection measures

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures

and mitigation measures listed below would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Impact 3.11-1: Implementing restoration projects permitted under the Order could result in the release of pollutants into surface water and/or groundwater that could violate water quality standards or waste discharge requirements, substantially degrade water quality, or obstruct implementation of a water quality control plan.

Effects of Project Construction Activities

Construction of restoration projects permitted under the Order (e.g., culverts, bridges, fish screens, ladders, and pilings; removal of small dams, tide gates, flood gates, and legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees, reconnect stream and river channels, or create depressions, berms, and drainage features; installation of cofferdams during construction) could require the movement of earth and other materials and the use of heavy equipment. In-channel disturbance for the placement or removal of structures could cause temporary changes to water quality in several different ways. For example, this work could temporarily disturb streambed sediments and cause the resuspension of sediment-associated pollutants (e.g., trace metals, heavy metals, pesticides) associated with legacy (e.g., gold mining) or contemporary (e.g., watershed urbanization) activities.

Construction work could also introduce pollutants through equipment (e.g., oils, lubricants, hydraulic fluids) and materials (e.g., soil and cover materials, concrete) into affected waterways, or into flood hazard, tsunami, or seiche zones, where inundation could release the pollutants. For example, excavation and grading for a large wetland restoration project could expose and release contaminated sediments, resulting in water quality impacts on receiving waters.

Localized degradation of groundwater quality could result from temporary, short-term construction activities such as building access roads and temporary facilities, or from O&M activities such as vegetation control. If hazardous materials were to be discharged to the land surface or surface waters during this work, they could travel to underlying aquifers. If the discharge volume were large enough, the hazardous materials could degrade local groundwater quality to a sufficient degree to impair its continued use. (Section 3.10, *Hazards and Hazardous Materials*, includes more information regarding hazardous materials.)

In addition, construction activities for some restoration projects could include temporary dewatering. Groundwater extracted during dewatering operations may contain elevated

levels of suspended sediment, turbidity, or other constituents (e.g., metals, construction materials) that could degrade water quality when discharged into surface waters.

The time to construct restoration projects could be as short as a few days, in the case of minor projects, or as long as several years during only certain months of the year for major projects. Therefore, the projects could result in effects on water quality that would persist throughout project construction.

As described in Section 3.1, *Approach to the Environmental Analysis*, the analysis assumes that project proponents would comply with applicable federal, state, and local regulations and ordinances. The federal Clean Water Act prohibits any stormwater discharge from a construction project unless the discharge is in compliance with an NPDES permit. The State Water Board and Regional Boards are the NPDES permitting authorities in California.

The State Water Board has adopted a Statewide General Permit for Stormwater Discharges Associated with Construction Activity (Construction General Permit, Order 2009-0009-DWQ) for construction sites where 1 or more acres of soil would be disturbed. The Construction General Permit requires, among other actions, the implementation of mandatory best management practices, including pollution/sediment/spill control plans, training, sampling, and monitoring for non-visible pollutants.

In addition, the Regional Boards may require projects to obtain an NPDES permit or waste discharge requirements before they discharge clean or relatively pollutant-free wastewaters that pose little or no threat to the quality of the receiving water (e.g., to discharge groundwater pumped during dewatering into surface waters). The NPDES discharge permit may require that groundwater removed during construction be treated before it is discharged to surface waters. Adherence to regulations may be enough to reduce impacts on water quality to less than significant in some cases.

Estuarine salinity levels, including those in the Delta and other estuaries throughout the State, are important to various water users, including municipal, industrial, and agricultural, and fish and wildlife. Salinity extends further into the estuaries during drier seasons and years since low freshwater inflows into the estuaries are diminished and less freshwater is available to offset salinity intrusion.

Restoration projects proposed for coverage under the Order could involve breaching and lowering existing levees and excavating a tidal channel network, thereby re-introducing daily tidal flows to a project site. Restored tidal exchange would also change flow patterns in the connected channels outboard of a project site. Because these tidal flows also distribute salinity within estuaries, these alterations in flow patterns could affect salinity levels in an estuary. Salinity increases are a concern to various municipalities, industries, agricultural interests, and resources agencies that depend on the availability of freshwater to maintain existing beneficial uses.

While these types of potential effects are possible, they would be expected to be rare and small, and only associated with large projects that have the potential to change tidal prism. For example, a model-based analysis of a 3,000-acre tidal marsh restoration project in the north Delta concluded that the project’s salinity effects would be less than

significant because the project resulted in negligible or small changes (under worst-case conditions) in salinities that were still in compliance with water quality standards that are protective of beneficial uses (ESA 2019).

As described in Order Section VII, "*project proponents (seeking coverage under the Order) will identify the receiving waters and beneficial uses of waters of the state to be impacted by a proposed project, as listed in the applicable Regional Board water quality control plan*." This information is required in the Notice of Intent (NOI; Order Attachment B), which must be completed by a project proponent to apply for authorization under this Order.

Further, as described under Order Section XIII, "*The Water Boards will independently review any project proposed for authorization under this Order to analyze impacts to water quality and designated beneficial uses within the applicable watershed(s). If the eligibility requirements set forth in this Order including Attachment A are not met, Water Boards will not authorize the proposed project under this Order and instead require the project proponent to apply for an individual certification or certification under another Order. Specifically, the approving Water Board may only authorize the proposed project under this Order if it determines that the following requirements are met: 1) the project meets the definition of a restoration project (as defined in Section V of the Order); 2) the project adopts and implements all appropriate GPMs and CEQA mitigation measures to protect water quality and beneficial uses; 3) the project proponent fulfills all approving Water Board requirements for project information and reporting; and 4) the project is designed to protect water quality and beneficial uses in accordance with regional or statewide water quality control plans."*

Any potential restoration projects seeking coverage under the Order would be required to undergo pre-application consultation with the approving Water Board and analyze impacts to water quality and designated beneficial uses within the applicable watershed(s) through its own environmental review pursuant to CEQA; and the project would be required to be designed to protect water quality and beneficial uses in accordance with regional or statewide water quality control plans.

The Order does not promote the construction or implementation of individual restoration projects, nor does it describe the specific size, location, implementation timing, or exact configuration of such projects. These are all factors necessary to identify the water quality impacts of constructing restoration projects permitted under the Order. Because the potential exists for adverse impacts on water quality as a result of the construction of restoration projects permitted under the Order, this impact would be **potentially significant**.

Projects implementing applicable general protection measures (Appendix E) included in the Order would further reduce impacts to hydrology and water quality. The following general protection measures may apply to hydrology and water quality:

- GPM-10: Equipment Maintenance and Materials Storage
- GPM-11: Material Disposal
- GPM-12: Fugitive Dust Reduction
- WQHM-1: Staging Areas and Stockpiling of Materials and Equipment

- WQHM-2: Storm Water Pollution Prevention Plan
- WQHM-3: Erosion Control Plans
- WQHM-4: Hazardous Materials Management and Spill Response Plan
- WQHM-5: In-Water Concrete Use
- WQHM-6: Accidental Discharge of Hazardous Materials
- IWW-1: Appropriate In-Water Materials
- IWW-2: In-Water Vehicle Selection and Work Access
- IWW-3: In-Water Placement of Materials, Structures, and Operation of Equipment
- IWW-4: In-Water Staging Areas and Use of Barges
- IWW-6: Dewatering/Diversion
- IWW-10: In-Water Pile Driving Methods
- IWW-11: Sediment Containment during In-Water Pile Driving
- IWW-12: Pile-driving Monitoring
- IWW-13: Dredging Operations and Dredging Materials Reuse Plan
- VHDR-2: Native and Invasive Vegetation Removal Materials and Methods
- VHDR-3: Revegetation Materials and Methods
- VHDR-4: Revegetation Erosion Control Materials and Methods
- VHDR-6: Herbicide Use
- VHDR-7: Herbicide Application Planning
- VHDR-8: Herbicide Application Reporting.

Integration of applicable general protection measures into project designs and plans would reduce impacts from construction activities on the water quality of the study area to a **less-than-significant** level.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Long-term effects on water quality from restoration projects permitted under the Order are expected to be beneficial or sometimes neutral (in the case of fish screens or ladders), because the specific purpose of these projects would be to correct existing conditions that contribute to resource degradation. For example, projects implementing bioengineered bank stabilization would reduce the input of fine sediment, which would improve water quality. Other restoration projects, such as those to remove pilings and other in-water structures, would improve water quality by removing potential contaminant sources and hazards such as untreated and chemically treated wood pilings, piers, and vessels. In addition, restoration projects permitted under the Order could establish, restore, and enhance tidal, subtidal, and freshwater wetlands. For example, living shorelines provide a natural alternative to “hard” shoreline stabilization methods like stone sills or bulkheads, and provide numerous ecological benefits including water quality improvements; floodplain restoration would also improve water quality because floodplains, when inundated with water, act as natural filters by removing excess sediment and nutrients.

In regard to potential impacts associated with cyanoHABs, predicting whether these will either 1) develop, or 2) increase in frequency, severity, and/or duration, relative to a baseline, in a given location due to incremental changes in environmental factors is difficult. At a minimum, it requires knowledge of the factors for triggering (water

temperature) and sustaining (high irradiance and high nutrient availability) growth and blooms in any particular location, together with data on how these factors are predicted to change. It is important to keep in mind that all three factors have to occur simultaneously for cyanoHABs to develop. Change in one factor alone will most likely not lead to a change in bloom status. For example, increase in nutrient concentration in a location with a well-mixed water column may not lead to a bloom of cyanoHAB species such as *Microcystis* as continued mixing of *colonies* to the bottom will prevent them from increasing their growth rate sufficiently to become dominant. Increase in residence time has been shown to increase cyanoHAB occurrences when it results in stratification of the water column (Carey et al. 2021). Stratification allows the surface layer to become isolated from the rest of the water column. This may increase the water temperature, water clarity, and decrease the mixing of cyanoHAB cells and colonies from the surface to the bottom allowing them to be continually exposed to high irradiance, and therefore, maintain maximum growth rates (Visser et al. 2005, Carey et al. 2012). If an increase in residence time does not lead to water column stratification, then the water may not warm sufficiently to trigger growth of cyanoHABs, or the mixing rate may not decrease sufficiently to maintain cyanoHAB species at the surface, effectively preventing the formation of colonies and accumulation of biomass. In addition, a decrease in residence time has to be sufficient that the growth rate of the cyanoHAB species exceeds the flushing rate of the water in order for colonies and biomass to accumulate in the area. If residence time is increased and stratification occurs, but the surface layer is depleted of nutrients, then cyanoHABs may not be able to develop due to nutrient limitation.

As is evident from the above discussion, changes in environmental factors and hydrology in a given location may or may not lead to changes in cyanoHABs depending on the thresholds of bloom development in that location and changes in environmental factors relative to those thresholds. However, restoration projects permitted under the Order would result in a number of improved ecological processes that would counteract these risks. For example, restoration projects have the potential to decrease water temperatures associated with the creation of shade through the restoration and enhancement of vegetation communities (e.g., riparian, emergent marsh). Restoration projects would also have the potential to improve tidal flushing, resulting in a well-mixed water column. The establishment of seagrasses, emergent marsh, and riparian vegetation would also result in increased uptake and removal of nutrients from the water. All of these beneficial ecological processes would counteract risks associated with environmental factors that contribute to increases in cyanoHABs. Finally, all projects must meet the definition of a restoration project, be consistent with categories of restoration projects described in the Order, and adhere to programmatic sideboards, including adopting applicable protection measures and design guidelines, and undergo pre-application consultation with the Water Board staff.

Routine O&M activities for restoration projects permitted under the Order could consist of periodic and routine work such as removing sediment within or near the facilities (e.g., culverts, fish screens and ladders), removing vegetation (e.g., invasive species in aquatic or riparian areas), and inspecting and maintaining facilities and natural features (e.g., replanting trees and shrubs, repairing biotechnical and other features). Routine

O&M activities would be similar to those described for construction; however, the level of activity would be less intense during the O&M phase than during construction, so the degree of temporary changes to water quality would be much less.

As described above, the Order does not promote the construction or implementation of individual restoration projects, nor does it describe the specific size, location, implementation timing, or exact configuration of such projects. Because the potential exists for adverse impacts on water quality as a result of the maintenance of restoration projects permitted under the Order, this impact would be **potentially significant**.

However, restoration projects would incorporate general protection measures (listed above under *Effects of Project Construction Activities)* that would reduce impacts from O&M activities on water quality.

Implementing these general protection measures would reduce impacts from O&M activities on water quality to a **less-than-significant** level. Further, many of the long-term effects of these projects on water quality are expected to be beneficial or neutral, because the specific purpose of these projects would be to correct existing conditions that contribute to resource degradation and/or counteract risks associated with environmental factors that contribute to water quality degradation.

Impact 3.11-2: Implementing restoration projects permitted under the Order could substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that a project may impede sustainable groundwater management of the basin or obstruct implementation of a sustainable groundwater management plan.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order could include temporary dewatering to facilitate equipment access, excavation or placement of materials, and repair or removal of infrastructure. These activities could result in a localized, temporary reduction in groundwater levels near the construction area, which would be expected to return to preconstruction levels after dewatering activities cease (or possibly better levels, if the aquifer were depleted, or in the case of a multi-benefit restoration project). Land grading, placement of dredged or other in-water material removed (e.g., legacy structures) on land before disposal, construction of structures (e.g., fish screens, earthen embankments), and stockpiling of construction materials could change drainage patterns during construction, which typically would result in changes in groundwater recharge. Actual alterations of groundwater recharge would depend on the type of construction activity and hydrologic and hydraulic factors.

In addition, although many construction-related impacts on groundwater would be temporary, it is reasonable to expect that construction for an infrastructure restoration project (e.g., setback levee) could occur over two or more years, which could result in recurring, localized changes. However, groundwater levels would be expected to return to preconstruction levels (or better) after dewatering activities cease.

In conclusion, construction of restoration projects permitted under the Order could reduce groundwater levels and alter groundwater recharge. However, these reductions would be localized and temporary, and preconstruction conditions would be expected to resume, or be improved, after construction. Project construction would not be anticipated to obstruct with implementation of a sustainable groundwater management plan. Therefore, this impact would be **less than significant**.

Projects implementing applicable general protection measures (Appendix E) included in the Order would further reduce impacts to hydrology and water quality. The following general protection measures may apply to hydrology and water quality:

- IWW-6: Dewatering/Diversion

Implementing this general protection measure would further reduce the **less-than-significant** impact from construction activities on localized groundwater supplies and groundwater recharge.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Some of the long-term effects of restoration projects permitted under the Order on groundwater recharge are expected to be beneficial (e.g., stream, floodplain, and riparian projects typically would improve groundwater recharge) or neutral. For example:

- Restoring off-channel/side channel habitat and/or floodplains would allow for greater inundation, which would lead to increased groundwater recharge.
- Installing beaver dam analogues would allow for greater groundwater recharge because as they trap sediment, the streambed rebuilds and forces water onto the floodplain, recharging groundwater.
- Removing legacy structures and other in-water structures would reduce the amount of impervious surfaces in the project area, which would allow for improved groundwater recharge.
- Restoration projects involving returning flows to a marsh could increase flows across the floodplain, which would enhance opportunities for groundwater recharge.

Restoration projects permitted under the Order could affect groundwater supplies and recharge. Construction work could include compaction of soil and other activities that would temporarily increase impervious land surfaces (e.g., concrete foundations for fish screens and fishways); however, these changes in land surfaces would be expected to be very small and would not be expected to result in decreases in groundwater recharge at these locations. As a result, alterations of, or interference with, groundwater recharge as a result of constructed facilities in the study area would likely be negligible. Most projects would not include large-scale impervious surfaces, and the constructed facilities, such as fish screens, or trails associated with multi-benefit projects would be relatively very small compared to the overall recharge area of a given watershed or sub-watershed. Therefore, there would be little or no likelihood for constructed facilities to affect groundwater recharge. Groundwater recharge could still occur around these

facilities, and projects would not obstruct implementation of a sustainable groundwater management plan.

Slurry cutoff walls may be installed in setback levees, which could restrict water flow and affect groundwater levels. A slurry cutoff wall is a civil engineering technique used to build reinforced concrete walls in areas of soft earth close to open water, or with a high groundwater table. Slurry cutoff walls create barriers to groundwater inflow or subsurface contaminants. The potential consequences are anticipated to be localized changes in well water levels and/or high groundwater levels near the setback levees and near the locations where slurry cutoff walls are installed. However, such changes would not be expected to substantially affect groundwater resources.

Restoration projects permitted under the Order would establish, restore, and enhance stream and riparian areas and may include activity in upslope watershed sites (e.g., outside of the State and Regional Water Boards' jurisdiction). Specific project features such as small wood structures or beaver dam analogues would increase ponding and reconnect floodplains. By increasing the rate, duration, and inundation of floodplain surfaces, these features would elevate the water table during both low- and high-flow conditions, increasing groundwater recharge. Floodplain restoration would also allow for groundwater recharge because floodplains, when inundated with water, allow floodwaters to infiltrate the ground.

Therefore, operation of restoration projects permitted under the Order would not reduce groundwater supplies or impair groundwater recharge. The goal of many projects would be to improve groundwater recharge, resulting in a beneficial effect. Therefore, this impact would be **less than significant**.

The Order does not include any general protection measures applicable to this impact.

Impact 3.11-3: Implementing restoration projects permitted under the Order could substantially alter the existing drainage pattern of a site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces in a manner that could substantially increase the rate of runoff; create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems; or impede or redirect flood flows.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order could temporarily change drainage patterns. This change could increase the rate and amount of surface runoff in a manner that would exceed the capacity of existing or planned stormwater drainage systems, result in flooding, or impede or redirect flood flows.

Project construction could require grading; levee setbacks; construction, repair, or removal of instream structures; and stockpiling of construction materials that could create physical barriers to surface runoff. The actual alterations of drainage patterns would depend on the type of construction activity (e.g., floodplain restoration; removal of

small dams, tide gates, flood gates, and legacy structures) and hydrologic and hydraulic factors (e.g., changing of runoff amounts or rates).

Land grading, placement of dredged or other in-water material removed (e.g., small dams) on land before disposal, construction of structures (e.g., fish screens), and stockpiling of construction materials could change drainage patterns during construction. These barriers could redirect surface runoff and/or result in an increase in water surface elevations on and adjacent to the construction site.

Construction activities such as compacting soils could increase their imperviousness (inability to be penetrated by water), which would reduce infiltration rates and cause an associated increase in the amount and rate of surface runoff. In addition, grading activities could change the slope of the land across which drainage flows, which could change the direction, rate, and amount of surface runoff from a construction site. Many factors affect the rate and amount of surface runoff, including topography, the amount and intensity of precipitation, the amount of evaporation, roughness and permeability of the substrate, and the amount of precipitation and imported water that infiltrates into groundwater. A construction-related change in the amount or rate of surface runoff would likely only have relatively localized effects on-site and immediately downstream, or downslope, of the site. In addition, although many construction-related impacts on surface runoff would be temporary, it is reasonable to expect that construction activities for restoration projects could occur over several years, which could result in changes to surface runoff that would persist throughout project construction.

Construction of restoration projects permitted under the Order could temporarily change drainage patterns; however, these changes would not be expected to change surface runoff in a manner that could exceed existing or planned stormwater drainage systems and/or create or increase on- or off-site flooding. Any changes would likely have relatively localized effects on-site and immediately downstream (or downslope) of the site; floodplain restoration improvements would not be expected to increase surface elevations or the chance of flooding in adjacent floodplains. Therefore, restoration projects permitted under the Order would not increase the rate or amount of surface runoff in a manner that would increase the risk of flooding on- or off-site. This impact would be **less than significant**.

To further reduce the impact of project construction on the rate or amount of surface runoff in a manner that would increase the risk of flooding on- or off-site, the Order includes the following general protection measures (Appendix E):

- WQHM-1 Staging Areas and Stockpiling of Materials and Equipment
- WQHM-2: Storm Water Pollution Prevention Plan

Implementing these general protection measures would further reduce the **less-than-significant** impact from construction activities on the rate or amount of surface runoff in a manner that would increase the risk of flooding on- or off-site.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects permitted under the Order could result in a permanent alteration of drainage patterns. Many of the long-term effects of these projects on drainage patterns and flood flows are expected to be beneficial or neutral, because the specific purpose of these projects would be to correct existing conditions that contribute to resource degradation such as groundwater overdraft, and poor water quality and flood management. For example:

- Bioengineered bank stabilization projects integrate living woody and herbaceous materials with earthwork and recontouring of streambanks, which provides for increased bank stability.
- Placing organic and inorganic materials to stabilize and increase the structure of the soil where site constraints limit opportunities for natural channel meander reduces soil erosion.
- Restoration and enhancement of off-channel/side-channel habitat features typically creates an improved hydrologic connection between floodplains and main channels.

Floodplain restoration, including setback, breaching, and removal of levees, berms, and dikes, and hydraulic reconnection and revegetation would improve the diversity and complexity of aquatic and riparian habitat by increasing floodway capacity and inundation frequency.

Floodplain and levee restoration improvements may cause the existing course of a stream or river to change or the hydraulic roughness to increase (e.g., from plantings that increase instream vegetation density). However, such improvements would not be expected to substantially increase surface elevations, increase the chance of flooding outside of restored floodplains or decrease the channel's flow carrying capacity as floodplain and levee restoration improvements would need to meet design standards and permitting requirements. Similarly, small dams would be removed only when dams are less than 25 feet in height from the natural bed of the stream or watercourse at the downstream toe of the barrier, and the dams would be removed to restore natural stream geomorphology. Therefore, removing small dams would not be expected to substantially increase surface water elevations or the chance of flooding in adjacent or downstream floodplains. For example, the potential for setback levees to redirect flood impacts to other areas is expected to be negligible because setback levees decrease flood stages by increasing channel widths. In addition, setback levees would need to meet design standards and permitting requirements.

Floodplain restoration or other restoration projects permitted under the Order would not be expected to result in operational changes to upstream reservoirs. Upstream reservoirs that are operated for flood management must maintain certain amounts of flood control space and operate under flood control rules established in the reservoir's operation manual. Hence it is not likely that restoration would require operational changes, and if they did, there should be no impact on flood risk. In addition, large-scale

floodplain restoration projects may provide for containment of reservoir releases in preparation for large storm events, which would be beneficial.

Projects such as fishways and offstream storage tanks could cause the imperviousness of the soils to increase, which would reduce infiltration rates and result in an associated increase in the amount and rate of surface runoff. The actual alterations of drainage patterns would depend on the facilities and hydrologic and hydraulic factors. The changes in drainage patterns could persist after construction, depending on project designs. For example, there could be permanent changes in land cover as a result of construction, such as increases in concrete or compacted surfaces (e.g., for fish screens) or vegetation removal.

The rate and amount of surface runoff are determined by multiple factors: topography, amount and intensity of precipitation, amount of evaporation in the watershed, and amount of precipitation and imported water that infiltrates into groundwater. However, these projects would not be expected to appreciably impede or redirect flood flows, or to negatively affect levee integrity or the potential for overtopping, once construction is complete. Projects would be designed consistent with existing regulatory requirements.

Restoration projects permitted under the Order could permanently alter drainage patterns. Many of the long-term effects of these projects on drainage patterns and flood flows are expected to be beneficial or neutral, because the specific purpose of these projects would be to correct existing conditions that contribute to resource degradation. Restoration projects could alter runoff rates and timing, as local drainage patterns could change during project construction. However, these projects would likely have relatively localized effects on-site and immediately downstream (or downslope) of the floodplain restoration improvements and would not increase surface water elevations or the chance of flooding in adjacent floodplains. Therefore, this impact would be **less than significant**.

The Order does not include any general protection measures applicable to this impact.

3.12 Land Use and Planning

3.12.1 Introduction

This section discusses land use and planning in the study area and evaluates the potential impacts of the types of restoration projects that would be permitted under the Order (Section 2.6, *Categories of Restoration Projects in the Order*).

The environmental setting and evaluation of impacts on land use and planning is based on a review of existing published documents and data, including city and county general plans and land management plans; information regarding example projects that are similar to those permitted under the Order; and other information sources listed in Chapter 8, *References*.

The indirect physical effects of actions for restoration projects permitted under the Order are the subject of the environmental analysis in this section, including those that could divide an existing community or conflict with an existing land use plan, policy, or regulation.

No comments addressing land use and planning were received in response to the notice of preparation (NOP). See Appendix B for NOP comment letters.

3.12.2 Environmental Setting

This section describes existing land uses in the study area. Because the Order could be implemented statewide, the environmental setting for land use covers all nine Regional Board jurisdictions. The study area covers a broad area of California with widely varying topography, vegetation, and weather. As a result, land uses in the study area are equally numerous and varied (Table 3.12-1). Also, the extent to which restoration projects permitted under the Order would include any particular action are yet to be determined; therefore, this section presents a general discussion of land use in the study area.

Table 3.12-1
Existing Land Uses in the Study Area

Land Cover and Description	Area (acres)	Percent of Study Area
Developed: Urban and Built-Up Land, Rural Residential Land	3,738,337	8
Other Land: Natural Land, Rural Residential Land, Vacant or Disturbed Land	13,267,942	27
Agricultural: Grazing Land, Farmland of Local Importance, Farmland of Local Potential, Prime Farmland, Farmland of Statewide Importance, Semi-Agricultural and Rural Commercial Land, Unique Farmland	31,351,190	64.0
Water	715,266	1

SOURCE: DOC 2017

NOTE: Totals may vary from total area in the study area because of rounding and small variances among different geographic information system datasets.

Cities and Communities

Cities and communities support residential, commercial, industrial, and public uses (e.g., utilities, transportation facilities and levees), recreation (e.g., golf courses), open space, and other lands (e.g., cemeteries and parking lots). Residential, commercial, and industrial development occurs mainly in several incorporated and unincorporated communities in the study area.

Natural Habitat

Natural habitats include alkaline seasonal wetlands, grasslands, inland dune scrub, managed wetlands, tidal and nontidal marshes, riparian forests and woodlands, riparian areas occupied by invasive species, riparian scrub, and vernal pool complexes. These habitats are described in more detail in Section 3.5, *Biological Resources—Terrestrial.*

Agricultural Land

Agricultural uses in the study area include farmlands that support a variety of crops, such as grains, fruits, vineyards, nuts, alfalfa, and vegetables. Agricultural land also supports dairies, livestock grazing, agricultural industrial and agricultural commercial uses, and farm-based tourism (e.g., wine-tasting rooms). Agricultural resources in the study area are described in more detail in Section 3.3, *Agriculture and Forestry Resources*.

Open Space

Several types of open space areas are scattered throughout the study area: national wildlife refuges and wildlife areas, trail systems, state recreation areas, preserves, and ecological reserves. For additional information on open space areas, see Section 3.5, *Biological Resources—Terrestrial*, and Section 3.16, *Recreation*.

Recreation

The study area provides extensive opportunities for water- and land-oriented recreation. As described in Section 3.16, *Recreation,* public access facilities in the study area include national, state, and county parks; marinas and yacht clubs; campgrounds; hunting clubs; and fishing areas.

Transportation

The study area contains land uses for many transportation modes, including land-based transportation, ports, and airports. Additional details about transportation are provided in Section 3.17, *Transportation, Traffic, and Circulation.*

Utilities

The study area also includes substantial infrastructure, including electric and natural gas transmission lines, water conveyance, and levees. Additional details about utilities are provided in Section 3.19, *Utilities and Public Services.*

3.12.3 Regulatory Setting

There are no applicable federal regulations pertaining to land use. This section discusses state and regional and local plans, policies, regulations, and laws, and ordinances pertaining to land use.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location.

State

State of California General Plan Guidelines and Zoning Law

The Governor's Office of Planning and Research provides a statewide regulatory document, the *State of California General Plan Guidelines*, for preparing long-term general plan documents in accordance with state law (Government Code Section 65040.2). All California cities and counties are must have a comprehensive general plan that guides planning and development decisions, and must consider a long-term perspective (Government Code Section 65300). Generally, the general plan must also cover all territory within the boundaries of the affected jurisdiction; for cities, all public and private land within the city limits must be covered, while all counties must include all unincorporated areas (OPR 2017).

The *State of California General Plan Guidelines* also explain the required components for a general plan. Plan text consists of goals in a range of categories that set the direction of a general plan concept and express community values. These goals are shaped by objectives, principles, standards, and in some cases, plan proposals, which in turn prepare specific policies to develop the changes that a jurisdiction seeks to achieve (OPR 2017).

The State Zoning Law (Government Code Section 65800 et seq.) establishes that zoning ordinances—laws that define allowable land uses in a specific zone district—must be consistent with the applicable general plan and any applicable specific plans.

Habitat Conservation Plan/Natural Community Conservation Planning

Numerous habitat conservation plans and natural community conservation plans are in the planning or implementation stage across the state. Habitat conservation plans generally provide a regional approach to managing urban development vis-à-vis habitat conservation; in some cases, they also involve agricultural protection. Typically, a habitat conservation plan identifies species that are federally or state listed as threatened or endangered, and determines the limits of development for jurisdictions to ensure that these habitats and species are appropriately protected.

The Natural Community Conservation Planning Act (California Fish and Game Code Sections 2800–2835) sets the standards for developing natural community conservation plans. Fish and Game Code Section 2805 defines a natural community conservation plan as a plan prepared pursuant to a planning agreement entered into in accordance with Section 2810 of the code. The plan identifies and provides for those measures necessary to conserve and manage natural biological diversity in the plan area while allowing compatible and appropriate economic development, growth, and other human uses.

Regional and Local

The study area covers multiple counties with multiple cities throughout the study area. Each city and county has adopted a general plan that describes plans for the physical

development of that county or city. General plans have unique goals and policies that preserve and guide development of lands within local jurisdictions; they identify an array of land use policies and policies that are meant to reduce environmental impacts. Each general plan addresses a broad range of topics, such as land use, circulation, housing, conservation, open space, noise, and safety. In addressing these topics, each general plan identifies the goals, objectives, policies, principles, standards, and plan proposals that support the city's or county's vision for the area. In addition, each jurisdiction has a zoning ordinance that defines allowable land uses in the specific zone district that are consistent with the applicable general plan.

3.12.4 Impacts and Mitigation Measures

Methods of Analysis

Land use and planning impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could impact land use conflicts and division of established communities. The analysis also considers the potential impacts of actions required for such projects to comply with applicable land use plans. However, the precise locations and detailed characteristics of potential future individual restoration projects are yet to be determined. Therefore, this land use and planning analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis.

Permanent impacts are considered those that would continue through the life of a proposed restoration project as a result of the environmental conditions created by the project (e.g., new fish screens and floodplain restoration projects located on the periphery of a community). Temporary impacts are considered those that would be temporary in nature (e.g., construction-related activities).

The approach to assessing land use and planning impacts was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of Restoration Projects in the Order*, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an impact related to land use and planning is considered significant if the types of projects that would be permitted under the Order would do either of the following:

- Physically divide an established community
- Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect

For this impact analysis, restoration projects permitted under the Order would result in a significant impact related to physical division of an established community if they would directly or indirectly disrupt the existing development pattern, divide an existing

incorporated or unincorporated community, or isolate such a community from other existing development.

Impacts and Mitigation Measures

Table 3.12-2 summarizes the impact conclusions presented in this section for easy reference.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Table 3.12-2
Summary of Impact Conclusions—Land Use and Planning

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.12-1: Restoration projects permitted under the Order could conflict with a land use plan, policy, or regulation adopted to avoid or mitigate an environmental effect.	LTS	SU
3.12-2: Implementing restoration projects permitted under the Order could physically divide an established community.	LTS	SU

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2020
NOTES: LTS = less than significant; SU = significant and unavoidable

Impact 3.12-1: Restoration projects permitted under the Order could conflict with a land use plan, policy, or regulation adopted to avoid or mitigate an environmental effect.

Effects of Project Construction Activities

Construction of restoration projects permitted under the Order could involve mobilization of equipment and materials, preparation of staging areas, installation of temporary construction offices, staging and storage of equipment and materials, vehicle parking, use of designated access and haul routes, clearing of vegetation and structures, preparation of borrow sites, site restoration and demobilization, and removal of excess materials. Restoration projects would be required to comply with applicable city and

county general plans and other local policies and ordinances. Potential temporary conflicts with adjacent land uses, policies and regulations from construction noise, dust, and traffic are addressed in those sections of this PEIR. Therefore, this impact would be **less than significant**.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

The majority of constructed facilities for restoration projects permitted under the Order would not conflict with a land use plan, policy, or regulation adopted to avoid or mitigate environmental effects. For example, some projects—stream crossing and fish passage improvements; removal of small dams, tide gates, flood gates, and legacy structures; bioengineered bank stabilization; and removal of pilings and other in-water structures—would occur in existing water channels and would not be expected to change existing land uses. Also, constructed facilities for the restoration projects could support land use plans, policies, or regulations if the plans, policies, and regulations include environmental goals for habitat preservation or restoration.

Other restoration projects could result in new long-term or permanent features that could conflict with land use plans, policies, or regulations adopted to avoid or mitigate environmental effects. Restoring and enhancing off-channel/side-channel habitat would involve reconnecting and creating side-channel, alcove, oxbow, pond, off-channel, floodplain, and other habitats, and potentially removing off-channel fill and plugs. Work may include removing or breaching levees, berms, and dikes; excavating channels; constructing wood or rock tailwater control structures; and constructing large wood habitat features. Impacts associated with construction activities and some operation activities have the potential to conflict with land use policies, such as those related to conversion of agricultural land and reduction of noise impacts. (For more detailed impacts related to agriculture and forestry resources see Section 3.3, *Agriculture and Forestry Resources* and Section 3.14, *Noise*.) Therefore, constructed facilities and operation associated with restoration projects permitted under the Order could result in conflicts with a land use plan, policy, or regulation adopted to avoid or mitigate an environmental effect. In these limited instances, compliance with required permits and approvals would reduce impacts associated with projects to a less than significant level. However, if there is no jurisdiction by the agency and no requirement to obtain a permit, land use policy conflicts could occur. Because there could be potential adverse changes to land use and planning due to the construction of restoration projects, this impact would be **significant and unavoidable**. The Order does not include any general protection measures applicable to this impact.

Impact 3.12-2: Implementing restoration projects permitted under the Order could physically divide an established community.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order could include mobilization of equipment and materials, preparation of staging areas, installation of temporary construction offices, staging and storage of equipment and materials, vehicle parking, use of designated access and haul routes, clearing of vegetation and

structures, preparation of borrow sites, site restoration and site demobilization, and removal of excess materials.

These types of construction activities would not be expected to physically divide an established community. For example, stockpiling of materials and new intakes/ diversions associated with subsidence reversal programs would be nonlinear and localized, and therefore would not physically divide an established community. Other restoration projects permitted under the Order, such as floodplain restoration projects—including levee, berm, and dike setback, breaching and removal, and hydraulic reconnection and revegetation—could involve constructing linear infrastructure. These elements are meant to reconnect historical stream and river channels, and to reconnect freshwater deltas with floodplains and historical estuaries to tidal influence. Therefore, construction activities for these types of projects would most likely take place on the periphery of a community, rather than through the community, and would not physically divide the community.

Some of these projects could be constructed in areas between communities and developed services. For example, a levee setback outside of a community may require road closures to facilitate construction, which could temporarily physically divide the community during construction.

Construction activities for restoration projects permitted under the Order could result in the temporary physical division of the community; however, these conversions would most likely take place on the periphery of a community, rather than through the community, and would be temporary. A majority of construction activities would take place on or near a body of water, which would not further divide an established community. Therefore, this impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects permitted under the Order (e.g., new fish screens and floodplain restoration) likely would not physically divide an established community. Floodplain restoration projects—including setback, breaching, and removal of levees, berms, and dikes, and hydraulic reconnection and revegetation—would typically involve reconnecting historical stream and river channels and reconnecting freshwater deltas with floodplains and historical estuaries to tidal influence. These projects are generally located on the periphery of a community. They would not result in a permanent division of established communities, isolate industry from communities with services, or disrupt development patterns that would adversely affect the accessibility of the area.

Some facilities outside of communities could isolate developed areas from urban services. For example, removing roads for construction of a new setback levee might isolate agricultural areas from facilities and communities that provide services and markets to farmers. Also, periodic inundation of roadways from flood widening projects could preclude or inhibit access between communities and services.

Because the extent and location of restoration projects permitted under the Order are yet to be determined, it is not possible to conclude that the restoration projects would not physically divide an established community. Therefore, this impact would be **significant and unavoidable**. The Order does not include any general protection measures or mitigation measures applicable to this impact.

3.13 Mineral Resources

3.13.1 Introduction

This section discusses mineral resources in the study area and evaluates the potential impacts of the types of restoration projects that would be permitted under the Order (Section 2.6, *Categories of Restoration Projects in the Order*).

The environmental setting and evaluation of impacts on mineral resources is based on a review of existing published documents, including city and county general plans; information regarding example projects that are similar to those permitted under the Order; and other information sources listed in Chapter 8, *References*.

No comments specifically addressing mineral resources were received in response to the notice of preparation (NOP). See Appendix B for NOP comment letters.

3.13.2 Environmental Setting

The environmental setting for mineral resources covers all nine Regional Board jurisdictions because the Order could be implemented statewide. The extent to which restoration projects permitted under the Order would include any particular action is yet to be determined; therefore, this section presents a general discussion of existing mineral resources in the study area.

The California Geological Survey publishes an annual summary of the state's mineral production (excluding oil, gas, geothermal, and coal). The following information regarding non-fuel mineral resources is based on the California Geological Survey's 2017 annual summary (CGS n.d.).

Based on the U.S. Geological Survey's preliminary data for 2017, California ranked fifth in the U.S. (after Nevada, Arizona, Texas, and Alaska) in the value of non-fuel mineral production, accounting for approximately 4.7 percent of the nation's total. In 2020, the market value of non-fuel mineral production for California was $4.7 billion (USGS 2021).

California produced more than two dozen different industrial minerals in 2017. California led the nation in the production of diatomite, construction sand and gravel, and was the only producer of boron compounds and rare earth elements. The state ranked second behind Texas for production of Portland cement. Based on data from the California Department of Conservation's Division of Mine Reclamation, about 1,042 mines were active in California during 2017, and of those, 663 reported producing non-fuel minerals. Approximately 5,500 people were employed at these mines and their processing facilities.

Industrial Minerals

Industrial minerals accounted for 92 percent of the value of non-fuel minerals produced in California in 2017 (DOC 2019). Construction-grade sand and gravel, Portland cement, and crushed stone—the solid ingredients of concrete—were the top three mineral commodities for the year, in both quantity and value. The building and paving industries consume large quantities of these construction materials, which together made up 67 percent of the value of California's 2017 minerals market.

Aggregate

Production of construction aggregate (sand and gravel, crushed stone) in 2017 totaled 151 million tons, valued at $1.49 billion, down from the revised 2016 numbers. California consumed an average of about 180 million tons of construction aggregate (all grades) per year from 1986 through 2016.

Cement

In 2017, Portland cement production at nine plants throughout the state totaled 10.6 million tons, valued at $907 million, a decrease in quantity and value from the revised 2016 figures (DOC 2019). The U.S. Geological Survey's mineral industry surveys indicate that imports of all hydraulic cement types into the San Francisco, Los Angeles, and San Diego ports totaled approximately 1.6 million tons.

Metals

Metals made up the remaining 8 percent of the value of non-fuel minerals produced in California. Gold dominated California's metals market in 2017, totaling more than 98 percent of the value of the state's metals production (DOC 2019). The quantity and value of 2017 gold production increased 56 percent from 2016.

Crude Oil

California's oil production for 2018 was 161.8 thousand barrels, a decrease of approximately 7.0 percent from 2017. Onshore and offshore oil production in California decreased from 2017 levels by approximately 9.4 and 2.9 percent, respectively (DOC 2019).

Natural Gas

In 2018, California's total natural gas total consumption was approximately 2,136,907 million cubic feet. Nearly 29 percent of the natural gas consumed was for electric power, with most remaining consumption falling within three sectors: residential (20 percent), commercial (12 percent), and industrial (36 percent) (EIA 2019).

California continues to depend on out-of-state imports for nearly 90 percent of its natural gas supply, underscoring the importance of monitoring and evaluating ongoing market trends and outlook. Natural gas has become an increasingly important energy source because the state's power plants rely on this fuel. Natural gas provides the largest portion of California's total in-state capacity and electricity generation (CEC 2021).

Geothermal

Because of its location on the Pacific "Ring of Fire" and at tectonic plate junctions, California has the largest capacity for geothermal electric generation in the United States. In 2018, the state's geothermal energy produced 11,528 gigawatt-hours of electricity. Combined with another 700 gigawatt-hours of imported geothermal power, geothermal energy produced 5.91 percent of California's total system power. A total of 43 geothermal power plants operate in California, with an installed capacity of 2,730 megawatts. The largest concentration of geothermal plants is located north of San Francisco, in The Geysers Geothermal Resource Area in Lake and Sonoma Counties (CEC 2019).

3.13.3 Regulatory Setting

No federal regulations pertaining to mineral resources are applicable to restoration projects proposed to be permitted under the Order. This section discusses state and regional and local plans, policies, regulations, and laws, and ordinances pertaining to mineral resources.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location.

State

The Surface Mining and Reclamation Act of 1975 (California Code of Regulations Title 14, Division 2, Chapter 8, Subchapter 1) requires the State Mining and Geology Board to adopt policies that regulate the operation of surface mines, reclamation of mined lands, and conservation of mineral resources.

In accordance with the Surface Mining and Reclamation Act, the State of California established the Mineral Land Classification System to help identify and protect mineral resources in areas that are subject to urban expansion or other irreversible land uses that would preclude mineral extraction. Protected mineral resources include construction materials, industrial and chemical mineral materials, metallic and rare minerals, and non-fluid mineral fuels. Economically significant mineral deposits are classified based on the known and inferred mineral resource potential of the land using the California Mineral Land Classification System, which includes the following four mineral resource zones (MRZs):

- *MRZ-1:* Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.
- *MRZ-2:* Areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence.
- *MRZ-3:* Areas containing mineral deposits, the significance of which cannot be evaluated.
- *MRZ-4*: Areas where available information is inadequate for assignment to any other zone.

Regional and Local

The study area encompasses multiple counties with multiple cities throughout California. Each county and city has local regulations and a general plan with goals and policies that guide development and encourage the provision and protection of mineral resources.

3.13.4 Impacts and Mitigation Measures

Methods of Analysis

Mineral resource impacts from the types of restoration projects permitted under the Order are evaluated in the terms of how typical construction and operation of project

components could impact the loss of availability of locally or regionally important mineral resources. However, the precise locations and detailed characteristics of potential future individual restoration projects are yet to be determined. Therefore, this mineral resource analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis.

Permanent impacts are considered those that would result from indefinite environmental conditions created by projects permitted under the Order (e.g., new infrastructure such as pumps would be located indefinitely in one location, resulting in the removal of a mineral resource from the facility's footprint). Temporary impacts are considered those that would be temporary in nature (e.g., construction-related activities).

The approach to assessing mineral resources was to identify and review existing environmental studies, data, model, results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of Restoration Projects in the Order*, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods.* Additionally, this analysis is based on mineral resource maps that were prepared by the California Geological Survey using the California Mineral Land Classification System.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an impact related to mineral resources is considered significant if the types of projects that would be permitted under the Order would do either of the following:

- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state
- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan

Impacts and Mitigation Measures

Table 3.13-1 summarizes the impact conclusions presented in this section for easy reference.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Table 3.13-1
Summary of Impact Conclusions—Mineral Resources

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.13-1: Implementing restoration projects permitted under the Order could result in the loss of availability of a known mineral resource.	LTSM	LTSM
3.13-2: Implementing restoration projects permitted under the Order could result in the loss of availability of a locally important mineral resource recovery site.	LTSM	LTSM

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2020
NOTE: LTSM = less than significant with mitigation

Impact 3.13-1: Implementing restoration projects permitted under the Order could result in in the loss of availability of a known mineral resource.

Effects of Project Construction Activities, Constructed Facilities (Natural or Artificial Infrastructure), and Operations and Maintenance of those Facilities

Construction of restoration projects, constructed facilities (natural or artificial infrastructure), and operations and maintenance of those facilities permitted under the Order (e.g., new setback levees and floodway widening) could affect mineral resources designated by the California Geological Survey as resources of regional and statewide importance (MRZ-2), depending on the projects' locations and proximity to mineral resources. Active, permitted mines may be present, and development of the proposed restoration projects could substantially deplete already inadequate aggregate resources. Construction-related demand could exceed the availability of mineral resource supplies. For example, constructing setback levees and widening floodways would require large quantities of construction aggregate, which could limit the ability of other aggregate users in the area to obtain and use aggregate. Therefore, this impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure MIN-1 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure MIN-1: Minimize Potential Impacts from Loss of a Known Mineral Resource

The following measures shall be implemented during construction of restoration projects permitted under the Order:

- Project proponents shall ensure land use compatibility between existing mineral resource extraction activities and restoration projects.
- An adequate buffer (to be determined on an individual project basis in coordination with appropriate regulatory agencies) shall be maintained between future projects and designated MRZ-2 sectors.
- Project proponents shall ensure that future land use changes in designated mineral resource extraction areas recognize mineral resource extraction as a compatible use.
- The use of construction aggregate shall be limited to local sources with sufficient capacity to meet the needs of both restoration projects and future local development, to the extent possible.
- Project construction shall use recycled aggregate where possible, to decrease the demand for new aggregate.

Implementing Mitigation Measure MIN-1, or equally effective mitigation measures, would reduce the potentially significant impacts of restoration projects permitted under the Order to a **less-than-significant** level.

Impact 3.13-2: Implementing restoration projects permitted under the Order could result in the loss of availability of a locally important mineral resource recovery site.

Effects of Project Construction Activities, Constructed Facilities (Natural or Artificial Infrastructure), and Operations and Maintenance of those Facilities

Construction of restoration projects, constructed facilities (natural or artificial infrastructure), and operations and maintenance of those facilities permitted under the Order could result in the loss of availability of a locally important mineral resource recovery site, if the restoration project's construction or resulting infrastructure would occur on or near mineral recovery sites that have been identified in local general plans, specific plans, or other land use plans. Many producing natural gas wells lie within delineated natural gas fields and a permitted mining operations are present in the study area.

Restoration projects have the potential to affect mineral resource recovery sites, including productive oil and natural gas wells and active mining sites, depending on the projects' specific locations and characteristics at the time they are implemented. For example, constructing setback levees and widening floodways could temporarily or permanently affect mining operations (i.e., leave the mining operation no longer feasible) if the projects were constructed at the locations of these existing resource recovery sites.

Impacts on mineral extraction sites would be temporary if the effects would be limited to the construction period. The impacts would be permanent if project facilities would be placed in an area where a resource recovery site exists and the extraction site would experience a permanent loss of availability. However, the specific locations and scale of future permitted restoration projects are yet to be determined. Therefore, the risk related to the loss of an important mineral resource recovery site cannot be determined. The factors necessary to identify the risk include the locations of the new facilities relative to known mineral resource recovery sites delineated on a local general plan, specific plan, or other land use plan.

Implementing restoration projects that would be permitted under the Order could result in the loss of an important mineral resource recovery site. Therefore, this impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board' issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure MIN-2 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure MIN-2: Minimize Potential Impacts from the Loss of a Locally-Important Mineral Resource Recovery Site

The following measures shall be implemented during and after construction of restoration projects permitted under the Order:

- Access to existing, active mineral resource extraction sites that have been identified in local general plans, specific plans, or other land use plans shall be maintained both during and after project construction.
- Projects shall implement the most current recommendations identified in the California Department of Conservation (DOC) Geologic Energy Management Division (formerly Division of Oil, Gas, and Geothermal Resources) construction site well review program (DOC 2021), such as:
  - Identify all existing natural gas well sites and oil production facilities in or near the project area.
  - Identify any oil or natural gas well within 100 feet of any navigable body of water or watercourse perennially covered by water or any officially recognized wildlife preserve as a "critical well" (California Code of Regulations Title 14, Chapter 4, Article 2, Sections 1720[a][2][B] and 1720[a][2][C]). DOC requires that "critical wells" include equipment capable of meeting more stringent blowout prevention requirements than noncritical wells, based on pressure testing and ratings.
  - Identify safety measures to prevent unauthorized access to equipment.
  - Include safety shutdown devices on oil and natural gas wells and other equipment, as appropriate.

- Notify DOC of new oil or natural gas wells or changes in oil or natural gas well operations or physical conditions, receive written approval of the changes from DOC, and receive written notification of DOC's inspection of new or changed equipment. The approvals will be related primarily to the ability to:
  - Protect all subsurface hydrocarbons and freshwater.
  - Protect the environment.
  - Use adequate blowout prevention equipment.
  - Use approved drilling and cementing techniques.
- If any plugged/abandoned or unrecorded oil and natural gas wells are uncovered during construction, notify DOC, complete remedial well plugging actions, and avoid constructing any structures over the abandoned oil and natural gas wells.
- If oil and natural gas wells are under the jurisdiction of or a lease from the State Lands Commission, provide additional plans and environmental documentation as required before modifying the oil or natural gas wells.

Implementing Mitigation Measure MIN-2, or equally effective mitigation measures, would reduce the potentially significant impacts of restoration projects permitted under the Order to a **less-than-significant** level.

3.14 Noise

3.14.1 Introduction

This section describes acoustic fundamentals and noise-sensitive land uses in the study area, and the potential noise and vibration impacts of the types of restoration projects that would be permitted under the Order. (Section 2.6, *Categories of Restoration Projects in the Order*.) The environmental setting and evaluation of noise impacts is based on a review of existing published documents, including city and county general plans; information regarding example projects that are similar to those permitted under the Order that may be implemented by other agencies; and other information sources listed in Chapter 8, *References*. See Section 3.5, *Biological Resources—Terrestrial*, and Section 3.6, *Biological Resources—Aquatic*, for potential noise impacts on special-status species.

Future restoration projects that would be permitted under the Order could generate noise or vibration during construction or operation, or both. As discussed further in this section, noise or vibration could be generated by all of the following:

- Mobilization of equipment and materials
- Use of staging areas and access and haul routes
- Site preparation
- Preparation of borrow sites
- Site restoration and demobilization
- Disposal of excess materials
- Operations and maintenance (O&M) activities

Section 3.6, *Biological Resources—Aquatic*, presents an analysis of noise, motion, and vibration disturbance impacts on listed fish species.

No comments specifically addressing noise and vibration were received in response to the notice of preparation (NOP). See Appendix B for NOP comment letters.

3.14.2 Environmental Setting

Acoustic Fundamentals

Definitions of Acoustics Terms

Acoustics is the scientific study of the perception and properties of sound waves. Table 3.14-1 presents definitions of the acoustics terms used to establish the environmental setting and examine the potential noise impacts of future restoration projects permitted under the Order.

Noise Generation and Attenuation

Both mobile sources such as automobiles, trucks, and airplanes and stationary sources such as construction activities, machinery, and commercial and industrial operations can generate noise. As a sound wave is initiated in a medium by a vibrating object, the sound wave contains minute variations of pressure that rise above and fall below the ambient atmospheric pressure. Once initiated, sound travels through the atmosphere from the source to the receiver. Noise levels fluctuate depending on characteristics such

Table 3.14-1
Acoustics Terms

Term	Definition
Noise	Sound that is loud, disagreeable, unexpected, or unwanted.
Decibel (dB)	A measurement of sound levels. The decibel scale was developed to relate to the range of human hearing. A decibel is logarithmic and cannot be directly summed. For example, a 65-dB source of sound, such as a truck, when joined by another 65-dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). A sound level increase of 10 dB corresponds to 10 times the acoustical energy, and an increase of 20 dB equates to a 100-fold increase in acoustical energy.
A-weighted decibel (dBA)	An adaptation of the decibel measurement reflecting that the human ear is not equally sensitive to loudness at all frequencies in the audible spectrum. To better relate overall sound levels and loudness to human perception, frequency-dependent weighting networks were developed, identified as A through E. There is a strong correlation between the way humans perceive sound and A-weighted sound levels. For this reason, A-weighted sound levels are used to predict community response to noise from the environment, including noise from transportation and stationary sources, and are expressed as A-weighted decibels. All sound levels discussed in this section are A-weighted decibels unless otherwise noted.
Equivalent noise level (Leq)	The average noise level during a specified time period; that is, the equivalent steady-state noise level in a stated period of time that would contain the same acoustic energy as the time-varying noise level during the same period (i.e., average noise level).
Maximum noise level (Lmax)	The highest instantaneous noise level during a specified time period.
Minimum noise level (Lmin)	The lowest instantaneous noise level during a specified time period.
Day-night noise level (Ldn)	The 24-hour Leq with a 10-dB penalty applied during the noise-sensitive hours from 10 p.m. to 7 a.m., which are typically reserved for sleeping.
Community noise equivalent level (CNEL)	Similar to the Ldn described above with an additional 5-dB penalty applied during the noise-sensitive hours from 7 p.m. to 10 p.m., which are typically reserved for evening relaxation activities.
Single-event noise level (SEL)	Sounds that occur in an irregular or non-repetitive manner, which makes them difficult to anticipate; these are usually measured by Lmax noise levels.

SOURCE: Caltrans 2013a

as ground absorption, atmospheric conditions, and the presence of physical barriers. Mobile sources generally generate noise at a rate of 4.5 decibels (dB) per doubling of distance from the source. Noise from stationary sources spreads with more spherical dispersion patterns and is generated at a rate of 6 to 7.5 dB per doubling of distance from the source.

Meteorological changes such as wind speed, wind direction, turbulence, temperature gradients, and humidity can alter noise distribution and affect noise levels at a receiver. Barriers such as topographic features, intervening buildings, or dense vegetation can substantially reduce noise levels at the receiver. Noise barriers can be both natural (e.g., berms, hills, and dense vegetation) and human-made (e.g., buildings and walls).

Table 3.14-2 shows the sound levels associated with common sources of environmental and noise levels.

Table 3.14-2
Typical Sound Levels Measured in the Environment and Industry

Common Outdoor Activities	Sound Level (dBA)	Common Indoor Activities
	110	Rock band
Jet flyover at 1,000 feet	100	
Gas lawn mower at 3 feet	90	
Diesel truck moving at 50 mph at 50 feet	80	Food blender at 3 feet, garbage disposal at 3 feet
Noisy urban area, gas lawn mower at 100 feet	70	Vacuum cleaner at 10 feet, normal speech at 3 feet
Commercial area, heavy traffic at 300 feet	60	
Quiet urban daytime	50	Large business office, dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime	30	Library, bedroom at night, concert hall (background)
Quiet rural nighttime	20	Broadcast/recording studio
	10	
Threshold of human hearing	0	Threshold of human hearing

SOURCE: Caltrans 2013a
NOTES: dBA = A-weighted decibels; mph = miles per hour

Effects of Noise on Humans

Excessive and chronic (long-term) exposure to elevated noise levels can result in auditory and non-auditory effects on humans. Auditory effects are the temporary or permanent hearing loss caused by loud noises. Exposure to noise can cause physical damage to the auditory system, resulting in gradual or extreme hearing loss. Sustained exposure to moderately high noise levels over a period of time can cause gradual hearing loss, whereas a short period of sudden exposure to extremely high noise levels can cause extreme hearing loss. Both of these hearing changes can result in the permanent loss of hearing.

The degree to which noise results in annoyance, nuisance, and dissatisfaction in humans is highly variable and can be influenced by multiple non-auditory factors. The human response to noise varies depending on individual characteristics such as sensitivity, location, time of day, location, and length of exposure.

Ground Vibration

Vibration is the periodic oscillation of a medium or object relative to a given reference point. Sources of vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous (e.g., operating factory machinery) or transient (e.g., explosions). Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, or acceleration.

Vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root-mean-square vibration velocity. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings (FTA 2018; Caltrans 2013a). PPV and root-mean-square vibration velocity are normally described in inches per second.

PPV is appropriate for evaluating the potential for building damage but is not always suitable for evaluating human response. It takes some time for the human body to respond to vibration signals. In a sense, the body responds to average vibration amplitude. The root mean square of a signal is the average of the squared amplitude of the signal, typically calculated over a 1-second period. As with airborne sound, the root-mean-square velocity is often expressed in decibel notation as vibration decibels (VdB), which serves to compress the range of numbers required to describe vibration (FTA 2018). Table 3.14-3 shows the general human response to different ground vibration-velocity levels.

The typical background vibration-velocity level in residential areas is approximately 50 VdB. Typical outdoor sources of perceptible ground vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground vibration is rarely perceptible. The range of interest is from approximately 50 VdB, the typical background vibration-velocity level, to 100 VdB, the general threshold at which minor damage can occur in fragile buildings. Construction activities can generate

sufficient ground vibration to pose a risk to nearby structures. Constant or transient vibration can weaken structures, crack facades, and disturb occupants (FTA 2018).

Table 3.14-3
Human Response to Different Levels of Groundborne Noise and Vibration

Vibration-Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there is an infrequent number of events per day.

SOURCE: FTA 2018

NOTE: VdB = vibration decibels referenced to 1 microinch per second and based on the root mean square velocity amplitude

Construction activities can be transient, random, or continuous. Transient construction vibration is generated by blasting, impact pile driving, and wrecking balls. Continuous vibration results from vibratory pile drivers, large pumps, and compressors. Random vibration can result from jackhammers, pavement breakers, and heavy construction equipment.

Existing Environment

Noise-sensitive land uses typically include places where quiet is crucial to their intended purpose, or those where noise exposure could result in detrimental effects on the health of individuals. Residences, hospitals, places of worship, libraries and schools, nature and wildlife preserves, and parks are considered sensitive to increased exterior noise levels. Fragile buildings, such as historical or lightweight buildings, are sensitive to groundborne vibration. Buildings whose operations could be disrupted by vibration, such as commercial and industrial buildings, are also considered vibration-sensitive; they may be sensitive at levels below those associated with human annoyance.

Restoration projects permitted under the Order could be implemented statewide. Primary sources of noise and vibration vary in each county, city, and region; generally, however, they consist of roadway traffic, railroads, aircraft, watercraft, and other sources such as farming, mining, timber, harvesting, industrial, and construction equipment. Fixed noise sources include lumber mills, auto maintenance shops, car washes, loading docks, recycling centers, electricity-generating stations, landfills, and athletic fields.

Numerous freeways, expressways, and railroads serve the study area, and a number of private and public airports of various sizes and daily flight frequencies serve the state. California’s leading ports include the Ports of Los Angeles and Long Beach on San Pedro Bay, yet harbors are found throughout the state.

As discussed in Section 2.6, *Categories of Restoration Projects in the Order*, the Order would permit the construction, modification, or operation of the following types of restoration projects:

- Stream crossing and fish passage improvements
- Removal of small dams, tide gates, flood gates, and legacy structures
- Bioengineered bank stabilization
- Restoration and enhancement of off-channel/side-channel habitat
- Water conservation
- Floodplain restoration
- Removal of pilings and other in-water structures
- Removal of non-native terrestrial and aquatic invasive species and revegetation with native plants
- Establishment, restoration, and enhancement of tidal, subtidal, and freshwater wetlands
- Establishment, restoration, and enhancement of stream and riparian habitats

Project areas could include a wide range of land uses from wildlands and forest lands to agricultural, rural residential, suburban, and urban. In general, noise is less prevalent in agricultural, rural, and rural-residential areas than in suburban and urban areas. All categories of sensitive receptors exist in the study area.

3.14.3 Regulatory Setting

This section discusses federal, state, and regional and local plans, policies, regulations, and laws, and ordinances pertaining to noise and vibration impacts.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location.

Federal

U.S. Environmental Protection Agency Office of Noise Abatement

The U.S. Environmental Protection Agency's Office of Noise Abatement and Control was originally established to coordinate federal noise control activities. The Office of Noise Abatement and Control subsequently enforced the Federal Noise Control Act of 1972, which established programs and for identifying and addressing the effects of noise on public health, welfare, and the environment.

In 1981, agency administrators determined that subjective issues such as noise would be better addressed at more local levels of government. Consequently, in 1982, responsibilities for regulating noise control policies were transferred to state and local governments. However, federal action is essential for dealing with major noise sources

in commerce, control of which requires nationally uniform treatment. Congress has directed the U.S. Environmental Protection Agency to coordinate the programs of all federal agencies related to noise research and noise control.

U.S. Department of Transportation

To address the human response to groundborne vibration, the Federal Transit Administration (FTA) set forth guidelines identifying maximum-acceptable vibration criteria for different types of land uses. These guidelines include the following maximum-acceptable vibration limits (FTA 2018):

- 65 VdB, referenced to 1 microinch per second and based on the root-mean-square velocity amplitude, for land uses where low ambient vibration is essential for interior operations (e.g., hospitals, high-tech manufacturing, laboratory facilities)
- 80 VdB for residential uses and buildings where people normally sleep
- 83 VdB for institutional land uses with primarily daytime operations (e.g., schools, churches, clinics, offices)

State

The State of California has adopted noise standards in areas of regulation not preempted by the federal government. State standards regulate the noise levels of motor vehicles, sound transmission through buildings, occupational noise, and noise insulation. Though not adopted by law, the *State of California General Plan Guidelines 2003,* published by the California Governor's Office of Planning and Research, provides guidance for project compatibility in areas of specific noise exposure. Acceptable and unacceptable community noise exposure limits for various land use categories have been identified to help guide new land use decisions in California communities. Many local jurisdictions use these guidelines to derive local noise standards and guidance.

Generally, residential uses (e.g., mobile homes) are considered acceptable in areas where exterior noise levels do not exceed 60 dBA Ldn. Residential uses are normally unacceptable in areas where exterior noise levels exceed 70 dBA L_{dn} and conditionally acceptable where levels are in the range of 55–70 dBA Ldn. Schools are normally acceptable in areas with exterior noise levels up to 70 dBA L_{dn} and normally unacceptable where with levels exceed 70 dBA L_{dn}. Commercial uses are normally acceptable in areas with exterior noise levels up to 70 dBA community noise equivalent level. Day-night noise levels between 67.5 and 77.5 dBA for commercial uses are conditionally acceptable, depending on the noise insulation features and noise reduction requirements. The guidelines also present adjustment factors that may be used to determine noise acceptability standards that reflect the particular community's noise control goals, sensitivity to noise, and assessment of the relative importance of noise pollution.

California Department of Transportation

In 2013, the California Department of Transportation published the *Transportation and Construction Vibration Guidance Manual*. The manual provides general guidance on vibration issues associated with project construction and operation relative to human

perception and structural damage. Table 3.14-4 lists vibration levels that could damage structures exposed to continuous vibration.

Table 3.14-4
California Department of Transportation Recommendations regarding Vibration Levels

PPV (in/sec)	Effect on Buildings
0.4 to 0.6	Architectural damage and possible minor structural damage
0.2	Risk of architectural damage to normal dwelling houses
0.1	Virtually no risk of architectural damage to normal buildings
0.08	Recommended upper limit of vibration to which ruins and ancient monuments should be subjected
0.006 to 0.019	Vibration unlikely to cause damage of any type

SOURCE: Caltrans 2013b
NOTES: in/sec = inch per second; PPV = peak particle velocity

Regional and Local

The Order would encompass all counties and cities throughout California. Government Code Section 65302(f) requires city and county general plans to include a noise element. Each county and city has local regulations and a general plan containing noise goals and policies that establish acceptable noise level criteria for transportation and stationary noise sources to guide future development and reduce land use conflicts. Noise ordinances establish limits that may be enforced by applying penalties or taking other actions. A noise ordinance generally must not be exceeded, whereas general plan standards are guidance to be considered during project development and may not represent strict limits, depending on the particular circumstances of the project.

3.14.4 Impacts and Mitigation Measures

Methods of Analysis

Noise and vibration impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could introduce temporary or permanent noise and vibration sources near sensitive receptors (e.g., residences); identifies the potential for noise levels to exceed applicable local ordinances; and determines the potential for a substantial permanent increase in ambient noise levels. However, the precise locations and character of potential future permitted restoration projects are yet to be determined. Therefore, this noise analysis focuses on reasonably foreseeable impacts of the types of restoration projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis.

Permanent impacts are considered those that would continue through the life of a project as a result of the environmental conditions caused by restoration projects permitted under the Order (e.g., fish screens on water intakes that could involve

operating a pump station that would produce noise). Temporary impacts are considered those that would be temporary in nature (e.g., construction-related activities).

The approach to assessing noise and vibration impacts was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of Restoration Projects in the Order*, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an impact related to noise is considered significant if the types of projects that would be permitted under the Order would do any of the following:

- Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies
- Generate excessive groundborne vibration or groundborne noise levels
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels

Impacts were determined based on methodologies, reference emission levels, and usage factors from FTA's *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) and the Federal Highway Administration's *Roadway Construction Noise Model User's Guide* (FHWA 2006). Jurisdictions throughout the study area apply a variety of numeric thresholds that would indicate a substantial temporary increase in ambient noise levels. This analysis uses a temporary increase of 10 dBA over ambient noise levels as a threshold: A 10-dBA increase is perceived as a doubling of loudness and may therefore indicate that the impact of the noise increase would be potentially significant. A long-term or permanent increase of 5 dBA over ambient noise levels would indicate a potentially significant increase in ambient noise levels. Human perception of changes in noise level generally can be perceived at an increase of 5 dBA (Caltrans 2013a) over ambient sound. The threshold is lower for long-term or permanent noise increases than for temporary noise increases because tolerance is greater for temporary changes in noise levels than for long-term or permanent changes (Caltrans 2013a).

For the purposes of this analysis, a project's impact from groundborne construction vibration would be significant if the project would expose residential structures or other buildings used by people to groundborne vibration levels exceeding either of the following standards:

- FTA's maximum acceptable vibration standard of 80 VdB for residential uses (e.g., annoyance, sleep disturbance)
- The California Department of Transportation–recommended standard of 0.2 inch per second PPV with respect to the prevention of damage to residential structures

Impacts and Mitigation Measures

Table 3.14-5 summarizes the impact conclusions presented in this section for easy reference.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Table 3.14-5
Summary of Impact Conclusions—Noise

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.14-1: Implementing future restoration projects permitted under the Order could result in a temporary or permanent increase in ambient noise levels in excess of standards established in applicable plans and ordinances.	SU	LTSM
3.14-2: Implementing future restoration projects permitted under the Order could expose sensitive receptors to excessive groundborne vibration.	SU	LTSM
3.14-3: Implementing future restoration projects permitted under the Order could expose sensitive receptors to excessive groundborne noise levels.	SU	LTSM
3.14-4: Implementing future restoration projects permitted under the Order that are located within the vicinity of a private airstrip, an airport land use plan, or where such a plan has not been adopted, within 2 miles of a public airport or public use airport, could expose people residing or working in the project area to excessive noise levels.	LTSM	LTS

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2020
NOTES: LTS = less than significant; LTSM = less than significant with mitigation; SU = significant and unavoidable

Impact 3.14-1: Implementing future restoration projects permitted under the Order could result in a temporary or permanent increase in ambient noise levels in excess of standards established in applicable plans and ordinances.

Effects of Project Construction Activities

Construction activities for future restoration projects permitted under the Order could require the use of haul trucks and heavy equipment (Section 2.7.1, *Construction Activities and Methods*). Depending on the types and models of equipment used for construction, typical noise levels for these kinds of construction equipment would range from 80 to 95 dBA maximum noise level at 50 feet (FTA 2018). Most construction activities would occur during daylight hours; however, in rare cases, some activities, expedited projects, and projects where the construction schedule is nearing the prohibited work time frames (e.g., for biological species) may require continuous daytime and nighttime work. Also, several cities and counties have exempted construction activities from restrictive noise limits during specified daytime hours, while others have placed numeric limits on noise generated during construction.

For example, a restoration project involving levee deconstruction and construction may use heavy equipment during site preparation, restoration-related grading and excavation, and levee deconstruction. In addition, fish passage improvement projects (e.g., construction of fish screens and removal of dams) could require the use of pile driving methods and explosives. In such a case, construction activities could influence noise levels at and near the project site. These noise levels would fluctuate depending on the particular type, number, and duration of equipment used (e.g., small power tools, generators, dump trucks, graders). If, for example, the construction activity was located near single-family and multifamily residential and transient lodging, restoration activities could expose these sensitive receptors to increased noise levels. The highest levels of noise would be generated during simultaneous operation of multiple pieces of construction equipment.

Most restoration projects would likely occur far from residential areas and other sensitive receptors and would take place during the day. However, some construction-related activities may occur close to receptors and/or at night (e.g., if construction must be completed before a blackout period for a sensitive species). Therefore, this impact would be **potentially significant**.

Projects implementing applicable general protection measures (Appendix E) included in the Order would further reduce impacts to noise. The following general protection measures may apply to noise impacts:

- GPM-2: Construction Work Windows
- GPM-3: Construction Hours
- GPM-6: Work Area and Speed Limits
- IWW-9: In-Water Pile Driving Plan for Sound Exposure

However, the specific locations of restoration projects that would be permitted under the Order are yet to be determined. Therefore, even with implementation of general protection measures, some construction activities could result in temporary or

permanent increases in ambient noise levels. Actual exposure levels would depend on multiple variables such as the intensity of construction activity, the distance of sensitive receptors to the noise source, and any structures or topography that might intervene and affect noise attenuation. Therefore, this impact would be **potentially significant**.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure NOISE-1 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure NOISE-1: Minimize Noise Conflicts

The following measures shall be implemented during construction of any restoration project permitted under the Order:

- Noise-generating activities shall follow the applicable general plan and/or noise ordinances for the jurisdiction located within the vicinity of the project.
- Construction equipment shall be located away from sensitive receptors, to the extent feasible, to reduce noise levels below applicable local standards.
- Construction equipment shall be maintained to manufacturers' recommended specifications, and all construction vehicles and equipment shall be equipped with appropriate mufflers and other approved noise-control devices.
- Idling of construction equipment shall be limited to the extent feasible to reduce the time that noise is emitted.
- An individual traffic noise analysis of identified haul routes shall be conducted and mitigation, such as reduced speed limits, shall be provided at locations where noise standards cannot be maintained for sensitive receptors.
- The project shall incorporate the use of temporary noise barriers, such as acoustical panel systems, between construction activities and sensitive receptors if it is concluded that they would be effective in reducing noise exposure to sensitive receptors.

Mitigation Measure NOISE-1 would be implemented to reduce the impacts of restoration projects under the Order. However, because the extent and location of such actions are not known at this time, it is not possible to conclude that the mitigation measure, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. Therefore, this impact would be **significant and unavoidable**.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Routine O&M activities for constructed facilities (natural or artificial infrastructure) for restoration projects that would be permitted by the Order could produce ambient noise. For example, O&M work for fish screens on water intakes could involve operating a pump station that would produce noise. However, pump stations are normally enclosed

and would not be expected to result in a permanent substantial noise increase relative to existing conditions, nor would noise levels generated by the pump station exceed local jurisdictions' noise standards.

Most maintenance activities would involve truck trips, vegetation removal, sediment removal within or near the facilities, and inspection and maintenance of facilities. These activities could require heavy equipment that would generate noise at levels similar to those described above. However, elevated noise levels would be less frequent than during construction of these projects, because maintenance would be less frequent than ongoing construction activities.

Therefore, the impact of operation of constructed facilities for restoration projects permitted by the Order related to a temporary or permanent increase in ambient noise levels would be **less than significant.**

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure NOISE-2 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure NOISE-2: Minimize Operations and Maintenance Noise Conflicts

The following measures shall be implemented during O&M activities for any restoration project permitted under the Order:

- Noise-sensitive receptors in the vicinity of project activities shall be identified and projects shall be designed to minimize exposure of sensitive receptors to long-term, operational noise sources (for example, water pumps) to reduce noise levels below applicable local standards.
- The hours of operation at noise generation sources near or adjacent to noise-sensitive areas shall be limited, wherever practicable, to reduce the level of exposure to meet applicable local standards.

Implementing Mitigation Measure NOISE-2 would reduce the impact related to a temporary or permanent increase in ambient noise levels from operation of constructed facilities for restoration projects permitted by the Order to a **less-than-significant level**.

Impact 3.14-2: Implementing future restoration projects permitted under the Order could expose sensitive receptors to excessive groundborne vibration.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order could require the use of heavy equipment such as pile drivers, bulldozers, haul trucks, and jackhammers, and explosives. These types of equipment or processes could generate groundborne vibration at levels ranging from 0.035 to 1.518 inches per second PPV at 25 feet and 79–112 VdB at 25 feet (FTA 2018) and could expose sensitive receptors to elevated vibration levels.

Vibration levels typically tend to dissipate rapidly as distance increases from the vibration source. For example, stockpiling of materials may require constructing piers for barge landings, and pier construction may use pile drivers that could generate 1.518 inches per second PPV and 112 VdB at 25 feet. Applying FTA's recommended procedure for determining vibration levels at various distances from the source, the predicted most-conservative ground vibration levels would exceed the threshold of 80 VdB for human disturbance for pile driving at distances within 290 feet. With regard to structural damage, the threshold of 0.2 inch per second PPV would be exceeded for pile driving at distances within 96 feet. Therefore, this impact would be **potentially significant**.

Projects implementing applicable general protection measures (Appendix E) included in the Order would further reduce impacts to noise. The following general protection measures may apply to noise impacts:

- IWW-9: In-Water Pile Driving Plan for Sound Exposure

Mitigation Measure NOISE-1, or equally effective mitigation measures, would help to reduce significant impacts to a less-than-significant level for many projects. However, because the exact locations of restoration projects permitted under the Order are yet to be determined at this time, it is possible that construction activities could take place near sensitive receptors which could be exposed to excessive ground borne vibration. The factors necessary to determine individual restoration projects impacts include the type and exact location of construction activities, construction schedule, type of equipment used, and applicable local noise standards. Therefore, this impact may, in some cases, be **significant and unavoidable**.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Operation of restoration projects permitted under the Order could expose people to elevated groundborne vibration, but far less frequently than during construction. Some projects, such as the construction of new levees, are not likely to generate vibration during operation. However, some heavier maintenance and repair activities could generate impacts similar to those discussed for Impact 3.14-1, except that jackhammering and pile driving and other activities that would generate the highest levels of vibration would not be expected to commonly be used as part of O&M activities. These operation and maintenance activities could result in temporary ground borne vibration at a level that is **potentially significant**.

Implementation of MM-NOISE 1 and NOISE-2 would reduce the impact of groundborne vibration during O&M activities for constructed facilities for restoration projects permitted by the Order to a **less-than-significant level**.

Impact 3.14-3: Implementing future restoration projects permitted under the Order could expose sensitive receptors to excessive groundborne noise levels.

Effects of Project Construction Activities

Construction activities for future restoration projects permitted under the Order could expose sensitive receptors to excessive groundborne noise levels (i.e., pile drivers,

bulldozers, haul trucks, jackhammers and explosives [e.g., small dam removal]). As shown in Table 3.14-2, groundborne noise levels ranging from 25 to 40 dBA are the approximate threshold of perception for many humans ranging from inaudible to excessive for quiet sleeping areas; 35–50 dBA is the approximate dividing line between barely perceptible and distinctly perceptible, ranging from tolerable for sleeping areas to excessive in most quiet occupied areas; and 45–60 dBA ranges from excessive for sleeping areas to excessive even for infrequent events for some activities (FTA 2018). A noise level increase of 10 dBA or more is considered substantial. Construction activities would take place mostly during the day when construction-related noise increases would be smaller; however, it is possible that these increases could be substantial. Furthermore, a project may require some nighttime work to complete work before prohibited work time frames (e.g., for biological species).

Because the specific locations and scale of applicable projects are not known at this time, the potential for permitted actions to result in exposure of sensitive receptors to excessive groundborne noise levels cannot be determined. Factors necessary to determine individual restoration projects impacts include the type and precise locations of project activities, construction schedule, types of equipment used, and local ambient and groundborne noise levels. Construction activities that would be permitted under the Order could increase groundborne noise levels by more than 10 dBA. This impact would be **potentially significant**.

The general protection measures listed for Impact 3.14-1 and Mitigation Measure NOISE-1 would be used to reduce the potential impacts of project construction related to the exposure of sensitive receptors to excessive groundborne noise levels.

Mitigation Measure NOISE-1 would be implemented to reduce the impacts of restoration projects under the Order. However, because the extent and location of such actions are not known at this time, it is not possible to conclude that the mitigation measure, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. Therefore, this impact would be **significant and unavoidable**.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Routine O&M activities for constructed facilities (natural or artificial infrastructure) for future restoration projects permitted by the Order could result in a substantial (10-dBA) long-term or permanent increase in groundborne noise levels. For example, operation of fish screens on water intakes could involve using a pump station that would produce noise. Ordinarily, these facilities are enclosed and would not be expected to result in a permanent substantial increase in noise levels relative to existing conditions, nor would the noise levels generated by pump stations be expected to exceed the local jurisdictions' noise standards. However, these projects could be located in a quiet rural environment where typical noise levels may be as low as 20 dBA. As a result, operation of restoration projects permitted under the Order could expose sensitive receptors to excessive groundborne noise levels by more than 10 dBA.

Most maintenance activities would involve truck trips, vegetation removal, sediment removal within or near the facilities, and inspection and maintenance of facilities. These activities could require heavy equipment that would generate noise levels similar to those described above, but elevated noise levels would occur less frequently than during construction of these projects, because maintenance would be less frequent than ongoing construction activities.

Therefore, the impact of excessive groundborne noise levels generated during operation of constructed facilities for restoration projects permitted by the Order would be **less than significant**.

Although the impact would be less than significant, mitigation measures may help to further reduce impacts associated with excessive groundborne noise levels associated with operation of constructed facilities. As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure NOISE-2 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Excessive groundborne noise levels associated with operation of constructed facilities that would be permitted by the Order would remain **less than significant**.

Impact 3.14-4: Implementing future restoration projects permitted under the Order that are located within the vicinity of a private airstrip, an airport land use plan, or where such a plan has not been adopted, within 2 miles of a public airport or public use airport, could expose people residing or working in the project area to excessive noise levels.

Effects of Project Construction Activities

Construction of restoration projects that would be permitted under the Order could be located in the vicinity of a private airstrip, an airport land use plan, or within 2 miles of a public airport or public use airport. These restoration projects would not include occupied structures; therefore, exposure of excessive noise levels to the people residing in the area of a restoration project is not discussed further.

As discussed in Impact 3.10-3 in Section 3.10, *Hazards and Hazardous Materials*, it is possible that some projects could be constructed within 2 miles of an airport. These projects would be likely be subject to consistency requirements of an airport land use plan. However, because each project's specific location and scale are yet to be determined, the risks associated with noise levels near an airport cannot be determined. The necessary factors to determine risks associated with noise levels in the vicinity of an airport include the project's location relative to the airport. Implementation of projects in the vicinity of an airport could expose people working in the project area to excessive noise levels. This impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure NOISE would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure NOISE-3: Prepare Preconstruction Safety Plans

To reduce potential impacts on people residing or working in the vicinity of a private airstrip, an airport land use plan, or where such a plan has not been adopted within 2 miles of a public airport or public use airport, construction contracts shall include requirements for the contractor to prepare a construction safety plan. The plan shall be developed before construction activities begin, in collaboration with aviation base personnel, to coordinate construction activities including a schedule, coordination of personnel with aviation radios, and notice requirements. Furthermore, the contractor shall coordinate with emergency service personnel.

Implementing Mitigation Measure NOISE-3 would reduce this impact to a **less-than-significant** level.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Routine O&M activities for facilities constructed for restoration projects permitted under the Order could be located within the vicinity of a private airstrip, an airport land use plan, or where such a plan has not been adopted, within 2 miles of a public airport or public use airport. Depending on their location, these projects could expose people working in the project area to excessive noise levels. However, routine O&M activities (e.g., vegetation clearing, debris removal, monitoring) would be limited and temporary, occurring yearly, monthly, weekly, or on an as-needed basis, depending on the restoration project. As stated above, restoration projects permitted under the Order would not include occupied structures; therefore, exposure of people residing in the area to excessive noise levels is not applicable.

The level of significance for potential impacts depends, in large part, on its proximity to an airport use plan, or on the project's location within 2 miles of a public airport or public use airport. However, because O&M activities would be temporary, this impact would be **less than significant**.

3.15 Population and Housing

3.15.1 Introduction

This section describes population and housing in the study area and the potential impacts of implementing restoration projects that would be permitted under the Order. (Section 2.6, *Categories of Restoration Projects in the Order.*) These restoration projects could directly and indirectly induce substantial unplanned population growth or the increase demand for housing, or necessitate the construction of replacement housing because of the displacement of people or houses.

The environmental setting and evaluation of impacts on population and housing are based on a review of existing published documents, including city and county general plans; information regarding example projects similar to those permitted under the Order; and other information sources listed in Chapter 8, *References.*

No comments specifically addressing population and housing were received in response to the notice of preparation (NOP). See Appendix B for the NOP comment letters.

3.15.2 Environmental Setting

Population and Population Growth

Since California's admittance to the Union in 1850, the state's population has steadily increased. According to the California Department of Finance (DOF), between July 1, 2018, and July 1, 2019, the population increased by 141,300 people to a total of approximately 39.96 million (DOF 2019a). The population increase represents a growth rate of 0.35 percent for the 2018–2019 year, a decrease from the prior year's (2017–2018) growth rate of 0.57 percent, making the last two growth rates the lowest recorded since 1900. If the current growth rate persists, California's population will reach 42.26 million by 2030 (DOF 2020). Annual growth rates for the state are estimated to be less than 0.8 percent; California will have an annual average increase in population exceeding 300,000 between 2020 and 2030 (PPIC 2020). Table 3.15-1 lists the 10 largest counties and their population percent of the state.

Housing

Housing distribution and household conditions are expected to evolve and change as the population increases throughout the state. In 2018, the net unit growth for completed housing units was 77,000 units, a 0.6 percent increase from 2017. This brought California's total housing to 14,235,000 units (DOF 2019b). Ranked by net housing gains, the most housing units added in 2018 were in Los Angeles (16,525), San Diego (4,505), Irvine (3,384), Santa Clarita (2,486), and Sacramento (2,353). Of the state's 14,253,000 housing units, approximately 9,186,000 are single-family units, 4,490,000 are multi-family units, and 560,00 are mobile homes. The top five cities to produce population growth related to housing production were Lathrop (5.2 percent) in San Joaquin County, San Juan Bautista (4.8 percent) in San Benito County, Dublin (4.4 percent) in Alameda County, Irwindale (4.1 percent) in Los Angeles County, and Beaumont (4.0 percent) in Riverside County.

Table 3.15-1
The 10 Largest Counties in California, 2019

County	Population Estimate	Percent of State
Los Angeles	10,260,237	25.68%
San Diego	3,357,442	8.40%
Orange	3,220,987	8.06%
Riverside	2,443,454	6.11%
San Bernardino	2,197,650	5.50%
Santa Clara	1,961,117	4.91%
Alameda	1,674,115	4.19%
Sacramento	1,553,253	3.89%
Contra Costa	1,153,077	2.89%
Fresno	1,021,960	2.56%

Source: DOF 2019b

3.15.3 Regulatory Setting

This section discusses federal, state, and regional and local plans, policies, regulations, and laws, and ordinances pertaining to population and housing.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location.

Federal

The Fair Housing Act (FHA) (42 USC § 3601 et seq.) affects municipal land use throughout the state of California. The FHA prohibits discrimination by direct providers of housing, such as landlords and real estate companies as well as other entities, such as municipalities, banks or other lending institutions and homeowner's insurance companies whose discriminatory practices make housing unavailable to persons because of:

- Race or color
- religion
- sex
- national origin
- familial status, or
- disability.

State

California Government Code Section 65302 requires that each city and county adopt a land use and housing element as part of its general plan. Section 65302(a) outlines requirements for a land use element and states that it must include the proposed general distribution and general location and extent of the uses of the land for housing,

business, industry, open space, include agriculture, natural resources, recreation, and enjoyment of scenic beauty, education, public buildings and grounds, solid and liquid waste disposal facilities, greenways, as defined in Section 816.52 of the Civil Code, and other categories of public and private uses of land. Section 65302(b) outlines requirements for the housing element, which include the following:

- An assessment of housing needs and an inventory of resources and constraints relevant to meeting those needs.
- A statement of the community's goals, quantified objectives, and policies relative to the maintenance, preservation, improvement, and development of housing.
- A program with a schedule of actions during the planning period that the local government will undertake to implement the housing element's policies and achieve the element's goals and objectives.

California Department of Housing and Community Development

The State Tenement House Act of 1909 was California's first housing regulation. The law applied only to the apartment houses and hotels in cities. Later laws such as the State Dwelling Act and the State Housing Law (formerly known as the State Housing Act) were applied to a wider range of housing types and eventually led to the formation of the California Department of Housing and Community Development (HCD) in 1965. HCD develops and enforces statewide minimum construction regulations for all types of housing and is responsible for promoting and maintaining adequate housing and decent living environments for all of California's citizens (HCD 2019).

Regional and Local

The study area encompasses all counties and cities throughout California. Each county and city has local regulations and a general plan containing goals and policies for housing and population that promote investments and land use decisions to address future growth and existing needs.

3.15.4 Impacts and Mitigation Measures

Methods of Analysis

Population and housing impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could impact growth and housing displacement. Trends for construction workforces and housing are discussed. However, the precise locations and detailed characteristics of potential future individual restoration projects are yet to be determined. Therefore, this population and housing analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis.

Permanent impacts are considered those that would continue through the life of a proposed restoration project as a result of the environmental conditions created by the project (e.g., ongoing maintenance that could require the relocation of an operations crew). Temporary impacts are considered those that would be temporary in nature

(e.g., construction-related activities). Indirect population growth is also discussed in Chapter 5, *Other CEQA Considerations.*

The approach to assessing population and housing impacts was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of Restoration Projects in the Order*, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an impact related to population and housing resources is considered significant if the types of projects that would be permitted under the Order would do either of the following:

- Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)
- Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere

Impacts and Mitigation Measures

Table 3.15-2 summarizes the impact conclusions presented in this section for easy reference.

Table 3.15-2
Summary of Impact Conclusions—Population and Housing

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.15-1: Implementing restoration projects permitted under the Order could require relocation by construction and operation crews, resulting in population growth and demand for housing.	LTS	LTS
3.15-2: Implementing restoration projects permitted under the Order may displace substantial numbers of people or housing, necessitating the construction of replacement housing elsewhere.	LTS	LTS

Source: Data compiled by Environmental Science Associates in 2019 and 2020
Note: LTS = less than significant

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given

project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Impact 3.15-1: Implementing restoration projects permitted under the Order could require relocation by construction and operation crews, resulting in population growth and demand for housing.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order could include large projects such as removing levees, constructing new setback levees, and widening floodways. During construction, non-locals may move to a project area to support these activities; however, construction employees are generally pulled from the region's existing labor pool and typically do not relocate when assigned to a new construction site. Those who are hired from outside of the existing labor pool generally tend to commute to jobsites, as projects can change several times a year and offer no permanent place of business. Some more specialized construction workers may be needed and potentially would relocate to the construction area; however, relocation by specialized workers is usually temporary and limited to the duration needed to complete a particular phase of construction that requires their skills. Once that construction phase is completed, specialized workers typically move onto the next jobsite requiring their skills. Construction of restoration projects may be as short as a few days or as long as several years, depending on the specific project being constructed. As such, worker relocation could vary depending on the size, type, and length of construction activities. Therefore, restoration projects would not be expected to result in substantial population or demand for housing.

Restoration projects permitted under the Order would have the potential to result in an increase in temporary and long-term population growth. Individual restoration projects locations and the scale of potential future permitted restoration projects and their staffing needs are not known at this time. Factors necessary to identify potential impacts include the number of construction workers employed, the duration of project construction, and the location of projects relative to populated areas. However, none of the restoration projects permitted under the Order would involve constructing new homes, businesses, or other infrastructure that would provide new long-term employment opportunities or result in population growth and demand for housing. Furthermore, while temporary or longer term population increases could occur, the potential presence of existing vacant units in and around the project area would help absorb the population increases, which would be negligible and temporary. Therefore, impacts would be **less than significant**.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Operations and maintenance (O&M) supporting constructed infrastructure for restoration projects permitted under the Order may include maintenance and cleaning of fish screens, removal of debris and sediment from stream crossings, and maintenance and operation of fishways. These O&M activities could require additional staff. However, it is anticipated that these activities would be similar to those in the project area located near a waterway. Furthermore, the potential presence of existing vacant units in and around the project area is expected to be sufficient to accommodate any workers who temporarily relocate to the area.

Routine O&M activities for restoration projects permitted under the Order could result in the relocation of an operations crew. However, potential vacant units in the area would provide sufficient housing for the minimal number of operations workers who may relocate to the project area. This impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Impact 3.15-2: Implementing restoration projects permitted under the Order could displace substantial numbers of people or housing, necessitating the construction of replacement housing elsewhere.

Effects of Project Construction Activities, Constructed Facilities (Natural or Artificial Infrastructure), and Operations and Maintenance of those Facilities

Construction of restoration projects, constructed facilities (natural or artificial infrastructure), and operations and maintenance of those facilities permitted under the Order would not result in the elimination of housing. Some construction activities (such as projects to establish, restore, and enhance stream and riparian habitats and upslope watershed sites (watersheds that are upslope and contribute flow to a common watershed outlet) could involve removing or relocating existing infrastructure such as boat docks, boat haul-out locations, campgrounds and campsites, day-use sites, roads/ trails, and off-highway/off-road vehicle routes.

Most, if not all, of the projects that would be constructed and operated under the Order would be located in or near waterways. Restoration projects would not be expected to displace substantial numbers of housing or people, and any displacements that could occur, would not be expected to result in the need to construct new housing. This is due to larger restoration projects (e.g., floodplain widening) being located in rural areas with the potential for small numbers of rural residences to be displaced, in which displaced individuals could be accommodated within existing available housing stock. Individual restoration projects permitted under the Order could displace future housing due to an expansive amount of land needed for a large restoration project, or an increase in housing due to the aesthetic nature of a restoration project; however, restoration projects would need to be consistent with local general plans and would not be expected to result in a substantial number of people or housing which would necessitate the construction of replacement housing elsewhere.

Water conservation projects could involve constructing new infrastructure (e.g., fish screens, fishways, pumps and piping, screens and head gates); however, these projects would most likely be in less urbanized or rural environments in areas with minimal housing. Given that the location and scope of an individual restoration project permitted under the Order are yet to be determined, the potential exists for some such projects to result in displacement of some housing and people. Factors necessary to identify specific impacts include the type of project and the location of construction relative to people and housing. Even though these factors are not known, these impacts should be negligible because projects would typically occur in low-density population regions near waterways, limiting the potential for the displacement of people or housing. Furthermore, none of the restoration projects permitted under the Order would include the removal or relocation of housing. Therefore, this impact would be less than significant. The Order does not include any general protection measures applicable to this impact.

3.16 Recreation

3.16.1 Introduction

This section describes recreation activities and resources in the study area and evaluates potential impacts on recreation from the types of restoration projects that would be permitted under the Order.

The environmental setting and evaluation of impacts on recreation resources is based on a review of existing published documents, including city and county general plans and land management plans; information regarding example projects similar to those permitted under the Order that may be implemented by other agencies; and additional information sources listed in Chapter 8, *References*.

Restoration projects permitted under the Order could increase the use of existing parks, require construction of new recreational facilities, or otherwise physically affect facilities discussed in this section. This section evaluates the potential for significant effects involving recreational facilities and activities and identifies mitigation measures that could be considered for implementation by projects permitted under the Order.

No comments specifically addressing recreation were received in response to the notice of preparation (NOP). See Appendix B for the NOP comment letters.

3.16.2 Environmental Setting

This section describes existing recreational resources and areas with recreation opportunities in the study area. Given its size and range of landscapes and water features, the study area contains a wide variety of recreation resources and opportunities. For instance, snowmelt from the Sierra Nevada and other mountain ranges feeds the network of rivers throughout the state, which in turn may spill into floodways. Although the study area encompasses all of California, projects permitted under the Order would occur mainly in areas of aquatic, riparian, and floodplain habitats.

Aquatic Features

Rivers and Streams

River and stream recreation facilities in the study area vary by location, property ownership, and ease of access. In the foothills and mountains, whitewater kayak put-in and take-out locations are frequently available on an “opportunity” basis along public rights-of-way at crossings and often lack improved facilities. National, state, and local parks have been developed at many riverside and stream locations and generally provide improved parking, picnicking, boat launching, sanitation, drinking water facilities, and sometimes camping and developed trails. Bidwell–Sacramento River State Park and Woodson Bridge State Park along the Sacramento River, Burton Creek State Park on Burton Creek, and the Merced River within Yosemite National Park are examples.

Private marinas, launch ramps, and campgrounds also can be found along rivers throughout the study area. Rivers at higher elevations with steeper profiles and often-uncontrolled springtime runoff provide a wide range of whitewater kayak recreation opportunities for individuals and commercial rafters and kayakers.

In addition, the corridors of some rivers and adjacent land areas have been designated as open space parkways, often expanding the value of river corridors for recreation by expanding public access. The American River Parkway and San Joaquin River Parkway are examples of this concept. These river parkways are unique, however, in that many river corridors, banks, and adjacent habitats are in private ownership. The American River Parkway extends more than 25 miles from the confluence with the Sacramento River to recreation lands at Folsom Lake State Recreation Area, which in turn connects to Auburn State Recreation Area, effectively creating a public recreation corridor that extends for some 50 miles.

Lakes and Ponds

More than 9,000 lakes, reservoirs, and dry lakes and countless ponds are scattered throughout the state of California. Recreation facilities in the study area vary by location, property ownership, and ease of access. Most of the lakes in California are United States Navigable Waterways, where areas up to 2 feet past the high-tide line are not available for private ownership as part of the Federal Navigation Act of 1892.

Lakes are typically surrounded by recreational activities such as campgrounds, cabins, resorts, parking, picnicking, boat launching, sanitation, drinking water facilities, and developed trails. Some of the largest lakes within the state include Salton Sea in Southern California, Lake Tahoe in Northern California, Goose Lake located along the border of California and Oregon, Mono Lake in central California, and Honey Lake in the northeastern part of the state.

Ponds in California often act as local swimming holes or offer aesthetic views containing a wide variety of wildlife and aquatic species.

Ocean

The Pacific Ocean is located along California’s western border, which results in the state having approximately 95,439 miles of shoreline (NOAA, 1975). Shoreline is defined as outer coast that includes offshore islands, sounds, bays, rivers, and creeks where tidal waters narrow to a width of 100 feet.

Recreational activities in ocean, coastal, and national parks along the coast vary by location, property ownership, and ease of access. A majority of the coastline provides access to beachfront locations to walk along the beach, swim, fish, canoe, surf, and other water activities. Tide pools located in intertidal zones along the shore offer visitors a chance to see seaweeds and other seashore animals (e.g., small fish, eels, crabs, and sea anemones). Some of the most popular beaches in the State include La Jolla Shores Beach, Santa Monica State Beach, Carmel City Beach, Moonstone Beach, San Gregorio State Beach, and Salt Creek Beach. Along with public access spots, California has designated areas as marine protected areas scattered along its coast line that allow varied amounts of activities and protections (e.g., marine reserves, marine conservation areas, and marine parks) as part of the Marine Life Protection Act passed in 1999 (CDFW 2020).

Amusement parks and piers are common tourist attractions located along the state’s shoreline. They offer waterfront seafood restaurants, shopping, attractions, and bay

views, along with wildlife viewing for seas lions, sea otters, whales, and other marine wildlife. Some popular attractions along California's coast include Pier 39 in San Francisco, Alcatraz Island in San Francisco Bay, the Santa Cruz Beach Boardwalk, Hearst Castle located in the Los Padres National Forest, and Carmel-by-the-Sea.

Wetlands

California has approximately 454,000 acres of nonagricultural wetlands, with over 90 percent of its historical wetlands being drained primarily due to agricultural purposes (USGS 1996). Wetlands provide countless recreational activities such as hiking, boating, hunting, fishing, trapping, birdwatching, and wildlife photography. Wetlands often co-occur with, and are integral to the health and recreational value of, rivers and streams, lakes and ponds, and the ocean. Some wetlands in California include the Sacramento–San Joaquin Delta, Laguna Wetlands Preserve, Bolsa Chica Ecological Reserve, Los Angeles River, and Ballona Wetlands.

Wildlife-Oriented Recreation

Hunting, wildlife viewing, birdwatching, and viewing of natural scenery (along interpretive, walking, and driving trails) compose wildlife-oriented recreation opportunities throughout the study area. Many wildlife areas and nature observation areas are operated in partnership with other state or local agencies. Types of wildlife areas and hunting facilities include national wildlife refuges, state wildlife areas, private hunting clubs, and private nonprofit wildlife preserves. Popular seasonal recreational activities include waterfowl and pheasant hunting, wildlife viewing, birdwatching, and fishing. In the Central Valley, areas along river floodplains have been established as wildlife refuges, such as Gray Lodge Wildlife Area. Sequoia and Kings Canyon National Parks offer wildlife viewing opportunities for animals such as coyotes, badgers, black bears, sheep, deer, opossums, wolverines, beavers, frogs, muskrats, mountain lions, snakes, foxes, turtles, birds, and fish. These areas provide opportunities for wildlife viewing, fishing, and hunting. Seasonal hunting on private lands requires permission from the landowner, whereas hunting and duck clubs are open to members and their guests only.

Fishing

The aquatic and riparian habitats in the study area are home to a variety of fish species desirable for recreational fishing. Examples of non-commercial fishing activities include bait fishing, bait casting/spin fishing, and fly fishing, which can occur from the shore/bank, wading, or watercraft. Shore/bank and wading fishing can include fishing from piers, levees, and waterway banks. Watercraft fishing can occur from either motorized or nonmotorized watercraft. Fly fishing can be done from both land or watercraft, or anglers can stand in the waterways. Fishing opportunities exist throughout the study area, along the coast, throughout the lower elevation areas, and throughout mountain areas such as the Sierra Nevada and Trinity Alps.

Desert

Recreation

California contains three main deserts: the Mojave Desert by the Tehachapi Mountains, the San Gabriel and San Bernardino Mountains, and California's borders with Arizona

and Nevada; the Colorado Desert in the southeast corner of the state, and the Great Basin Desert, which is located to the east of the Sierra Nevada range and extends to Nevada. Deserts provide a wide range of landscapes such as mountains, canyons, sand dunes, and dry cracked earth. Recreational activities within California's deserts vary depending on the season and time of year, and include hiking, rock climbing, bouldering, sightseeing, using off-road vehicles such as sand buggies, and sightseeing. Another recreational activity within some desert areas include playas. Playas (e.g., the Death Valley Playa) are evaporated lakes whose formation depends on climate and location.

Ephemeral Waters

An ephemeral stream or ephemeral river is a stream or river that flows only briefly during and following a period of rainfall within an area and is a common feature of the arid regions of Southern California. One such river within the state is the Mojave River in the San Bernardino Mountains. Unlike a majority of rivers found within California, the Mojave River flows inland instead of toward the ocean. River flows can be seen at the upper narrows and winds down the Afton Canyon before dissipating into the sand. When these arid land streams and rivers are dry, they become popular spots for camping and both legal and illegal off-highway motor vehicles. Playas are also a type of ephemeral water.

Roadways

The California Department of Transportation manages the State Scenic Highway Program, provides guidance, and assists local government agencies, community organizations, and citizens with the process of officially designating scenic highways. In some cases, scenic highways may be located adjacent to aquatic and riparian habitats where restoration projects could occur. Visitors may drive along these scenic roadways to enjoy their aesthetic attributes, such as scenic vistas of waterways and farmland dotted with historic sites. For example, State Route 1 crosses the Carmel River, which may offer aesthetic value to drivers. Another example is State Route 89, which crosses the Sierra Nevada and is a designated scenic highway between the El Dorado–Placer County line to a point 3.2 miles west of U.S. Highway 395. State Route 89 runs along several rivers and streams as well as forestland.

Parks

Parks provide outdoor areas for gathering and recreation and are generally developed and maintained by state or local governments. They include local, small parks and larger parks such as state recreation areas. California has approximately 300 state parks and many more local parks. The National Park System operates a large and diverse group of parks, monuments, and recreation areas including nine national parks, 10 national monuments, three national recreation areas, 850 federally recognized areas under the National Landscape Conservation System, and four National Marine Sanctuaries. In addition, California includes the Point Reyes National Seashore and the Mojave National Preserve. Park amenities may include restrooms, picnic tables, and fishing access. Additional amenities may include playgrounds, boat launches, trails, and historic site interpretation.

Hiking, Biking, and Trail Use

Trails and paths are often located in areas along the edge of waterways, throughout foothills and mountain ranges, and can be found in parks or wildlife areas, or along shorelines in urban areas. For example, the cities of Sacramento and West Sacramento have public promenades along the Sacramento River. Trails along the San Joaquin River can be found in the cities of Antioch, Pittsburg, and Oakley and in Bay Point. A bike and jogging path along the Calaveras River is accessible in the city of Stockton.

Camping

Tent camping and recreational vehicle sites are located throughout the study area. For example, numerous campsites are located along the North Yuba River and State Route 49. Campsites may offer recreational amenities that provide a variety of activities during vacations or visits. Examples of this type of multi-use facility include recreational vehicle and/or tent camping sites, picnic and barbecue facilities, cafés, and fishing and water access. Camping is also offered in the national parks such as Redwood National Park where tent campgrounds, recreational vehicle campgrounds, and cabins are available.

Historic Sites

The National Register of Historic Places is the official list of the nation's historic places, structures, objects, sites, and districts that have been deemed worthy of preservation because of their significance in American history, architecture, archaeology, engineering, and culture. Designated California historical landmarks are sites, buildings, features, or events that are of statewide significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value.

National historic places or California historical landmarks may be located near waterways where there are aquatic or riparian habitats. For example, Sutter's Landing (California Historical Landmark No. 530) is part of Marshall Gold Discovery State Historic Park and located along the South Fork of the American River in Coloma.

3.16.3 Regulatory Setting

This section discusses federal, state, and regional and local plans, policies, regulations, laws, and ordinances pertaining to recreational resources.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location.

Federal

Clean Water Act

The Federal Water Pollution Control Act Amendments of 1972, better known as the Clean Water Act, established the institutional structure for the U.S. Environmental Protection Agency to regulate discharges of pollutants into waters of the United States, establish water quality standards, conduct planning studies, and fund grant projects. Congress has amended the Clean Water Act several times since 1972.

The U.S. Environmental Protection Agency has provided most states with the authority to administer many of the provisions of the Clean Water Act. In California, the State Water Board has been designated to develop and enforce water quality objectives and implementation plans. The State Water Board has delegated specific responsibilities for development and enforcement actions to the individual Regional Boards.

Section 303(d) of the Clean Water Act requires states, territories, and authorized tribes to develop a list of water quality–impaired segments of waterways and other water bodies under their jurisdiction. The law requires the jurisdictions to establish priority rankings for the waters they list and to develop action plans, known as total maximum daily loads, to improve water quality.

For descriptions of other parts of the Clean Water Act, see Section 3.6, *Biological Resources—Aquatic*, and Section 3.11, *Hydrology and Water Quality*.

Federal Water Project Recreation Act

Under the Federal Water Project Recreation Act (U.S. Code Title 16, Sections 460[L][12] through 460[L][21]), recreation and fish and wildlife enhancement are to be given full consideration as purposes of federal water development projects if non-federal public bodies agree to do all of the following:

- Bear no less than half the separable costs allocated for recreational purposes or 25 percent of the cost for fish and wildlife enhancement.
- Administer project land and water areas devoted to these purposes.
- Bear all costs of operation, maintenance, and replacement.

Where federal lands or authorized federal programs for fish and wildlife conservation are involved, cost-sharing is not required.

The Federal Water Project Recreation Act also authorizes using federal water project funds for land acquisition to establish refuges for migratory waterfowl when recommended by the Secretary of the Interior. The law further authorizes the Secretary to provide facilities for outdoor recreation and fish and wildlife at all reservoirs under his control, except within national wildlife refuges.

Federal Land and Water Conservation Fund Act

The Land and Water Conservation Fund, created by Congress in 1964, provides money to federal, state, and local governments to purchase land, water, and wetlands for the benefit of all Americans. Lands and waters purchased through the Land and Water Conservation Fund do all of the following:

- Provide recreational opportunities
- Provide clean water
- Preserve wildlife habitat
- Enhance scenic vistas
- Protect archaeological and historical sites
- Maintain the pristine nature of wilderness areas

State

State Lands Commission

The California State Lands Commission was established in 1938 and provides stewardship of the lands and waterways of California (SLC 2020). The State of California owns nearly 4 million acres of “sovereign lands,” which include the beds of navigable rivers, lakes, and streams, tidal waterways, and tidelands up to the ordinary high-water mark and submerged lands along the coastline extending from the shoreline out to 3 miles offshore. The State Lands Commission may lease sovereign lands for any public trust purpose, including recreation, navigation, fisheries, commerce, and open space. For instance, a public or private entity must lease sites for marinas and recreational piers that fall within sovereign lands. In addition, the State Lands Commission issues permits for dredging lands that fall under its jurisdiction.

California Division of Boating and Waterways

The California Division of Boating and Waterways, part of the California Department of Parks and Recreation, has a mission to provide safe and convenient public access to California’s waterways and leadership in promoting the public’s right to safe, enjoyable, and environmentally sound recreational boating. The California Division of Boating and Waterways endorses boating safety and education, assists local boating law enforcement agencies, ensures uniformity in boating regulations, and licenses boat operators and brokers. The division is also responsible for reviewing, updating, and adopting state boating regulations to reflect changes in federal and state boating laws, and planning and designing state boating facilities. The California Division of Boating and Waterways has been the lead agency for controlling water hyacinth (since 1982) and *Egeria densa* (since 1997) (State Parks 2018).

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) established the State Water Board and divided the state into nine regions, each overseen by a Regional Board. The nine Regional Boards have primary responsibility for the coordination and control of water quality within their respective jurisdictional boundaries. Under the Porter-Cologne Act, water quality objectives are limits or levels of water quality constituents or characteristics established for the protection of beneficial uses.

The Porter-Cologne Act requires the Regional Boards to establish water quality objectives while acknowledging that water quality may be changed to some degree without unreasonably affecting beneficial uses. Designated beneficial uses, together with the corresponding water quality objectives, and an antidegradation policy also constitute water quality standards under the federal Clean Water Act. The water quality objectives provide requirements for water quality control.

If USACE determines that only no jurisdictional waters of the United States are present in the restoration project area, then no federal CWA permit would be required. Regardless of federal jurisdiction, however, the project will require a permit, or waste discharge requirements (WDRs), for impacts to any waters of the state. The WDRs would be issued by the appropriate Regional Board or, for statewide or multi-regional projects, by the State Water Board. Under the Porter-Cologne Act, discharges to all

waters of the state, including all wetlands and other waters of the state (including but not limited to isolated wetlands), are subject to state regulation.

A discharger whose project disturbs one or more acres of soil, or disturbs less than 1 acre but is part of a larger common plan of development that in total disturbs 1 or more acres, must obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities, Construction General Permit Order No. 2009-009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, and disturbances to the ground such as stockpiling or excavation; however, it does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a storm water pollution prevention plan (SWPPP).

California Department of Parks and Recreation

The mission of the California Department of Parks and Recreation is to provide for the health, inspiration, and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation. In addition to the lands it directly owns, the California Department of Parks and Recreation has certain jurisdiction over granted or ungranted tidelands or submerged lands abutting State Park System lands (Public Resources Code Section 5003.5).

Regional and Local

The study area encompasses all counties and all cities throughout California. Each county and city has local regulations and a general plan with unique goals and policies that preserve and guide development of recreation and recreational resources within their local jurisdictions and may identify mitigation measures to protect these resources.

3.16.4 Impacts and Mitigation Measures

Methods of Analysis

Recreational impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could impact recreation facilities and opportunities in the study area. However, the precise locations and detailed characteristics of potential future individual restoration projects are not yet known. Therefore, this recreation analysis focuses on foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis.

Permanent impacts are considered those that would result from indefinite conditions created as a result of restoration projects permitted under the Order (e.g., new infrastructure [setback levees] preventing recreation in that location). Temporary impacts are considered those that would be temporary in nature (e.g., construction-related activities).

The approach to assessing recreational impacts was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of Restoration Projects in the*

Order, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an impact related to recreation is considered significant if the types of projects that would be permitted under the Order would do either of the following:

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated
- Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment

In addition, a significant impact would occur if the types of projects that would be permitted under the Order would:

- Impair, degrade, or eliminate recreational facilities and opportunities

Impacts and Mitigation Measures

Table 3.16-1 summarizes the impact conclusions presented in this section for easy reference.

Table 3.16-1
Summary of Impact Conclusions—Recreation

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.16-1: Implementing future restoration projects permitted under the Order could directly impair, degrade, or eliminate recreational resources, facilities, and opportunities.	LTS	LTSM
3.16-2: Future restoration projects permitted under the Order could alter recreational resources or facilities or require the construction or expansion of recreational facilities that could result in environmental impacts.	LTSM	LTSM
3.16-3: Implementing future restoration projects permitted under the Order could increase the use of existing recreational resources and facilities such that substantial physical deterioration would occur or be accelerated.	LTSM	LTSM

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2020
NOTES: LTS = less than significant; LTSM = less than significant with mitigation

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Impact 3.16-1: Implementing future restoration projects permitted under the Order could directly impair, degrade, or eliminate recreational resources, facilities, and opportunities.

Effects of Project Construction Activities

Construction work for restoration projects permitted under the Order would include all of the following types of activities:

- Mobilizing equipment and materials in channels
- Preparing staging areas
- Installing temporary construction offices
- Staging and storing equipment and materials
- Parking vehicles
- Using designated access and haul routes
- Clearing vegetation and structures
- Preparing borrow sites
- Restoring and demobilizing from project sites
- Removing excess materials

These activities could temporarily impair, degrade, or eliminate recreational resources, facilities, and opportunities. For example, work to remove small dams, tide gates, flood gates, and legacy structures could temporarily block boaters' access to boat launches and other river access areas and adversely impair recreational opportunities for trail users. Another example would be removing a small dam that created a local swimming hole which could impair recreational activities for swimmers. The affected recreation users may then choose to go elsewhere, which could increase the use of other recreational facilities. Additionally, establishing, restoring, or enhancing stream, riparian, or tidal habitats may require permanently relocating or decommissioning existing trails or roads, which could also increase the use of other recreational facilities.

While these types of construction activities may impair recreational activities, the would not be expected to significantly impair, degrade, or eliminate recreational resources, facilities, and opportunities. In addition, a restoration project permitted by the Order could provide new recreational opportunities, which would be beneficial. For instance, improvements to stream crossings and fish passage (e.g., small dam removal) could support safe passage for migratory and non-migratory species. These features would result in increased primary and secondary production and diversification and increased

aquatic habitat for a diversity of fish and wildlife species, which could allow for wildlife-oriented recreation (e.g., hunting, fishing, and birdwatching). In addition, restoration projects permitted under the Order such as removal of a small dam could provide increased recreational opportunities in stream or river systems, such as kayaking.

Furthermore, recreational opportunities are abundant throughout the study area, and construction work for restoration projects permitted under the Order would be temporary and localized. Therefore, impacts on parks, trails, boating, and fishing areas throughout the study area would be less than significant when compared to the total recreation opportunities for the surrounding populations. This impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects permitted under the Order could permanently impair or eliminate recreational resources, depending on the project locations and types. Infrastructure may be removed or relocated along streams and in riparian areas. The infrastructure affected may include but would not be limited to boat docks, boat haul-out locations, campgrounds and campsites, day-use sites, and roads/trails and off-highway/off-road vehicle routes in the areas of the restoration projects. For example, constructing a setback levee across a trail in a recreational area would impair the use of that recreational area. Widening a floodway may also preclude the use of recreational facilities because the facilities could be periodically inundated.

Alternatively, a restoration project permitted by the Order could provide new recreational opportunities, which would be beneficial. For instance, removing a small dam could provide increased recreational opportunities in the stream, such as kayaking. In addition, restoration projects such as establishing, restoring, and enhancing tidal, subtidal, and freshwater wetlands could support native marsh plants, provide habitat elements for targeted species, provide other targeted wetland functions, and provide hydrologic variability for fish and other aquatic species. These features would result in increased primary and secondary production and diversification and increased aquatic habitat for a diversity of fish and wildlife species, which would allow for wildlife-oriented recreation such as recreational experiences in the restored areas, hunting, and fishing. This could result in increased recreation resources, which could decrease the use of other existing recreational resources, which would be beneficial.

Impacts attributable to the locations, sizes, and nature of restoration projects could include long-term and permanent changes to recreational resources. However, the specific locations and scale of possible future projects are not currently known. Therefore, the potential significant recreational impacts in the study area cannot be determined at this time. The factors necessary to identify specific impacts include the size and characteristics of a project, the duration of construction, and the type and precise location of the resource or facility itself. This impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure REC-1 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

> ***Mitigation Measure REC-1: Minimize Impairment, Degradation, or Elimination of Recreational Resources***
>
> If restoration projects permitted under the Order result in the substantial impairment, degradation, or elimination of recreational facilities, replacement facilities of equal capacity and quality shall be developed and installed.

Implementing Mitigation Measure REC-1 would reduce the impact related to impairment, degradation, or elimination of recreational resources to a **less-than-significant** level.

Impact 3.16-2: Future restoration projects permitted under the Order could alter recreational resources or facilities or require the construction or expansion of recreational facilities that could result in environmental impacts.

Effects of Project Construction Activities, Constructed Facilities (Natural or Artificial Infrastructure), and Operations and Maintenance of those Facilities

Construction of restoration projects, constructed facilities (natural or artificial infrastructure), and operations and maintenance of those facilities permitted under the Order could alter or result in the construction or expansion of existing recreational resources, with resulting environmental impacts. For example:

- Constructing a floodplain restoration project could generate noise that would impair the use of a nearby recreation area. However, the construction-related increase in noise levels would be temporary and would not likely prompt construction of a new recreation facility to replace the loss of use of the existing facility.
- Constructing a setback levee may require closing a trail for an extended time period. The agency conducting the modification may decide to construct a detour trail around the closure, which may result in erosion and the removal or degradation of habitat.
- Establishing, restoring, or enhancing stream, riparian, or tidal habitats may require permanently relocating or decommissioning existing trails or roads, which may result in erosion and the removal or degradation of habitat.
- Restoring upslope watershed areas, floodplain restoration, and multi-benefit restoration projects may include upgrading or expanding recreation facilities such trails or wildlife-oriented recreation.

Restoration projects permitted under the Order could result in construction, alteration, or expansion of recreational facilities. Some restoration projects would result in long-term and permanent closure or alteration of a recreational use. For example, floodplain

restoration may inundate a trail and prompt its long-term and permanent closure. A new trail may be constructed at the new edge of the floodway to replace the closed facility, which may result in erosion and the removal or degradation of habitat. In addition, restoration projects such as establishing, restoring, and enhancing tidal, subtidal, and freshwater wetlands could support native marsh plants; provide habitat elements for targeted species; provide other targeted wetland functions; and provide hydrologic variability for fish and other aquatic species. These features would result in increased primary and secondary production and diversification and increased aquatic habitat for a diversity of fish and wildlife species, which would allow for wildlife-oriented recreation such as recreational experiences in the restored areas, hunting, and fishing. This could result in increased recreation resources and lessen the need for new recreational facilities, which would be beneficial.

In addition, as described in Section 3.15, *Population and Housing*, none of the restoration projects permitted under the Order would involve constructing new homes, businesses, or other infrastructure that would provide new long-term employment opportunities or result in population growth and demand for housing. Therefore, construction or expansion of recreational facilities (due to an increase in population) would not occur.

Operation and maintenance of projects could include monitoring of vegetation, irrigation systems or other natural structures and operation and maintenance of fish screens. These activities would be temporary in nature and would not likely prompt construction of a new recreation facility to replace the loss of use of the existing facility.

In summary, construction activities and constructed facilities for restoration projects permitted under the Order could result in the construction and modification of recreational facilities and associated environmental impacts. However, the specific locations and scale of possible future permitted actions are not currently known. Therefore, the locations and characteristics of new or modified recreational facilities in the study area cannot be determined at this time. The factors necessary to identify individual restoration projects impacts include the project's size and characteristics, the duration of construction, and the types and precise locations of construction activities and the facility or resource itself. Because restoration projects permitted under the Order could result in changes to recreational resources that could result in impacts on the environment, this impact would be **potentially significant**.

The Order includes the following general protection measures to reduce this impact (Appendix E):

- GPM-6: Work Area and Speed Limits
- GPM-7: Environmentally Sensitive Areas and/or Wildlife Exclusion
- GPM-10: Equipment Maintenance and Materials Storage
- GPM-11: Material Disposal
- GPM-12: Fugitive Dust Reduction
- GPM-13: Trash Removed Daily
- GPM-14: Project Cleanup after Completion
- GPM-15: Revegetate Disturbed Areas

- WQHM-1: Staging Areas and Stockpiling of Equipment
- WQHM-2: Storm Water Pollution Prevention Plan
- WQHM-4: Hazardous Materials Management and Spill Response Plan
- WQHM-5: In-Water Concrete Use
- WQHM-6: Accidental Discharge of Hazardous Materials
- IWW-1: Appropriate In-Water Materials
- IWW-2: In-Water Vehicle Selection and Work Access
- IWW-3: In-Water Placement of Materials, Structures, and Operation of Equipment
- IWW-5: Cofferdam Construction
- IWW-6: Dewater/Diversion Restrictions
- IWW-8: Removal of Diversion and Barriers to Flow
- IWW-13: Dredging Operations and Dredging Materials Reuse Plan
- VHDR-1: Avoidance of Vegetation Disturbance
- VHDR-2: Native and Invasive Vegetation Removal Materials and Methods
- VHDR-3: Revegetation Materials and Methods
- VHDR-4: Revegetation Erosion Control Materials and Methods
- VHDR-6: General Herbicide Use

Mitigation Measure NOISE-2: Minimize Operations and Maintenance Noise Conflicts

Implementation of these general protection measures and Mitigation Measures REC-1 and NOISE-2 would reduce impacts to recreational resources to a **less-than-significant** level.

Impact 3.16-3: Implementing future projects permitted under the Order could increase the use of existing recreational resources and facilities such that substantial physical deterioration would occur or be accelerated.

Effects of Project Construction Activities, Constructed Facilities (Natural or Artificial Infrastructure), and Operations and Maintenance of those Facilities

Construction of restoration projects, constructed facilities (natural or artificial infrastructure), and operations and maintenance of those facilities permitted under the Order could temporarily or permanently impede recreational use, as discussed in Impact 3.16-1, causing recreational users to be displaced to other resources or facilities. For example, many levees have trails, and modifying or removing levees as part of levee setbacks would require closing those trails during construction. As another example, establishing, restoring, or enhancing stream, riparian, or tidal habitats may require permanently relocating or decommissioning existing trails or roads. Recreationists who use the trails and/or roads would need to use other facilities while the trails/and or roads are closed. This displacement may increase the use of other existing recreational resources or facilities, potentially leading to substantial physical deterioration.

Many construction-related impacts may be temporary; however, it is reasonable to expect that some impacts may be long-term and some may be long-term and permanent. Alternatively, scenarios including improved or setback levees, restoring upslope watershed areas, floodplain restoration, and multi-benefit restoration projects could result in new public access or recreation facilities such trails.

In addition, restoration projects such as establishing, restoring, and enhancing tidal, subtidal, and freshwater wetlands could support native marsh plants; provide habitat elements for targeted species; provide other targeted wetland functions; and provide hydrologic variability for fish and other aquatic species. These features would result in increased primary and secondary production and diversification and increased aquatic habitat for a diversity of fish and wildlife species, which would allow for wildlife-oriented recreation such as recreational experiences in the restored areas, hunting, and fishing. This could result in increased recreation resources, which could decrease the use of other existing recreational resources, which would be beneficial. Also, fish passage improvement projects (e.g., dam removal) could improve recreation (e.g., allow for boating or kayaking that was previously impassable).

The specific locations and scale of possible future permitted restoration projects are not yet known. Therefore, the potential for displacement that would accelerate physical deterioration at existing recreational facilities in the study area cannot be determined at this time. The factors necessary to identify individual restoration projects impacts include the size and characteristics of a project; the duration of construction; and the types and precise locations of construction activities, the facility or resource itself, and alternative recreational opportunities. Because adverse changes to recreation resources could result from the construction and operation of restoration projects permitted under the Order, this impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure REC-2 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure REC-2: Minimize Impacts on Existing Recreational Resources

If a restoration project results in substantial temporary or permanent impairment, degradation, or elimination of recreational facilities that causes users to be directed toward other existing facilities, the project proponent shall coordinate with affected public and private recreation providers to direct the displaced users to underused recreational facilities.

The project proponent shall conduct additional operations and maintenance work at existing facilities to prevent them from deteriorating. If possible, temporary replacement facilities shall be provided. If the increase in use is temporary, once use levels have decreased back to existing conditions, the degraded facilities shall be rehabilitated or restored.

Where impacts on existing facilities are unavoidable, the project proponent shall compensate for impacts through mitigation, restoration, or preservation off-site or creation of additional permanent new replacement facilities.

Implementing Mitigation Measures REC-1 and REC-2 would reduce this impact to a **less-than-significant** level.

3.17 Transportation

3.17.1 Introduction

This section describes the characteristics of transportation in California and the potential impacts of the types of projects that would be permitted under the Order. (Section 2.6, *Categories of Restoration Projects in the Order*.) In addition, this section evaluates potential disruptions to transportation, such as through a plan, ordinance, or policy; long-term changes to the operability and function of transportation facilities; increased hazards from geometric design or incompatible uses; or inadequate emergency access caused by project implementation.

The environmental setting and evaluation of impacts on transportation resources is based on a review of existing published documents, including city and county general plans; other information regarding example projects similar to those permitted under the Order that may be implemented by other agencies; and other information sources listed in Chapter 8, *References*.

No comments specifically addressing transportation were received in response to the notice of preparation (NOP). See Appendix B for NOP comment letters.

3.17.2 Environmental Setting

Roadways

California's roadways are classified functionally throughout the state as either urban or rural and have the following hierarchy:

- *Interstates:* Arterial roads that provide the highest level of mobility and speeds over the longest uninterrupted range, limited access, typically posted speeds of 55 to 75 miles per hour.
- *Other Freeways and Expressways:* High-mobility roads with limited on- and off-access points (e.g., ramp locations or at-grade intersections) and whose directional travel lanes are generally separated by a physical barrier.
- *Other Principal Arterials:* High-mobility, limited-access roads that typically have four lanes or more and posted speeds of 50 to 70 miles per hour. This roadway type is classified as either urban or rural (FHWA 2017):
  - Urban classification:
    - Serves major activity centers; has the highest traffic volume corridors and longest trip demands.
    - On minimum mileage, carries a high proportion of total urban travel.
    - Provides interconnection and continuity for major rural corridors to accommodate transportation through, to, and from urban areas.
    - Serves demand for travel between central business districts and outlying residential areas.

- Rural classification:
  - Serves corridor movement that expresses characteristics representative of substantial statewide or interstate travel.
  - Connects all or a majority of urbanized areas and urban clusters of a 25,000 or more populations.
  - Provides an integrated network of continuous routes.

- *Minor Arterials:* Moderate-mobility, limited-access roads that typically have two or three lanes and include turn lanes to benefit through traffic.
- *Collectors:* Moderate-mobility, moderate-access roads that connect local roads to arterials with few businesses, and that typically have posted speed limits between 35 and 55 miles per hour.
- *Local Roads and Streets:* High-access, limited-mobility roads that emphasize access to abutting land and typically have posted speed limits between 20 and 45 miles per hour.

These classifications fall into the three most basic types of roadways in California: interstate highways, state routes, and local roadways. Interstate highways were designed to be high-speed interregional connectors and include sections of the National Highway System. Local roadways provide the greatest amount of access to adjacent land through driveways and other roadways, and therefore tend to be smaller. Arterials emphasize a high level of traffic flow for through movement, and as a result, have a higher capacity and speed with little accessibility to adjacent land. Collector roads provide a combination of both functions.

Interstate highways and state routes are typically labeled as intercity highways or principal arterials. In California, interstate highways contain a larger percentage of vehicular traffic than local arterials and roadways, as shown in Table 3.17-1 (Caltrans 2017, 2019). State routes connect centers of commerce, industry, agriculture, and mineral wealth for communities and regions of the state (California Streets and Highways Code, Division 1, Chapter 2).

Federal highways (i.e., interstate highway system and freeways) and state highways (i.e., interstate highway system, state highways, and freeways) are maintained by the California Department of Transportation (Caltrans). Federal and state highways are generally classified according to the Federal Highway Administration's Functional Classification Guidelines based on the designated level of mobility and land access. Designated truck routes are also located throughout the state and are maintained and located primarily on major federal, state, and county highways and major local arterials. These routes provide alternative routes for large trucks from mainline routes that are ill-suited for large-truck travel due because of obstacles (low-clearance bridges, sharp turns, or steep grades) or with conditions that could create unsafe conditions for smaller vehicles.

Table 3.17-1
2018 Maintained Miles, Lane Miles, and Annual Vehicle Miles of Travel by Functional Classification in California

Functional Classification	Maintained Miles	Lane Miles	Annual Vehicle Miles of Travel (in Millions)
Interstate	2,455.94	15,299.25	92,010.08
Principal Arterial (other freeways and expressways)	1,919.03	10,996.64	67,979.73
Principal Arterial (other)	9,959.67	35,116.22	64,750.34
Minor Arterial	17,099.99	44,497.90	56,936.26
Major Collector	24,945.03	51,615.58	34,336.53
Minor Collector	7,854.28	15,836.18	1,692.16
Local	111,655.15	225,798.80	29,489.85
Statewide Total	175,589.10	399,157.56	347,194.95

SOURCE: Caltrans 2019

Roadways in the study area include approximately 71,650 miles of maintained county roads, which in terms of mileage, account for the largest percentage of all roadways (Caltrans 2019). The most heavily populated areas in California are generally along interstate or state highway corridors. Future restoration projects permitted under the Order are anticipated to occur adjacent to waterbodies; however, some of the projects (e.g., establishment, restoration, and enhancement of stream and riparian habitat; floodplain restoration) could occur in rural areas, which are located throughout the study area and include a range of roadways such as two-lane rural arterials, local roads, and levee roads.

Traffic Control

A variety of traffic control devices, such as signs, signals, and markings, are used to regulate, warn, and guide traffic and are placed on, over, or adjacent to a street, highway, pedestrian facility, bikeway, or private road open to public traffic (Caltrans 2014:43). Traffic controls might include but are not limited to speed limits, speed bumps, varying numbers of lanes, lane striping, and metering at freeway on-ramps. Intersection traffic may be controlled through stop signs, yield signs, traffic circles, traffic signals, and other measures.

Railroads

The State of California regulates railroads located throughout the study area:

- *Class I railroads* are freight railroads and operate in multiple states over thousands of miles of track. California is served by two Class I railroads: Burlington Northern Santa Fe Railroad (BNSF) and Union Pacific Railroad (UP).

Generally, these railroads have revenue of at least $464 million, and account for approximately 68 percent of U.S. freight rail mileage.

- *Class III railroads*, often referred to as "short line" railroads, generate average revenue of $336.6 million or less. Some examples of Class III railroads in the state include the California Northern Railroad, Los Angeles Junction Railway, Quincy Railroad, and Sacramento Valley Railroad.
- *Commuter rails*, or suburban rail, are transport services that operate primarily within a metropolitan area for passenger travel, connecting commuters to a central city from adjacent suburb or town. Some examples include Caltrain, the North County Transit District Coaster, and Amtrak Capitol Corridor.

The California High-Speed Rail Authority is responsible for the planning, design, building, and operation of the nation's first high speed rail system, proposed to cover a total of 800 miles with up to 24 stations. This project will occur in two phases: Phase 1 will connect San Francisco to the Los Angeles basin via the Central Valley and Phase 2 will extend from Sacramento to San Diego. Initial construction is in progress from Merced to Bakersfield. The first operating sections of the project are projected to open in 2028 (California High-Speed Rail Authority, 2020).

All railroads in California are regulated by the California Public Utilities Commission. The commission's Railroad Operations and Safety Branch enforces federal and state safety rules, regulations, and inspection efforts and carries out proactive assessments of potential risks.

Bridges

As of December 2017, California had 25,657 bridges, the fourth largest state inventory of bridges in the United States behind Texas, Ohio, and Illinois (ASCE 2018). More than 17,000 of California's 25,657 bridges cross over waterways and generally range from one to six lanes. Caltrans owns and operates about half of the state's bridges; the remainder are owned and maintained by local jurisdictions. The following are some of the most iconic bridges in the state:

- The Golden Gate Bridge, connecting San Francisco and Marin Counties along U.S. Highway 101, is 4,200 feet long. The bridge was opened in 1937 and has a total of six lanes. More than 100,000 vehicles cross the Golden Gate Bridge every day.
- The Bixby Creek Bridge was opened in 1932. Located in Big Sur along State Route 1, this bridge is 714 feet long with one lane in each direction. Its aesthetic design makes the Bixby Creek Bridge one of the most photographed bridges in California.
- The Foresthill Bridge in Auburn was constructed in 1973. With two lanes each way, the Foresthill Bridge is the state's tallest bridge, spanning 2,428 feet in length and 730 feet in height.

Ports, Deep Water Channels, and Ferries

Ports and Deep Water Channels

Ports and deep water channels allow movement and docking for watercraft of all sizes and are places where vessels, boats, and ships can unload and load cargo. Generally, regular ports are recreational types where water depth is 20 feet or shallower, whereas deep channel ports are used by large, heavy loaded ships in waters 30 feet deep or deeper.

Ports and deep water channels have been a basis for economic growth in the study area. As such, they are found throughout the state to assist in the movement of goods and people. California has 11 public ports: three megaports (Los Angeles, Long Beach, and Oakland) and eight smaller niche ports (Hueneme, Humboldt Bay, Redwood City, Richmond, West Sacramento, San Diego, San Francisco, and Stockton). The state also has one private port (Benicia).

The Port of Los Angeles, one of the state's three megaports, lies along San Pedro Bay. It occupies 7,500 acres of land with a 43-mile-long waterfront and is ranked the 19th busiest port in the world in regard to container volume. In 2018, the Port of Los Angeles moved approximately 18 percent of the nation's containerized cargo.

Another of the state's megaports, the Port of Long Beach, occupies 3,520 acres of land and handles approximately 82.3 million metric tons of cargo, making it the second-busiest port in the United States.

One of the smaller niche ports, the Port of West Sacramento, is located 79 nautical miles inland from San Francisco and is reached via a 40-mile-deep ship channel maintained at a depth of 30 feet by the U.S. Army Corps of Engineers.

In addition, dozens of small craft harbors are found along the entire California coast, serving pleasure boaters, commercial fishing boats, cargo boats and barges, law enforcement patrol boats, and other craft.

Ferries

Ferries provide transportation over short distances at regular intervals across waterways where bridges are not practical or cost effective. Ferry service is a primary means of public access to the Channel Islands of Southern California. Ferries also serve commuters crossing San Francisco Bay. As such, ferries are found throughout California. On a smaller scale, two examples of ferries are the *Real McCoy II*, which is classified as an extension of State Route 84, and the *J-Mack*, classified as an extension of State Route 220. Both of these ferries are operated by Caltrans and offer public transport to and from public land in the Sacramento–San Joaquin Delta.

Airports

A number of airports are located in the study area. These facilities include both private and public regional and international airports. Restoration projects could attract wildlife (e.g., waterfowl, bats, rodents) or alter migration patterns or the local movement patterns of birds, thus presenting potential risks to aircraft by altering avian pathways and putting

them within airport flight paths. Table 3.17-2 includes a summary of information on wildlife strikes from 2019 for California's largest international airports.

See Section 3.10, *Hazardous and Hazardous Materials,* for more information on hazards associated with airports.

Table 3.17-2
Wildlife Strike Summary for California's Largest International Airports in 2019

International Airport	≤1,500 feet strikes/ 100,000 movements	≤1,500 feet adverse effect strikes/ 100,000 movements
Los Angeles	22.17	1.01
San Francisco	14.85	0.44
San Diego	9.6	0
Norman Y. Mineta San José	31.83	0.98
Metro Oakland	34.09	3.29
Sacramento	84.68	5.94

SOURCE: Embry-Riddle Aeronautical University, 2020 and Federal Aviation Administration Wildlife Strike Database, 2020

Bicycle and Pedestrian Facilities

Bicycle and pedestrian facilities provide modes of transportation for local and regional travel, as well as recreational activities. These facilities include paved bike and walking paths, shared bike lanes, sidewalks, and natural trails, all of which are present throughout the study area.

3.17.3 Regulatory Setting

This section discusses federal, state, and regional and local plans, policies, regulations, and laws, and ordinances pertaining to transportation.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location.

Federal

California Department of Transportation

Caltrans is responsible for planning, designing, constructing, operating, and maintaining all state-owned roadways, and for implementing federal highway standards for interstate highways.

Rivers and Harbors Act of 1899

The Rivers and Harbors Act prohibits the construction of any bridge, dam, dike, or causeway over or in navigable waterways of the United States without congressional approval. The U.S. Coast Guard manages oversight of these structures and protects

people, maritime commerce, and the environment against hazards in navigable waters of the United States (USFWS 2020). See Section 3.11, *Hydrology and Water Quality*, for additional information on the Rivers and Harbors Act.

U.S. Department of Transportation

The U.S. Department of Transportation administers numerous laws and regulations that regulate California roads and interstate commerce. The department is responsible for planning and coordinating federal restoration projects while setting safety regulations for all major modes of transportation.

Federal Railroad Administration

The Federal Railroad Administration regulates interstate railroads and is responsible for providing for safe, reliable, and efficient movement of people and goods throughout the United States.

Federal Aviation Administration

The Federal Aviation Administration regulates civil aviation that promotes safety. The agency develops and operates a system of air traffic control and navigation for both civil and military aircraft.

State

Caltrans manages the California Scenic Highway Program to preserve and protect scenic highway corridors from changes that would affect the aesthetic value of the land adjacent to the highways. Designation as a scenic highway is determined by views of the natural landscape, scenic quality, and the extent of visual intrusion. A city or county must nominate an eligible scenic highway for official designation and adopt a corridor protection program that includes zoning and planning policies to preserve its scenic quality.

Regional and Local

The Order would permit a variety of restoration projects that would take place throughout the state, and as such would include all counties and all cities. Each county and city has local regulations and a general plan with transportation goals and policies that help support, preserve, and adhere to existing programs, plans, ordinances, and policies addressing transportation, traffic, and circulation. Each general plan has categorized its primary road system (e.g., arterial, collector) and set level-of-service standards for them, which define a scope to measure the amount of traffic a roadway may be capable of handling. These standards are used to assess the performance of a street or highway system and the capacity of a roadway.

3.17.4 Impacts and Mitigation Measures

Methods of Analysis

Transportation impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could impact existing traffic. However, the precise location and detailed characteristics of potential future individual restoration projects are yet to be determined. Therefore, this transportation analysis focuses on reasonably foreseeable changes from

implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis. The restoration projects permitted under the Order could affect the transportation facilities analyzed in this section in several ways:

- Project construction could increase congestion on area roads and intersections for short periods of time.
- Under some circumstances, permitted restoration projects could displace existing roadways, requiring them to be relocated or redesigned to accommodate the future projects.
- Roadway capacity could be reduced.
- Waterway navigability could be reduced (e.g., stream crossings and fish passage improvements, and removal of small dams, tide gates, flood gates, and legacy structures).

Permanent impacts are considered those that would continue through the life of a project as a result of the environmental conditions caused by restoration projects permitted under the Order (e.g., new infrastructure that requires activities involving the routine removal of debris or the use of heavy equipment). Temporary impacts are considered those that would be temporary in nature (e.g., construction-related activities).

The approach to assessing transportation impacts was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of Restoration Projects in the Order*, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an impact related to transportation and traffic is considered significant if the types of projects that would be permitted under the Order would do any of the following:

- Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities
- Conflict or be inconsistent with State CEQA Guidelines Section 15064.3(b)
- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)
- Result in inadequate emergency response access

Conflict or Inconsistency with State CEQA Guidelines Section 15064.3

The new State CEQA Guidelines Section 15064.3(b) was adopted in December 2018 by the California Natural Resources Agency. Revisions to the State CEQA Guidelines criteria for determining the significance of transportation impacts are primarily focused on projects within transit priority areas, and shift the focus from driver delay to reduction of greenhouse gas emissions, creation of multimodal networks, and promotion of a mix

of land uses. Vehicle miles traveled (VMT) is a measure of the total number of miles driven to or from a development and is sometimes expressed as an average per trip or per person.

The newly adopted guidance provides that a lead agency may elect to be governed by the provisions of this section immediately. Beginning on July 1, 2020, the provisions of this section were applied statewide. Some CEQA lead agencies are using state recommended standards (e.g., Office of Planning and Research or California Air Resource Board) and others are working on updating their general plans, local CEQA guidelines, etc. with transportation significance thresholds or transportation impact analysis procedures.

For an evaluation of how restoration projects permitted under the Order could interfere with emergency response access or with an adopted emergency response or evacuation plan, see Section 3.10, *Hazards and Hazardous Materials*.

Impacts and Mitigation Measures

Table 3.17-3 summarizes the impact conclusions presented in this section for easy reference.

Table 3.17-3
Summary of Impact Conclusions—Transportation

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.17-1: Future restoration projects permitted under the Order could conflict with a plan, ordinance, or policy addressing the circulation system including transit, roadways, bicycle, and pedestrian facilities.	LTSM	LTS
3.17-2: Future restoration projects permitted under the Order could conflict with or be inconsistent with State CEQA Guidelines Section 15064.3(b).	SU	LTS
3.17-3: Implementing future restoration projects permitted under the Order could substantially increase hazards due to a geometric design feature or incompatible uses.	LTSM	LTSM

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2020
NOTES: LTS = less than significant; LTSM = less than significant with mitigation; SU = significant and unavoidable

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given

project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Impact 3.17-1: Future restoration projects permitted under the Order could conflict with a plan, ordinance, or policy addressing the circulation system including transit, roadway, bicycle, and pedestrian facilities.

Effects of Project Construction Activities

Construction activities for future restoration projects that would be permitted under the Order could result in temporary partial or full road closures. As a result, these projects could conflict with a plan, ordinance, or policy associated with the circulation system, or could affect the use of federal, state, and local highways and bridges and transit, roadways, bicycle, and pedestrian facilities:

- Road or lane closures may be necessary for the use of construction equipment, installation and removal of project components, or restoration and enhancement activities.
- Based on specific project designs, roads may need to be relocated, which could generate new and/or rerouted traffic at intersections or road segments that are not designed to fit the additional traffic.
- The import and export of construction materials may lead to a substantial increase in traffic congestion at intersections or road segments, depending on the number of trucks and haul trips needed for the project.
- Some of the roads that could be affected by increased congestion could be designated truck routes. Project construction could lead to an impact on truck routes in areas where no other alternative truck route is available.

Construction-related impacts on railroads from restoration projects permitted under the Order could be similar to the anticipated road and transit impacts because tracks and trestles may require temporary closure. Adverse effects could include rerouting of passengers and freight that could cause delays. Track closures would be temporary and could affect private freight companies and a small number of commuters.

Certain restoration projects permitted under the Order would involve establishment, restoration, and enhancement of stream and riparian habitat. These projects may involve removing or relocating infrastructure along streams and in riparian areas. The affected infrastructure would vary depending on the specific project details. General infrastructure work for this type of project could involve removing boat docks, boat haul-out locations, campgrounds and campsites, day-use sites, roads and trails, and off-highway/off-road vehicle routes that affect aquatic resources or riparian habitat. These types of restoration projects could temporarily disrupt the use or circulation of traffic

associated with pedestrian facilities and could affect a small number of commuters and recreational users located adjacent to the restoration project.

Some construction activities, such as removal or relocation of infrastructure along streams and in riparian areas, could occur in navigable waterways and could adversely affect navigation. For example, restoration projects to remove tide gates may include installation of temporary cofferdams and dewatering pumps, and excavation of existing channels, adjacent floodplains, flood channels, and wetlands. These projects could use excavators, cranes, boats, barges, pumps, dump trucks, and similar equipment, which could temporarily obstruct vessel navigation and boat passage during times of high boat traffic. In addition, speed restrictions in construction areas could delay boat traffic. Restoration projects permitted under the Order would be required to comply with Sections 9 and 10 of the Rivers and Harbors Act, which address placing obstructions or constructing structures in certain navigable waters; dredging or disposing of dredged materials; and excavating, filling, and reconstructing channels.

Construction activities for future restoration projects permitted under the Order could take place in areas containing bridges and could affect bridge traffic. Some projects that might affect bridges include restoration and enhancement of off-channel/side channel habitat; stream crossing and fish passage improvements; removal of small dams, tide gates, flood gates, and legacy structures; establishment, restoration, and enhancement of stream and riparian habitats; and floodplain restoration. These projects could include removal or installation of or upgrades to infrastructure that could temporarily disrupt bridge traffic.

For example, a restoration project that would involve grading and breaching for tidal inundation, relocating berms, and restoring native marsh vegetation may cause a slight, temporary increase in VMT within the circulation system because construction workers would travel to and from the site. However, the traffic increase attributable to worker trips and hauling of vegetation off-site would be temporary, and would not cause delays, increases in peak traffic volume, or increases in VMT sufficient to create a conflict with any applicable plan, ordinance, or policy.

However, the exact locations and extent of restoration projects that would be permitted under the Order are yet to be determined. Therefore, it is not possible to conclude that such projects would not conflict with a plan, ordinance, or policy addressing the circulation system including transit, roadways, bicycle, pedestrian facilities, and bridge crossings. Therefore, this impact would be **potentially significant.**

Projects implementing applicable general protection measures (Appendix E) included in the Order would further reduce impacts to the circulation system. The following general protection measures may apply to transportation:

To reduce impacts on the circulation system, the Order includes the following general protection measures (Appendix E):

- GPM-6: Work Area and Speed Limits
- GPM-10: Equipment Maintenance and Materials Storage
- WQHM-1: Staging Areas and Stockpiling of Materials and Equipment

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure TRA-1, TRA-2, TRA-3, TRA-4, and TRA-5 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure TRA-1: Prepare Construction Traffic Management Plan

Before construction begins, the construction manager shall have a qualified professional prepare a construction traffic management plan. The plan shall provide the appropriate measures to reduce potential traffic obstructions or service level degradation at affected traffic facilities. The scope of the construction traffic management plan will depend on the type, size, and duration of the specific qualifying restoration project under the Order. The plan could include such measures as construction signage, flaggers for lane closures, and construction schedule and/or delivery schedule restrictions. The plan shall be submitted to the local public works department and implemented as appropriate throughout construction.

Mitigation Measure TRA-2: Prepare Waterway Traffic Control Plan

A waterway traffic control plan shall be prepared before project construction begins. The plan shall be followed throughout construction to ensure that vessels can navigate safely and efficiently during construction. The plan shall identify vessel traffic control measures to reduce congestion and navigation hazards to the extent feasible. Construction zones in waterways shall be barricaded or guarded by readily visible barriers or other effective measures to warn boaters of their presence and restricted access. Warning devices and signage shall comply with the California Uniform State Waterway Marking System and shall be operational during nighttime hours and periods of dense fog.

Mitigation Measure TRA-3: Develop Channel Closure Plan for Affected Facilities

Before construction begins in areas where temporary partial waterway closure is necessary, a temporary channel closure plan shall be developed. The plan shall identify alternative detour routes and procedures for notifying boaters of construction activities and partial closures including coordination with the U.S. Coast Guard, local boating organizations, and marinas. The channel closure plan shall be implemented as appropriate throughout construction.

Mitigation Measure TRA-4: Reduce Project Effects on Boat Passage and Transit Facilities

To the extent feasible, the following actions shall be implemented to reduce impacts of project construction on boat passage and transit facilities:

- To the extent feasible, ensure that safe boat access to public launch and docking facilities, businesses, and residencies is maintained.
- Coordinate with transit system operators, as appropriate, to establish alternative transit system routes to be rerouted during construction.

- Provide boat passage as an integral component of operable gate facilities, and design such facilities to provide uninterrupted boat passage when the gates are in the “up” position. Floating docks with mooring bits shall be provided along the shoreline on both sides of the boat passage facilities for boaters to use while waiting.
- Before construction begins in areas where bridge closure may be necessary, develop a traffic plan that identifies traffic control measures to reduce congestion and provide alternative routes.

Mitigation Measure TRA-5: Minimize Effects on Trails and Bicycle and Pedestrian Circulation and Identify Alternatives

To minimize potential impacts of project construction on trails and bicycle and pedestrian circulation, the following actions shall be taken when feasible:

- Minimize closure of paths.
- Provide for temporary or permanent relocation of the trails and bicycle pedestrian circulation locations to the extent feasible.
- Consult with the appropriate public works department to determine the most feasible alignment for facility relocation.

Implementation of the applicable general protection measures and Mitigation Measures TRA-1 through TRA-5 into project designs and plans would reduce the impact related to a conflict with a plan, ordinance, or policy addressing the circulation system to a **less-than-significant** level.

Effects of Constructed Facilities (Natural and Artificial Infrastructure) and Operations and Maintenance of those Facilities

Operations and maintenance of facilities for future restoration projects that would be permitted under the Order are not likely to substantially increase traffic or cause circulation problems associated with transit, roadways, bicycle, and pedestrian facilities. These projects would adhere to regional and local general plans and traffic regulations; therefore, they would not create substantial traffic during peak-hour periods. Workers involved with the operations and maintenance of constructed facilities would come from an existing worker pool within the project region and would not result in a substantial increase in the number of workers or vehicle trips. Therefore, operations would not substantially increase traffic or roadway congestion.

Some restoration projects permitted under the Order could remove or relocate bicycle and pedestrian facilities, affecting demands on other pathways and recreational activities. Constructing project facilities in waterways and small channels could affect navigation and boat traffic (Impact 3.17-3); periodic maintenance activities could be required, which could temporarily obstruct vessel navigation and boats. However, these restoration projects would be required to adhere to statewide, regional, and local policies, regulations, and ordinances governing traffic and circulation systems. Therefore, this impact would be **less than significant**.

Impact 3.17-2: Future restoration projects permitted under the Order could conflict with or be inconsistent with State CEQA Guidelines Section 15064.3(b).

Effects of Project Construction Activities

Section 15064.3(a) of the State CEQA Guidelines calls for evaluation of a project's transportation impacts in terms of VMT, which refers to the amount and distance of automobile travel attributable to a project. Section 15064.3(a) of the CEQA Guidelines also provides that, except as provided in Section 15064.3(b), Criteria for Analyzing Transportation Impacts (e.g., land use and transportation projects), a project's effects on automobile delay shall not constitute a significant environmental impact. In addition, Section 15064.3(b) allows CEQA lead agencies to tailor their criteria for determining the significance of transportation impacts, including using VMT. In addition, Section 15064.3(b) recognizes that not all transportation projects will induce vehicle travel and would not result in a significant impact to transportation.

Construction activities for future restoration projects that would be permitted under the Order could exceed the threshold of significance and conflict with State CEQA Guidelines Section 15064.3(b). Equipment, materials, and workers would have to be transported to project construction sites. Larger projects located near water may use large barges to transport construction equipment and materials via waterways. However, the level of significance of impacts for automobile travel would depend on the locations and types of restoration projects permitted under the Order.

Each project would require its own analysis in terms of VMT and would be required to adhere to State CEQA Guidelines Section 15064.3(b). However, the specific projects that would be carried out under the Order are yet to be determined. Therefore, the potential exists for a restoration project to exceed the threshold of significance set for transportation impacts by the CEQA lead agency or conflict or be inconsistent with State CEQA Guidelines Section 15064.3(b), and this impact would be **potentially significant.** The Order does not include any applicable general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure TRA-6 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure TRA-6: Reduce Emissions

To comply with State CEQA Guidelines Section 15064.3(b), the following measures shall be taken to reduce effects associated with increased VMT:

- Limit idling time for commercial vehicles, including delivery and construction activities.
- Use low- or zero-emissions vehicles, including construction vehicles.
- Institute a heavy-duty off-road vehicle plan and a construction vehicle inventory tracking system for construction projects.

- Promote ridesharing.
- Provide the necessary facilities and infrastructure to encourage the use of low- or zero-carbon emissions vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations).
- Increase the cost of driving and parking private vehicles, such as by imposing tolls and parking fees.
- Provide a shuttle service to public transit and worksites.
- Provide information on all options for individuals and businesses to reduce transportation-related emissions.

Mitigation Measure TRA-6 would be implemented to reduce the impacts of restoration projects permitted under the Order. However, because the extent and location of such actions are not yet determined at this time, it is not possible to conclude that the mitigation measure, or equally effective mitigation measure, would reduce significant impacts to a less-than-significant level in all cases. Therefore, this impact would be **significant and unavoidable**.

Effects of Constructed Facilities (Natural and Artificial Infrastructure) and Operations and Maintenance of those Facilities

Operations of facilities for restoration projects that would be permitted under the Order are not likely to require a large amount of automobile travel. The workers hired for each project would likely come from the regional worker pool and would not substantially increase automobile trips. Some projects may require operations and maintenance activities involving the removal of debris or the use of heavy equipment. However, substantially fewer trips are anticipated to occur than during construction. Therefore, this impact would be **less than significant**.

Impact 3.17-3: Implementing future restoration projects permitted under the Order could substantially increase hazards due to a geometric design feature or incompatible uses.

Effects of Project Construction Activities, Constructed Facilities (Natural or Artificial Infrastructure), and Operations and Maintenance of those Facilities

Construction of restoration projects, constructed facilities (natural or artificial infrastructure), and operations and maintenance of those facilities permitted under the Order could affect transportation infrastructure such as roads, bridges, railroads, and navigable waterways. Work to establish, restore, and enhance stream and riparian habitat has the potential to affect infrastructure elements such as boat docks, boat haul-out locations, campgrounds and campsites, day-use sites, roads and trails, and off-highway/off-road vehicle routes. Such work could require substantial temporary alterations to the horizontal and vertical alignments of these facilities. Upslope restoration and enhancement projects could decommission, upgrade, and stormproof priority roads and trails.

In addition, employees could commute along designated access routes. These routes would generally be preexisting public roads near construction sites; however, new off-road haul routes may be constructed between borrow sites, staging areas, and construction sites. These constructed access roads would be temporary, and restored to pre-project conditions once construction was completed.

For example, for a restoration project to replace a culvert and enhance fish passage, slow-moving trucks that deliver materials and remove materials and debris could enter and exit public streets, which could create hazards to vehicles, pedestrians, and bicyclists, thus resulting in potentially significant impacts.

Construction of some projects would affect navigation in waterways and deep water channels, potentially increasing hazards associated with channel design and geometric features. Such projects could expose boaters to additional hazards, such as increased water velocities (Section 3.11, *Hydrology and Water Quality*), or an increased risk of a collision when multiple vessels are present in the construction area. However, the exact designs of the restoration projects permitted under the Order are yet to be determined.

Project operations could affect navigation in waterways and shallow water channels and cause a potential for an increased navigation hazard if debris such as tree snags and other types of floating or submerged debris accumulated (e.g., on bridges, culverts, large woody material, engineered logjams). This debris could pose a navigational hazard or damage vessels navigating in the channel.

Therefore, impacts related to geometric design or incompatible use hazards would be **potentially significant**. The Order does not include any applicable general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure TRA-7 and TRA-8 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure TRA-7: Conduct Routine Inspections

An inspection and operation plan shall be developed and implemented, where applicable. The plan shall include procedures for routine inspections and facility operation to allow safe navigation should the facility become damaged or malfunctions. This plan shall include the following specific components:

- Routine inspections and correction procedures to ensure that facility safety features are in good working order.
- Routine inspections and correction procedures for navigational hazards around facilities, including floating or submerged debris and the formation of shoals.

Mitigation Measure TRA-8: Repair Damaged Roadways and Trails Following Construction

If damage to roads, sidewalks, trails, and/or medians occur, the construction contractor shall coordinate with the affected project proponents to ensure that any impacts are adequately repaired in accordance with applicable agency standards. Roads and/or driveways disturbed by construction activities or construction vehicles shall be properly restored to ensure long-term protection of road surfaces. Roadside drainage structures and road drainage features (e.g., rolling dips) shall be protected by regrading and reconstructing roads to drain properly. The construction contractor shall work with the applicable agencies to document preconstruction conditions of road features before the start of construction.

Restoration projects would be required to adhere to statewide, regional, and local policies, regulations, and ordinances governing traffic and circulation systems. Implementing Mitigation Measures TRA-7 and TRA-8 and the applicable general protection measures would reduce the impact related to a substantial increase in hazards due to a geometric design feature or incompatible use to a **less-than-significant** level.

3.18 Tribal Cultural Resources

3.18.1 Introduction

This section addresses tribal cultural resources in the study area and the potential impacts of the types of restoration projects that would be permitted under the Order. (Section 2.6, *Categories of Restoration Projects in the Order*.) Cultural resources are discussed separately in Section 3.7, although tribal cultural resources are included in the cultural resources section because some of the same mitigation measures for reducing impacts on cultural resources also apply to tribal cultural resources.

The environmental setting and evaluation of impacts on tribal resources is based on a review of existing published documents, including city and county general plans; information regarding example projects similar to those permitted under the Order that may be implemented by other agencies; and other information sources listed in Chapter 8, *References*.

The Native American Heritage Commission provided comments specifically addressing tribal cultural resources in response to the notice of preparation (NOP). See Appendix B for NOP comment letters.

Key Terms

For this analysis, the term *cultural resource* is defined as follows:

> Indigenous and historic-era sites, buildings, structures, districts, and landscapes, or other evidence associated with human activity considered of value to a culture, a subculture, or a community for scientific, traditional, religious, or other reason. These resources include the following types of CEQA-defined resources: historical resources, archaeological resources, and human remains.

CEQA Guidelines section 15064.5 defines the term *historical resource* as follows:

- A resource in the California Register of Historical Resources (California Register)
- A resource included in a local register of historical resources, as defined in PRC Section 5020.1(k), or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g)
- Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California by the lead agency, provided the lead agency's determination is supported by substantial evidence in light of the whole record

If a lead agency determines that an archaeological site is a historical resource, the provisions of PRC Section 21084.1 and PRC Section 15064.5 apply. If an archaeological site does not meet the criteria for a historical resource contained in the State CEQA Guidelines (PRC Section 15000 et seq.), the site may be treated in accordance with the provisions of PRC Section 21083, pertaining to unique archaeological resources.

The term *indigenous*, rather than *prehistoric*, is used as a synonym for "Native American–related" (except when quoting). *Pre-contact* is used as a chronological adjective to refer to the period before the arrival of Euroamericans in the subject area. "Indigenous" and "pre-contact" are often but not always synonymous: The former term refers to a cultural affiliation and the latter is chronological.

This section also includes the key terms defined below.

- **Architectural Resource.** This resource type includes historic-era buildings, structures (e.g., bridges, canals, roads, utility lines, railroads), objects (e.g., monuments, boundary markers), and districts. Residences, cabins, barns, lighthouses, military-related features, industrial buildings, and bridges are some examples of architectural resources.
- **Archaeological Resource.** This resource type consists of indigenous, or pre-contact, and historic-era archaeological resources:
  - *Indigenous archaeological resources* consist of village sites, temporary camps, lithic scatters, roasting pits/hearths, milling features, petroglyphs, rock features, and burials. Associated artifacts include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil (midden) containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs). Indigenous sites that were occupied into the historic era can have both pre-contact and historic-era artifacts.
  - *Historic-era archaeological resources* consist of town sites, homesteads, agricultural or ranching features, mining-related features, refuse concentrations, and features or artifacts associated with early military and industrial land uses. Associated artifacts include stone, concrete, or adobe footings and walls; artifact-filled wells or privies; and deposits of metal, glass, and/or ceramic refuse.

  If a resource is considered a ruin (e.g., a building lacking structural elements, a structure lacking a historic configuration), it is classified as an archaeological resource.

3.18.2 Environmental Setting

This section describes the types of indigenous resources, some of which could qualify as tribal cultural resources, that could be affected by the types of restoration projects that would be permitted under the Order. The area of analysis covers the entire geographic extent of California and includes many types of tribal cultural resources.

The ethnographic setting and examples of indigenous resource types that may qualify as tribal cultural resources are described here to allow analysis at a program level of detail. This description does not preclude the need for or replace any project-level environmental review.

Ethnographic Setting

Beginning in the early 16th century, but primarily during the late 19th and early 20th centuries, Native American lifeways and languages (i.e., ethnographic data) were documented throughout California. Whether provided by professional ethnographers or archaeologists, by field personnel from government agencies such as the Bureau of Indian Affairs, or by soldiers, merchants, settlers, or travelers, ethnographic accounts partly illuminate the traditions, beliefs, and cultures of Native American groups during specific points in time. Synthesized narratives such as the *Handbook of North American Indians,* Volume 8: *California* (Heizer 1978) categorize Native traditions and practices documented at the time in California; however, the complexity of regional diversity should not be overlooked.

At least six primary language families exist in California, and there may be more than 300 different dialects of approximately 100 languages. The “geolinguistic mosaic of the ethnographic period, with a startling diversity of languages and language families” indicates numerous major population shifts and migrations (Golla 2007:71). Ethnographers have also quantified at least 60 greater Indian cultures and as many as 250 specific tribes throughout the state.

Similarities between California’s native populations crossed geographic, climatic, and cultural boundaries. Acorns, where available, were a staple throughout California. Native populations relied on deer, elk, small mammals, birds, and fish, and they used resources to their fullest extent, with little to no waste product. Ethnographically documented communities were generally focused on a central tribe with smaller satellite tribelets, although this characteristic varied by region. Shamanism and ceremonialism played important roles in the lives of most California Native Americans; the specific religious traditions themselves differed between groups. Basketry was widespread, and some southern tribes also manufactured pottery. Hunting, trapping, and fishing technologies were shared across tribal and cultural boundaries but varied depending on environmental conditions.

Native American fishing techniques along inland waterways included constructing fish weirs or dams across rivers to trap anadromous fish during upstream migration. Weirs were constructed of wood poles, logs, and small stakes to obstruct fish passage up a waterway. Some fish weirs were built and used by small groups, mainly individual families, but communal constructions were also common (Gould 1975). Organized labor teams from many surrounding villages worked cooperatively to collect logs for the construction of a communal fish weir, catch fish, gather firewood, and process the catch. The dam would be in place for approximately 10 days before the group would tear it down. Other methods of fishing included net traps, harpoons, spears, platforms, and clubs (Kroeber and Barrett 1960). Tule balsa canoes and dugout canoes were also used for fishing (Wilson and Towne 1978). Among the other important riverine subsistence species were steelhead, candlefish, lamprey, eel, and trout.

Trade was well developed in California. The use of shell beads as currency was an important economic and cultural practice for many tribes. Food, ornaments, household items, clothing, industrial materials such as obsidian, finished items including canoes, pottery, basketry, and tobacco were used for trade items. Trade networks were well

established, and although it appears that there were not professional traders, central villages served as focal points for trading (Heizer 1978).

Regional differences in Native American beliefs are significant, yet there is a common identity and relationship with the environment. California Native peoples believe that nature is interrelated and immersed with sacred power. Most California tribes have creation histories that often explain the origins of the earth, human existence, and individual cultural attributes. These histories have often taught morality or defined the establishment of elements. Modern Native American beliefs vary but are rooted in their ancestral land and traditions.

Indigenous Resources and Waterways

Water—whether present in springs, creeks, rivers, lakes, bays, or the ocean—is one of the most important resources necessary for human use and settlement. Water, and access to water, provides sustenance, travel and trade corridors, and traditional boundaries. Indigenous cultural resources are present along waterways throughout California.

Indigenous archaeological resources generally found along California's waterways include permanent or semi-permanent habitation sites, temporary camps or food processing localities, and isolated artifacts. Archaeological materials that can be found at sites along waterways include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil (midden) containing heat-affected rocks, artifacts, or shellfish remains; stone milling equipment (e.g., mortars, pestles, handstones, milling slabs); and battered stone tools, such as hammerstones and pitted stones. Native American human remains can also be found at indigenous archaeological sites. These types of resources are generally not within stream channels; rather, they are located on riverbanks and in surrounding areas.

Other indigenous archaeological site types that could be in or adjacent to waterways are fish weirs and platforms. Flooding and sediment deposition episodes over millennia have buried many of these archaeological sites, resulting in complex archaeological sites with components both at and below the surface.

In addition to archaeological resources and human remains that may also qualify as tribal cultural resources, a variety of tribal cultural resources that may or may not also qualify as archaeological resources or human remains may be present along or in the vicinity of waterways throughout California. Some examples of such tribal cultural resource types are sacred places, traditional gathering and hunting areas, viewsheds, and landscapes.

Contemporary Values of California Native Americans

Today, California Native Americans find membership amongst many federally recognized tribes, as well as California Native American Tribes. Tribes continue to maintain a thriving culture, a deep connection to traditional homelands, and reverence for ancestral sites and heritage.

The following discussion regarding Tribal values and cultural continuity has been adapted from Rosenthal et al. (2021):

> "Tribal sense of place is "inseparably intertwined" with their historic and contemporary sense of themselves. Places provide the backdrop to religious understanding, traditional stories, knowledge of resources such as varying landscapes, bodies of water, animals and plants, and self-identity. Knowledge of place is central to the continuation and persistence of culture, even if former [Native American] occupants now live removed from the core of their traditional homelands through no fault of their own. [Tribes] view…interconnected sites and places…as living entities within a Native American landscape; their associations and feeling persist and connect with Tribal members today." (Rosenthal et al., 2021:21).
>
> "Each Tribe has a differing view of [landscapes] with consideration to varying cultural components and values, and a different history within the same [l]andscape. Knowledge is held within each Tribal environment, integral to the thoughts and worldview of each Tribal member. Tribal political, economic, and physical relationships to the landscape are integral to traditional values and beliefs. In this respect, indigenous places continue to exist within, throughout, and outside of modern infrastructure. To the European way of framing worldviews, these concepts may seem abstract, but to many Tribal members, they are only commonsense, and involve innate abilities and traditions." (Rosenthal et al., 2021:27).
>
> "Tribes maintain a thriving culture and continue to have a deep connection to their traditional homelands and reverence for their ancestral sites and heritage that each of these places evokes." (Rosenthal et al., 2021:40)

Native American Consultation

The State Water Board sent a notification via email to 171 tribes (Certified mail to 25 AB52 and standard mail to 146 Executive Order B-10-11 designated tribes) contacts on July 19, 2019. In response to the notification letter, the State Water Board consulted with the 10 tribes who responded to the project notification letter sent. Tribes requested and State Water Board continued to provide tribes public updates on development of the Order and continued to take tribes input and comments as the PEIR and Order were drafted. In addition, the tribes asked that the State Water Board include Tribal Cultural Resource measures in the Order that would:

- Require tribal notification of projects within their territories (especially projects with ground disturbing activities) as early as possible in the project development phase so tribes have an opportunity to comment on location, design, survey and monitoring plans
- Included additional tribal information in project notifications
- Include project information such as name, description, location, engineering plans, location, and extent of ground-disturbing activities

3.18.3 Regulatory Setting

This section discusses federal, state, and regional and local plans, policies, regulations, and laws, and ordinances pertaining to tribal cultural resources.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration project requirements, depending on the project location.

Federal

National Historic Preservation Act Section 106 (USC 470f)

The National Historic Preservation Act (NHPA) Section 106 as amended (Section 106, 16 USC 470f) requires federal agencies having direct or indirect jurisdiction over a proposed federal or federally assisted “undertaking” to take into account the effects of the undertaking on historic properties in the United States, including the outer continental shelf and the exclusive economic zone. The NHPA Advisory Council on Historic Preservation has issued regulations regarding the Section 106 process, which explain how Federal agencies must take into account the effects of their actions on historic properties.

Native American Graves Protection and Repatriation Act (Public Law 101-601; 25 USC 3001 et seq.)

The Native American Graves Protection and Repatriation Act (NAGPRA) (Public Law 101-601; 25 USC 3001 et seq.) of 1990 is a federal law that describes the process for federal agencies to return certain Native American cultural items (human remains, funerary objects, sacred objects, and objects of cultural patrimony) to linear descendants, Indian tribes, and Native Hawaiian organizations. NAGPRA includes regulations for unclaimed and culturally unidentifiable Native American cultural items, intentional and inadvertent discovery of Native American cultural items on Federal and tribal lands, and penalties for noncompliance and illegal trafficking. All federal agencies are subject to NAGPRA. The excavation and inadvertent discovery of provisions of NAGPRA apply only to Federal and tribal lands.

American Indian Religious Freedom Act (Public Law 95-341, 42 U.S.C. 1996 Section 1 and 2)

The American Indian Religious Freedom Act (AIRFA), enacted August 1978 as amended, protects and preserves American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of American Indian, Eskimo, Aleut, and Native Hawaiians, which includes but not limited to, access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rights (Pub. L. 95–341, §1, Aug. 11, 1978, 92 Stat. 469). The AIRFA requires policies of all governmental agencies to eliminate interference with the free exercise of Native religion and to accommodate access and use of religious sites to the extent that is practicable and consistent with an agency’s essential functions.

State

California Environmental Quality Act

CEQA (PRC Section 21000 et seq.) is the principal statute governing environmental review of projects occurring in California. CEQA requires lead agencies to determine whether a proposed project would have a significant effect on the environment, including a significant effect on tribal cultural resources. Under CEQA (PRC Section 21084.2), a project that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment.

Assembly Bill 52 and Tribal Cultural Resources

Assembly Bill (AB) 52, enacted in September 2014, recognizes that California Native American Tribes have expertise with regard to their tribal history and practices. The law established a new category of resources in CEQA, *tribal cultural resources*, to consider tribal cultural values when determining the impacts of projects (PRC Sections 21080.3.1, 21084.2, and 21084.3).

PRC Section 21074(a) defines a tribal cultural resource as any of the following:

- Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe that are either of the following:
  - Included or determined to be eligible for inclusion in the California Register [of Historical Resources].
  - Included in a local register of historical resources, as defined in PRC Section 5020.1(k).
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. In applying these criteria, the lead agency would consider the significance of the resource to a California Native American Tribe.

A cultural landscape that meets the criteria of PRC Section 21074(a) is also a tribal cultural resource if the landscape is geographically defined in terms of the size and scope. A historical resource as described in PRC Section 21084.1, a unique archaeological resource as defined in PRC Section 21083.2, or a non-unique archaeological resource as defined in PRC Section 21083.2 may also be a tribal cultural resource under CEQA if it meets the criteria identified in PRC Section 21074(a).

AB 52 requires CEQA lead agencies to analyze the impacts of projects on tribal cultural resources separately from impacts on archaeological resources (PRC Sections 21074 and 21083.09) because tribal cultural resources have cultural values beyond their ability to yield data important to prehistory or history. AB 52 also defines tribal cultural resources in a new code section (PRC Section 21074; discussed above). Lead agencies must engage in additional consultation with California Native American Tribes (PRC Sections 21080.3.1, 21080.3.2, and 21082.3).

California Register of Historical Resources

The California Register is "an authoritative listing and guide to be used by State and local agencies, private groups, and citizens in identifying the existing historical resources of the State and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1[a]). Under PRC Section 5024.1, certain resources are automatically included in the California Register, including California properties formally determined eligible for, or listed in, the National Register of Historic Places (National Register).

To be eligible for the California Register, a cultural resource must be significant at the federal, state, and/or local level under one or more of the following four criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage

(2) Is associated with the lives of persons important in our past

(3) Embodies the distinctive characteristics of a type, period, region, or method of construction. or represents the work of an important creative individual, or possesses high artistic values

(4) Has yielded, or may be likely to yield, information important in prehistory or history

A resource eligible for the California Register must be of sufficient age, and retain enough of its historic character or appearance (integrity), to convey the reason for its significance. The California Register consists of resources that are listed automatically and those that must be nominated through an application and public hearing. The California Register automatically includes the following resources:

- California properties listed in the National Register and those formally determined eligible for the National Register
- California Registered Historical Landmarks from No. 770 onward
- California Points of Historical Interest that have been evaluated by the California Office of Historic Preservation and have been recommended to the State Historical Commission for inclusion in the California Register

The following other resources may be nominated to the California Register:

- Historical resources with a significance rating of Category 3, 4, or 5 (properties identified as eligible for listing in the National Register, the California Register, and/or a local jurisdiction register)
- Individual historic resources
- Historic resources contributing to historic districts
- Historic resources designated or listed as local landmarks, or designated under any local ordinance, such as an historic preservation overlay zone

California Public Resources Code Section 5097

PRC Section 5097.99, as amended, prohibits obtaining or possessing Native American artifacts or human remains that are taken from a Native American grave or cairn. Knowingly or willfully obtaining or possessing Native American artifacts or human remains is a felony punishable by imprisonment. Similarly, unlawful removal of any such items with an intent to sell or dissect or with malice or wantonness is a felony punishable by imprisonment.

California Native American Historic Resources Protection Act

The California Native American Historic Resources Protection Act of 2002 imposes civil penalties, including imprisonment and fines up to $50,000 per violation, on persons who unlawfully and maliciously excavate upon, remove, destroy, injure, or deface a Native American historic, cultural, or sacred site that is listed or may be listed in the California Register.

California Health and Safety Code Section 7050.5

Section 7050.5 of the California Health and Safety Code protects human remains by prohibiting the disinterment, disturbance, or removal of human remains from any location other than a dedicated cemetery. PRC Section 5097.98 (reiterated in State CEQA Guidelines Section 15064.59[e]) also identifies steps to follow if human remains are accidentally discovered or recognized in any location other than a dedicated cemetery.

Regional and Local

The study area encompasses multiple counties with multiple cities throughout California. Many of these counties and cities have local regulations and general plans with tribal cultural resources goals and policies that guide development and encourage providing and maintaining open space resources and preserving areas of outstanding cultural value in their communities. Many cities and counties in the study area have goals and policies that promote the preservation and of the area’s tribal cultural resources.

3.18.4 Impacts and Mitigation Measures

Methods of Analysis

Effective for projects for which an NOP or a notice of negative declaration/mitigated negative declaration was filed on or after July 1, 2015, CEQA requires that a project’s impacts on tribal cultural resources be considered as part of the overall analysis of project impacts (PRC Sections 21080.3.1, 21084.2, and 21084.3). The significance of a tribal cultural resource is assessed by evaluating the following factors as they apply to the resource:

(1) Eligibility for listing in the California Register

(2) Eligibility as a unique archaeological resource pursuant to PRC Section 21083.2 (g)

(3) Listing status in the California Native American Heritage Commission’s Sacred Lands File

In addition, a lead agency can independently determine a resource to be a tribal cultural resource.

California Native American tribes traditionally and culturally affiliated with a geographic area may have expertise concerning their tribal cultural resources. Therefore, the analysis of whether project impacts may result in a substantial adverse change to the significance of a tribal cultural resource depends heavily on the results of consultation between the lead agency and culturally affiliated California Native American Tribes during the CEQA process.

The precise locations and detailed characteristics of potential future individual restoration projects are yet to be determined. Therefore, this tribal cultural resources analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis.

Permanent impacts are considered those that would result from indefinite environmental conditions created by projects permitted under the Order (e.g., new infrastructure such as pumps would be located indefinitely in one location, resulting in infrastructure that could be located within close proximity of a tribal cultural resource). Temporary impacts are considered those that would be temporary in nature (e.g., construction-related activities).

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an impact related to tribal cultural resources is considered significant if the types of projects that would be permitted under the Order would do any of the following:

- Cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:
  - Listed or eligible for listing in the California Register, or in a local register of historical resources as defined in PRC Section 5020.1(k); or
  - A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American Tribe.

Impacts and Mitigation Measures

Table 3.18-1 summarizes the impact conclusion presented in this section for easy reference.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the

potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Table 3.18-1
Summary of Impact Conclusions—Tribal Cultural Resources

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.18-1: Implementing future restoration projects permitted under the Order could cause a substantial adverse change in the significance of a tribal cultural resource, as defined in PRC Section 21074.	SU	SU

Source: Data compiled by Environmental Science Associates in 2019 and 2020
Note: SU = significant and unavoidable

Project proponents shall submit a Sacred Lands File & Native American Contacts List Request to the Native American Heritage Commission (NAHC) at the initial stages of project development (or as early as practicable) to determine if a project would have an impact on Native American cultural resources. The project proponent shall coordinate with the approving Water Board or other CEQA lead agency, if applicable, as soon as possible whenever tribes that are traditionally and culturally affiliated to a project area are identified. Any tribe identified by the NAHC will require notification of the proposed project by the lead agency as soon as practicable during early design. Tribes will be consulted if a request is received after initial notification. Consultation will include discussion regarding project design, cultural resource survey, protocols for construction monitoring, and any other tribal concern. Construction of the project will not commence until the approving Water Board or other CEQA lead agency achieves compliance with the California Environmental Protection Agency Tribal Consultation Protocol (April 2018) and the State Water Board's Tribal Consultation Policy (June 2019).

Impact 3.18-1: Implementing future restoration projects permitted under the Order could cause a substantial adverse change in the significance of a tribal cultural resource, as defined in PRC Section 21074.

Effects of Project Construction Activities

Construction for restoration projects permitted under the Order could involve ground disturbance, vibration, and removal of architectural resources (e.g., agricultural outbuildings, irrigation facilities, power poles, utility lines, piping) and vegetation (e.g., trees, stumps). Constructing these projects may also affect the biological resources community (e.g., fishes, riparian vegetation), visual setting, noise levels, and air quality, among other resources. However, the exact details, including locations, of any such construction activities have yet to be determined. Therefore, it is not known whether

implementing future restoration projects permitted under the Order would affect any tribal cultural resources.

Construction of new infrastructure or modifications to existing infrastructure (e.g., bridges, culverts, fishways and screens, dams, levees, water conveyance features) could result in significant impacts on tribal cultural resources by introducing new visual elements to landscapes associated with or comprising tribal cultural resources. Ground-disturbing activities could result in significant impacts on tribal cultural resources through their partial or complete destruction. In addition, construction activities could alter the makeup of biological communities (e.g., fishes, riparian vegetation) that comprise tribal cultural resources (e.g., traditional hunting/fishing/gathering areas). Any impacts of these construction activities on such tribal cultural resources could be significant.

If construction activities for any of the restoration projects permitted under the Order were to result in either a direct impact (e.g., physical modification, damage, or destruction) or an indirect impact (e.g., alteration to setting, biological community, or visual setting) on any tribal cultural resources as defined in PRC Section 21074, the impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Constructed facilities and operations and maintenance for restoration projects permitted under the Order could involve ground disturbance, vibration, and modifications to architectural resources (e.g., agricultural outbuildings, irrigation facilities, power poles, utility lines, piping) and vegetation (e.g., trees, stumps). These projects may also affect the biological resources community (e.g., fishes, riparian vegetation), visual setting, noise levels, and air quality, among other resources. However, the exact details, including locations, of any such facilities and operational activities have yet to be determined. Therefore, it is not known whether implementing future restoration projects permitted under the Order would affect any tribal cultural resources.

If constructed facilities and operations for any of the restoration projects permitted under the Order were to result in either a direct impact (e.g., physical modifications, damage, or destruction) or an indirect impact (e.g., alterations to setting, biological community, visual setting) on any tribal cultural resources as defined in PRC Section 21074, the impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

Impact Conclusion

Construction activities and constructed facilities and operations and maintenance for restoration projects permitted under the Order are the types of activities that have potential to affect tribal cultural resources. Because the exact details, including locations, of any such activities have yet to be determined, it is not known whether implementing restoration projects permitted under the Order would affect any tribal cultural resources. Factors necessary to identify specific impacts on tribal cultural resources include the design and footprint of a project, type, and precise location and

timing (i.e., seasonal access for cultural ceremonies or resources) of construction activities and facilities, and type and location of operations activities. If any of the future restoration projects permitted under the Order were to affect tribal cultural resources as defined in PRC Section 21074, the impact would be **potentially significant**. As described above, the Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure TCR-1,-TCR-2, and CUL-4 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure TCR-1: Conduct Inventory and Significance Evaluation of Tribal Cultural Resources with Tribes that are Culturally and Geographically Affiliated with the Project Vicinity

Before implementation of any project permitted under the Order, the following shall be conducted: consultation with California Native American Tribes pursuant to PRC Section 21080.3; a cultural resources records search; a California Native American Heritage Commission (NAHC) Sacred Lands File (SLF) search; and an inventory and significance evaluation of tribal cultural resources identified that could be impacted by the project. These tasks shall be conducted as follows.

- Project proponent shall submit an NAHC SLF & Native American Contacts List Request at the initial stages of project development (or as early as practicable) to determine if a project would have an impact on tribal cultural resources.
- Project proponent shall coordinate with the approving Water Board or other CEQA lead agency, if applicable, as soon as possible to identify California Native American Tribes that are traditionally and culturally affiliated to a project area. The CEQA lead agency shall then conduct Tribal consultation, pursuant to PRC Section 21080.3, and as soon as practicable during early design, with such Tribes to determine whether any tribal cultural resources could be affected by the project. Consultation will include discussion regarding project design, cultural resources surveys, identification of tribal cultural resources, protocols for construction monitoring, and any other Tribal concerns. Construction of the project will not commence until the approving Water Board or other CEQA lead agency achieves compliance with the California Environmental Protection Agency Tribal Consultation Protocol (April 2018) and consultation pursuant to PRC Section 21080.3 has been concluded. If potential tribal cultural resources that may be impacted by the project are identified through consultation with California Native American Tribes that are traditionally and culturally affiliated to a project area, the following shall be conducted:
    - Documentation of any tribal cultural resources identified in the project area, which may require additional tasks such as ethnographic research and interviews.

- If tribal cultural resources are identified in a project area, develop, before project implementation and in coordination California Native American Tribes that are traditionally and culturally affiliated to a project area, an approach for reducing such impacts. If any such tribal cultural resources are on or in the tide and submerged lands of California, this process shall also include coordination with the California State Lands Commission.

Mitigation Measure TCR-2: Implement Measures to Protect Tribal Cultural Resources during Project Construction or Operation. These measures include, but are not limited to, those outlined in PRC Section 21084.3.

If tribal cultural resources or indigenous archaeological resources that may qualify as tribal cultural resources are encountered during project construction or operation of any project permitted under the Order, all activity within 100 feet of the find shall cease and the find shall be flagged for avoidance. The lead agency, a qualified archaeologist, defined as one meeting the U.S. Secretary of the Interior's Professional Qualifications Standards for Archeology, and California Native American Tribes that are traditionally and culturally affiliated to a project area shall be immediately informed of the discovery. The qualified archaeologist and representatives from the notified Native American Tribes shall inspect the discovery and notify the lead agency of their initial assessment.

If the lead agency determines, based on recommendations from the qualified archaeologist and California Native American Tribes that are traditionally and culturally affiliated to a project area, that the resource may qualify as a tribal cultural resource (per PRC Section 21074), then the resource shall be avoided if feasible. If avoidance of the resource is not feasible, the lead agency shall consult California Native American Tribes that are traditionally and culturally affiliated to a project area to determine treatment measures to minimize or mitigate any potential impacts on the resource pursuant to PRC Section 21083.2 and State CEQA Guidelines Section 15126.4. If any such resources are on or in the tide and submerged lands of California, this process shall also include coordination with the California State Lands Commission. Once treatment measures have been determined, the lead agency shall prepare and implement a tribal cultural resources management plan that outlines the treatment measures for the resource. Treatment measures typically consist of the following steps:

- Determine whether the resource qualifies as a tribal cultural resource (per PRC Section 21074) through analysis that could include additional ethnographic research, archaeological investigations, or laboratory analysis.
- If it qualifies as a tribal cultural resource (per PRC Section 21074) implement measures for avoiding or reducing impacts such as the following:
  - Avoid and preserve the resource in place through measures that include but are not limited to the following:
    - Plan and construct the project to avoid the resource and protect the cultural and natural context.

  - Plan greenspace, parks, or other open space to incorporate the resources with culturally appropriate protection and management criteria.

- Treat the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, through measures that include but are not limited to the following:
  - Protect the cultural character and integrity of the resource.
  - Protect the traditional use of the resource.
  - Protect the confidentiality of the resource.
- Implement permanent conservation easements or other interests in real property, with cultural appropriate management criteria for the purposes of preserving or using the resource or place.

Mitigation Measure CUL-4: Implement Measures to Protect Human Remains during Project Construction or Operation

See Section 3.7.4, *Impacts and Mitigation Measures*, in Section 3.7, *Cultural Resources*.

Mitigation Measures TCR-1, TCR-2, and CUL-4 would be implemented to reduce the impacts of restoration projects permitted under the Order. However, because the extent and location of such actions are not known at this time, it is not possible to conclude that the mitigation measures, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. Therefore, this impact would be **significant and unavoidable**.

3.19 Utilities and Service Systems and Public Services

3.19.1 Introduction

This section describes utilities and service systems and public services in the study area and the potential impacts of the types of restoration projects that would be permitted under the Order. (Section 2.6, *Categories of Restoration Projects in the Order*.)

Utilities and service systems that could be affected by these restoration projects include water supply treatment and distribution systems, wastewater collection and treatment systems, and solid waste collection and disposal. Many of these services and utilities are provided by counties, cities, or community services/special districts; in some cases, local governments may contract the services to private entities. Public services that may be affected by restoration projects permitted under the Order include police, emergency response, and fire protection, parks, and other public facilities. Impacts related to changes in water supply and runoff from drainage system capacity and water quality are addressed in Section 3.11, *Hydrology and Water Quality*. Impacts related to public services and emergency response are addressed in Section 3.10, *Hazards and Hazardous Materials*, Section 3.17, *Transportation*, and Section 3.20, *Wildfire.*

The environmental setting and evaluation of impacts on utilities and service systems and public services is based on a review of existing published documents, including city and county general plans; information regarding example projects similar to those permitted under the Order that may be implemented by other agencies; and other information sources listed in Chapter 8, *References*.

No comments specifically addressing utilities and service systems and public services were received in response to the notice of preparation (NOP). See Appendix B for NOP comment letters.

3.19.2 Environmental Setting

This section describes the utilities and service systems and public services that could be affected by the types of restoration projects that would be permitted under the Order. The area of analysis covers the entire geographic extent of California and includes numerous utilities and service systems and public services.

Water supply and distribution systems, wastewater collection and treatment systems, solid waste collection and disposal, and public services (law enforcement, emergency medical services, and other public facilities) are described here to support a program-level analysis of environmental impacts.

Utilities and Service Systems

Water Supply and Distribution Systems

In California, water service is provided by cities, counties, special districts, and private utilities. Most service providers get their water from surface water, groundwater, or a combination of both, and serve a wide range of connections, from just a few connections to thousands. Water rights, water contract agreements, groundwater

pumping limitations, and the infrastructure required to treat, pump, and deliver water are the factors that limit the amount of water available to service providers.

Wastewater Collection and Treatment Systems

A variety of federal and state laws regulate wastewater in California; however, wastewater collection and treatment services are provided by cities, counties, and special districts. Urban areas generally contain collection systems at wastewater facilities. Where sewer service is unavailable, residents and businesses in some rural areas dispose of wastewater in on-site septic systems. In some areas, individual nonindustrial developments also have treatment plants to treat localized wastewater from mobile home parks, apartment complexes, and resorts.

Municipal sewer systems consist of sewer collection pipelines, treatment facilities, and outfall structures or disposal systems. Secondary- or tertiary-treated effluent is generally discharged into rivers, streams, creeks, and sloughs. Land disposal includes evaporation and percolation plants, or application to irrigated agricultural lands. During the summer, recycled effluent is used for industrial purposes or agricultural irrigation. In addition, municipalities may provide wastewater collection infrastructure and services that discharge to regional facilities owned and operated by other municipalities.

Solid Waste Collection and Disposal

Counties and cities oversee solid waste management planning, administration, and facility approval. Under the California Integrated Waste Management Act, local enforcement agencies are responsible for permitting of solid waste facilities. Where authorized local enforcement agencies are missing, permitting falls under the jurisdiction of the California Department of Resources Recycling and Recovery (CalRecycle).

Many municipalities enter into franchise agreements with private waste management businesses. Planning and operation of solid waste management facilities is typically coordinated regionally; some communities do not have landfill sites within their boundaries, thus making it necessary for such communities to haul waste to a facility outside the county or city for disposal. These communities use transfer stations and recycling facilities that are a component of local waste management solutions.

To comply with state diversion regulations, extend the life of landfills, reduce the environmental impacts of solid waste disposal, and reuse resources, resource recovery measures such as recycling, composting, and waste-to-energy are implemented. These activities are often subject to performance measures and requirements identified in local integrated waste management plans.

Telecommunication

The California Public Utilities Commission develops and implements policies for the telecommunication industry to achieve the following goals:

- Ensure fair, affordable universal access to necessary services.
- Develop clear rules of the game and regulatory tools to allow flexibility without compromising due process.

- Remove barriers that prevent a fully competitive market.
- Reduce or eliminate burdensome regulation.

In California, telecommunication facilities are being shifted to wireless facilities such as small cells and distributed antenna systems. A majority of these facilities are proposed for installation in public rights-of-way. U.S. Code Title 47, Section 332 (47 USC 332) maintains local authority over local decisions regarding the placement, construction, and modification of personal wireless telecommunication facilities.

Natural Gas

Natural gas consists of many different compounds such as methane and natural gas liquids (ethane, propane, butanes, and pentanes). It is formed through the decomposition of historic animals and plants that have been converted to hydrocarbon fuels by high pressure and temperatures deep under the earth's surface.

In 2018 California withdrew approximately 202,616 million cubic feet from gas, oil, and shale gas wells within its boundaries. Out of the 30.59 trillion cubic feet of natural gas used in the United States in 2018, California was the second largest consumer, using approximately 7.1 percent of natural gas used in the U.S. (EIA 2019). Nearly 90 percent of California's natural gas supply comes from out-of-state imports; approximately 45 percent of the natural gas burned in California is used for electricity generation, 21 percent is consumed in the residential sector, 25 percent in the industrial sector, and 9 percent in the commercial sector.

Natural gas facilities in the state provide residents with electricity, heat buildings, fuel vehicles, and provide many other uses. Natural gas is generally delivered to residents and users through pipelines and tanks in the form of compressed natural gas. These facilities are located throughout the state.

Electric Power

In 2018, California produced approximately 194,842 gigawatt-hours of electricity and imported approximately 90,646 gigawatt-hours (CEC 2019). Generally, electric power is generated by power plants or renewable energy resources such as hydropower, geothermal, biomass, and solar energy. Energy is transferred through electricity substations, transformers, and power lines that relay the energy from the producer to the consumer.

California is part of the western transmission system that helps keep electricity flowing reliably and safely throughout the western United States. On a more local scale, balancing authorities help to ensure that demand and supply are regionally balanced. California has eight balancing authorities:

- Balancing Authority of Northern California
- California Independent System Operator
- Imperial Irrigation District
- Los Angeles Department of Water & Power
- PacifiCorp West
- NV Energy

- Turlock Irrigation District
- Western Area Lower Colorado

The California Independent System Operator operates in all 58 California counties and operates the flow of electricity through three main investor-owned utilities (Pacific Gas and Electric Company, Southern California Edison, and San Diego Gas and Electric Company) in addition to several other municipal operators.

Public Services

Public services are provided by counties, cities, or community services/special districts, and in some cases by private entities under contract with local governments. The level of demand for public services depends on the population requiring such services. Additional factors that affect demand and the cost of delivering services include development density and the economic circumstances of the region.

Law Enforcement

Unincorporated areas of the state are generally served by county sheriff's departments, which typically operate county jails and coroner's offices, and by the Governor's Office of Emergency Services. Incorporated cities have their own police departments that provide law enforcement within the city limits, generally including responses to calls, investigations, surveillance, and routine patrols. The California Highway Patrol, the primary law enforcement agency for state highways and roads, provides law enforcement, traffic school, accident investigations, and management of hazardous materials spills. The California Department of Fish and Wildlife is responsible for enforcing laws governing hunting and fishing.

Fire Protection and Emergency Medical Services

Fire Protection

Emergency medical rescue and fire protection services are provided by cities, counties, and special districts. Some agencies provide advanced life support via fire department ambulances, paramedic squads, and/or the placement of firefighters/paramedics on fire engines. Special squads or response units operated by fire districts, fire departments, and county sheriff's offices conduct water rescues. Fire districts receive and respond to an abundance of calls, most for medical emergencies, with fire suppression making up the remaining calls. Multiple fire districts and departments serve counties, cities, and communities in California. These districts and departments are located strategically to fulfill targeted response times. These response goals are affected by geographic distance (shorter in urban locations, longer in rural areas), circulation, development, and population growth.

Emergency Medical Services

Emergency medical services in California include emergency dispatch (911), ambulances, and hospitals and other medical care services.

Ambulances

Ambulance services are provided by local fire districts or contracted through private companies. To provide advanced life support and ambulance transport services in a

region, private ambulance companies must obtain operating permits. In some cases, fire departments are equipped to provide advanced life support until an ambulance service arrives, but they mostly provide first responder services such as basic life support.

Hospitals and Medical Care Services

Numerous hospitals and medical care services are located within the study area with services ranging from emergency services to social services, radiation therapy, comprehensive outpatient rehabilitation services, home health care services, and many others.

Other Public Facilities

Numerous public school districts operate in the study area, serving students from preschool through high school. These districts are typically found in more densely populated areas. Libraries are provided by counties affected by population growth and demographic changes. Public libraries are typically funded by local property taxes, state funds, library fines and fees, grants, and donations. County libraries generally provide additional community services such as internet access, mobile book services, children's programs, and adult literacy programs in addition to traditional services. Each county in the study area generally provides public library services to its residents in coordination with the cities.

According to 42 USC 5122, a "public facility" is defined as a facility owned by the state or local government such as:

- A flood control, navigation, irrigation, reclamation, public power, sewage treatment and collection, water supply and distribution, watershed development, or airport facility
- A non-federal-aid street, road, or highway
- Any other public building, structure, or system, including those used for educational, recreational, or cultural purposes
- Any park

The Order would include the use of such public facilities such as access and haul routes consisting of public roads, nature preserves, and other public facilities found throughout the state.

3.19.3 Regulatory Setting

This section discusses federal, state, and regional and local plans, policies, regulations, and laws, and ordinances pertaining to utilities and public services.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location.

Federal

Clean Water Act

The Federal Water Pollution Control Act Amendments of 1972, also known as the Clean Water Act (CWA), established the institutional structure for the U.S. Environmental Protection Agency (EPA) to regulate discharges of pollutants into the waters of the United States, establish water quality standards, conduct planning studies, and provide funding for specific grant projects. Congress has amended the CWA several times since 1972.

EPA has provided most states with the authority to administer many of the provisions of the CWA. In California, the State Water Board has been designated by EPA to develop and enforce water quality objectives and implementation plans. The State Water Board has delegated the specific responsibilities for the development and enforcement actions to the Regional Boards.

Water quality criteria are designed to protect beneficial uses. Ambient surface water quality may be judged against national and state water quality criteria and specific numeric and narrative objectives of the water quality control plan (basin plan). Each Regional Board has established its own basin plan, which contains regulations meant to control the discharge of waste and other controllable factors that affect the quality of waters of the state within each region's boundaries.

Section 303(d) requires states, territories, and authorized tribes to develop a list of water quality–impaired segments of waterways and other water bodies under their jurisdiction. The law requires that the jurisdictions establish priority rankings of waters on the list and develop action plans, or total maximum daily loads, to improve water quality.

Section 402 of the CWA established the National Pollutant Discharge Elimination System (NPDES) permit program to regulate point-source discharges of pollutants into waters of the United States. (EPA defines a "point source" as "any single identifiable source of pollution from which pollutants are discharged, such as a pipe, ditch, ship or factory smokestack.") An NPDES permit sets specific discharge limits for point sources that discharge pollutants into waters of the United States and establishes monitoring and reporting requirements, as well as special conditions. Typically, Regional Boards issue NPDES permits for a 5-year period.

Safe Drinking Water Act

The Safe Drinking Water Act, which was enacted to protect the quality of drinking water in the United States, authorizes EPA to:

- Establish minimum standards to protect tap water
- Require all owners and operators of public water systems to comply with health-related standards
- Establish minimum standards for state programs to protect underground sources of drinking water

Under the Safe Drinking Water Act, state governments can be authorized to implement rules established by EPA.

Resource Conservation and Recovery Act

Subtitle D of the Resource Conservation and Recovery Act (42 USC 6901 et seq.) contains regulations for municipal solid waste landfills and requires states to implement their own permitting programs incorporating the federal landfill criteria. The federal regulations address the location, operation, design, groundwater monitoring, and closure of landfills. EPA's waste management regulations are listed in Volume 40, Parts 239–282 of the Code of Federal Regulations. Resource Conservation and Recovery Act Subtitle D is implemented by Title 27 of the Public Resources Code, approved by EPA.

State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) established the State Water Board and the Regional Boards as the principal state agencies with primary responsibility for the coordination and control of water quality (Water Code Section 13001), including the enforcement of applicable laws and regulations. In addition to overseeing the efforts of the Regional Boards, the State Water Board is responsible for allocating surface water rights.

The State Water Board and Regional Boards focus their efforts primarily on stormwater; wastewater treatment; water quality monitoring; wetlands protection; ocean protection; environmental education; environmental justice; cleanup of contaminated sites, including brownfields; and low-impact development. They also administer several financial assistance programs to assist communities in the construction of water and wastewater infrastructure (State Water Board 2019).

Under the Porter-Cologne Act, waters of the state fall under the jurisdiction of the State Water Board and the nine Regional Boards. "Waters of the state" are any surface or groundwater body within the boundaries of the state (Water Code Section 13050[e]). The State Water Board and Regional Boards have been delegated federal authority to implement the requirements of the federal CWA in California, including issuing federal NPDES permits, pursuant to the Porter-Cologne Act. However, the requirements of the Porter-Cologne Act are even broader than those of the CWA.

Under the Porter-Cologne Act, the Regional Boards must prepare and periodically update water quality control plans, also known as basin plans. Each basin plan sets forth water quality objectives sufficient to ensure the reasonable protection of designated beneficial uses of surface water and groundwater, and actions to control nonpoint and point sources of pollution. Any person who discharges or proposes to discharge any waste that could affect the quality of the waters of the state must file a "report of waste discharge" with the appropriate Regional Board. "Waste" includes any and all waste substances associated with human habitation, of human or animal origin, or from any producing, manufacturing, or processing operation (Water Code Section 13050[d]). Upon receipt of a report of waste discharge, the Regional Board may issue "waste discharge requirements" designed to ensure compliance with applicable water quality objectives and other requirements of the basin plan.

California Public Utilities Commission

The California Public Utilities Commission regulates privately owned water, energy, and telecommunications utilities. The commission is also responsible for safety enforcement, which includes investigating accidents occurring on the property of any public utility. The California Public Utilities Commission's Division of Ratepayer Advocates has a statutory mandate to obtain the lowest possible utility rates for service consistent with safe and reliable service levels.

State Water Board's Division of Drinking Water

The State Water Board's Division of Drinking Water (DDW) is responsible for regulating public water systems; oversees water recycling projects; permits water treatment devices; supports and promotes water system security; and performs a number of other functions. The DDW consists of three branches: The Northern California Field Operations Branch, the Southern California Field Operations Branch, and the Program Management Branch. The Northern California and Southern California Field Operations Branches (FOBs) are responsible for the enforcement of the federal and California Safe Drinking Water Acts and regulatory oversight of public water systems within California. In this undertaking, staff perform field inspections, issue operating permits, review plans and specifications for new facilities, take enforcement actions for non-compliance with laws and regulations, review water quality monitoring results, and support and promote water system security. The FOBs also participate in funding infrastructure improvements, conducting source water assessments, overseeing water recycling projects, and promoting public water systems in drought preparation and water conservation.

Integrated Waste Management Act (Assembly Bill 939)

The regulations affecting solid waste disposal in California can be found in Title 14 of the California Public Resources Code, the Integrated Waste Management Act. Originally enacted in 1989 through Assembly Bill (AB) 939, the law is designed to increase the life of landfills by requiring diversion of solid waste from landfills in the state and conservation of other resources through increased recycling programs and incentives.

AB 939 requires counties to prepare integrated waste management plans to implement landfill diversion goals, and requires cities and counties to prepare and adopt source reduction and recycling elements. These elements must establish a program for managing solid waste generated within the city's or county's jurisdiction. Each source reduction and recycling element must include, but is not limited to, all of the following components for solid waste generated within the plan's jurisdictional area:

- Waste characterization
- Source reduction
- Recycling
- Composting
- Solid waste facility capacity
- Education and public information
- Funding
- Special waste

Source Reduction and Recycling Element programs are designed to achieve landfill diversion goals by encouraging recycling in the manufacture, purchase, and use of recycled products. AB 939 also requires California cities to implement plans designed to divert the total solid waste generated within each jurisdiction by 50 percent based on a base year of 2000. The diversion rate is adjusted annually for population and economic growth when calculating the percentage achieved in a particular jurisdiction.

Public Resources Code Section 41780

The California Legislature set a policy goal that not less than 75 percent of solid waste generated in the state would be source reduced, recycled, or composted commencing by January 1, 2020. A 50 percent diversion rate will be enforced for local jurisdictions.

Assembly Bill 1220

CalRecycle and the State Water Board completed parallel rulemaking as a result of AB 1220 (Chapter 656, Statutes of 1993). AB 1220 required clarification of the roles and responsibilities of CalRecycle and the State Water Board, the Regional Boards, and CalRecycle's local enforcement agencies in regulating solid waste disposal sites. The approved regulations in California Code of Regulations (CCR) Title 27 combine the prior disposal site/landfill regulations of CalRecycle and the State Water Board, which were maintained in CCR Title 14 and CCR Title 23, Chapter 15 (which contains requirements for disposal of hazardous waste).

The purpose of CalRecycle's regulatory standards is to protect public health and safety and the environment. The regulations apply to active and inactive disposal sites, including facilities or equipment used there. These standards clarify that the local enforcement agency has primary responsibility for enforcing the state's minimum standards, working in cooperation with the Regional Board or other oversight agencies.

The CCR Title 27 regulations also include the following operating criteria and requirements for landfills and disposal sites:

- Sufficient materials to cover waste to prevent a threat to human health and the environment
- Proper handling of waste and the equipment needs of solid waste facilities
- Control of activities on-site
- Control of landfill gas that is made from the decomposition of wastes on-site
- Proper operation of the site to protect the site from fire threats

Assembly Bill 341

To reduce greenhouse gas emissions from disposal of recyclables in landfills, AB 341 requires local jurisdictions to implement commercial solid waste recycling programs. Businesses that generate 4 cubic yards or more of solid waste per week or multifamily dwellings of five units or more must arrange for recycling services. To comply with AB 341, jurisdictions' commercial recycling programs must include education, outreach, and monitoring of commercial waste generators and must report on the process to

CalRecycle. Jurisdictions may enact mandatory commercial recycling ordinances to outline how the goals of AB 341 will be reached.

For businesses to comply with AB 341, they must arrange for collection of recyclables by self-hauling, subscribing to a franchised hauler for collection, or subscribing to a recycling service that may include mixed waste processing that yields diversion results comparable to source separation (CalRecycle 2019).

Assembly Bill 1826

To further reduce greenhouse gas emissions from disposal of organic materials in landfills, AB 1826 required certain businesses to recycle their organic waste beginning on April 1, 2016, with required recycling services dependent on the amount of solid waste generated per week. Similar to AB 341, jurisdictions must implement an organic waste recycling program that includes the education, outreach, and monitoring of businesses that must comply. “Organic waste” refers to food waste, green waste, landscaping and pruning waste, nonhazardous wood waste, and food-soiled paper that is mixed with food waste.

California Occupational Safety and Health Administration

In accordance with 8 CCR Section 1270, *Fire Prevention*, and 8 CCR Section 6773, *Fire Protection and Fire Equipment*, the California Occupational Safety and Health Administration has established minimum standards for fire suppression and emergency medical services. Among the standards are guidelines on the handling of highly combustible materials; requirements for the sizing of fire hoses; restrictions on the use of compressed air; access roads; and testing, maintenance, and use of all firefighting and emergency medical equipment.

Uniform Fire Code

The Uniform Fire Code provides regulations governing the construction, maintenance, and use of buildings. The code addresses fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazards safety, storage and use of hazardous materials, provisions for protecting and assisting fire responders, industrial processes, and many other general and specialized fire-safety requirements for new and existing buildings and the surrounding premises. The Uniform Fire Code contains specialized technical regulations related to fire and life safety. The code provides sprinkler system standards and requirements for different types of buildings, including hospitals.

Essential Services Building Seismic Safety Act

The Essential Services Building Seismic Safety Act of 1986 (California Health and Safety Code, Sections 16000–16022) applies to fire stations, police stations, and other public facilities that respond to emergencies. This law is intended to ensure that essential-services buildings can continue to serve the public after a disaster and are designed and constructed to minimize fire hazards. In addition, these buildings and the nonstructural components vital to their operation must be able to resist, insofar as practical, the forces created by earthquakes, gravity, fire, and wind.

California Health and Safety Code

State fire regulations are set forth in Section 13000 et seq. of the California Health and Safety Code. The code includes regulations for building standards (as established in the California Building Code), fire protection and notification systems, fire protection devices such as extinguishers, smoke alarms, and fire suppression training.

Regional and Local

Policies and regulations governing utilities and public services are found in each county's adopted general plan and can vary from county to county.

3.19.4 Impacts and Mitigation Measures

Methods of Analysis

Utilities and public services impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could impact existing utilities and service systems and public services. However, the precise locations and characteristics of potential future individual restoration projects are yet to be determined. Therefore, this utilities and public services analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis.

Permanent impacts are considered those that would continue through the life of a project as a result of the environmental conditions caused by restoration projects permitted under the Order (e.g., new infrastructure that would require maintenance and monitor activities). Temporary impacts are those that would be temporary in nature (e.g., construction-related activities).

The approach to assessing utilities and public service impacts was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of Restoration Projects in the Order*, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an impact related to utilities and public services is considered significant if the types of restoration projects that would be permitted under the Order would do any of the following:

- Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects
- Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years

- Result in a determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments
- Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of soil waste reduction goals
- Fail to comply with federal, state, and local management and reduction statutes and regulations related to solid waste
- Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:
  - Fire protection
  - Police protection
  - Schools
  - Park
  - Other public facilities

Section 3.11, *Hydrology and Water Quality*, evaluates impacts related to changes in water supply availability for water users in California, as well as impacts of increased surface runoff on drainage system capacity and water quality. For a more detailed discussion of public services related to fire protection and wildfire, see Section 3.20, *Wildfire*.

Impacts Not Evaluated Further

Construction of new wastewater systems (e.g., collection, treatment, and discharge facilities) or expansion of existing systems is prompted by increased customer demand, typically as a result of new land development (such as development that transitions land use from a rural to more urban use) or population growth. Future restoration projects permitted under the Order would not include development of occupied structures that would result in an increase in demand for wastewater treatment. Construction crews are generally available in existing population centers and would not be anticipated to relocate when assigned to a new construction site (discussed further in Section 3.15, *Population and Housing*). Therefore, construction activities would not add substantial new customer demands to existing wastewater systems.

To the extent that future restoration projects permitted under the Order would occur in municipal settings, the relatively small amount of wastewater temporarily generated by construction activities would not exceed any requirements or require the construction of new or expansion of existing wastewater treatment facilities. Therefore, no adverse impact would occur, and issues related to new or expanded wastewater treatment facilities are not discussed further in this PEIR.

Impacts and Mitigation Measures

Table 3.19-1 summarizes the impact conclusions presented in this section for easy reference.

Table 3.19-1
Summary of Impact Conclusions—Utilities and Service Systems and Public Services

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.19-1: Implementing future restoration projects permitted under the Order could require or result in the construction or relocation of new water or expanded water, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.	SU	LTS
3.19-2: Implementing future restoration projects permitted under the Order could result in insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years.	LTS	LTS
3.19-3: Future restoration projects permitted under the Order could be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs and could fail to comply with federal, state, and local statutes and regulations related to solid waste.	LTS	LTS
3.19-4: Implementing future restoration projects permitted under the Order could result in substantial adverse physical impacts associated with construction of new or modified fire protection, police protection, schools, and other public facilities.	LTS	LTS

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2020
NOTE: LTS = less than significant

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the

potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Impact 5.18-1: Implementing future restoration projects permitted under the Order could require or result in the construction or relocation of new water or expanded water, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.

Construction of new water systems (e.g., diversion, treatment, and distribution facilities) or expansion of existing systems is prompted by increased customer demand, typically as a result of new land development (such as development that transitions land use from rural to more urban use) or population growth. As described in Section 3.14, Population and Housing, and Section 5.1, Growth-Inducing Impacts, restoration projects permitted under the Order would not include new land development or induce substantial population growth that would add new water customer demands or increase long-term water demand from water systems.

Implementing future restoration projects permitted under the Order are not anticipated to require the relocation of new water or expanded water facilities due to the extensive cost of relocation and potential environmental impacts from the relocation. However, future restoration projects could require the relocation of stormwater outfalls or utilities (e.g., electric power, natural gas, or telecommunication facilities) that would cause significant environmental effects as described below.

Effects of Project Construction Activities, Constructed Facilities (Natural or Artificial Infrastructure), and Operations and Maintenance of those Facilities

Construction activities for restoration projects (e.g., floodplain widening or removal of small legacy structures) could require the relocation of facilities, such as stormwater outfalls, utilities (e.g., electric power, natural gas, or telecommunication facilities), or water conveyance facilities (e.g., canals or diversions), if those facilities are located near or in the footprint of the restoration project. Significant impacts could occur with relocation of the facilities. For example, a stormwater outfall or natural gas line could be in an area with cultural resources that would be impacted during relocation activities. Therefore, future restoration projects could result in the relocation of facilities that could cause significant environmental effects.

The types and range of potential environmental effects to other resource areas (e.g., effects to cultural or tribal cultural resources, special status species and habitat, erosion, water quality, air quality) due to the relocation of stormwater outfalls or other facilities resulting from construction activities are analyzed in the other resource sections in Chapter 3 of this PEIR. As noted in the resource sections of Chapter 3, the Order includes general protection measures, species protection measures, and mitigation measures to avoid and minimize impacts on environmental resources in the study area resulting from the implementation of future restoration projects.

Since there are significant and unavoidable impacts for some of these resource areas this impact would be **significant and unavoidable**.

Routine O&M activities for restoration projects permitted under the Order would not require or result in the construction or relocation of new water or expanded water, storm drainage, electric power, natural gas, telecommunications facilities or water conveyance facilities. Thus, this impact would be **less than significant.** The Order does not include any general protection measures applicable to this impact.

Impact 3.19-2: Implementing future restoration projects permitted under the Order could result in insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years.

Population changes could occur resulting in reasonably foreseeable future development (e.g., new housing or commercial development). These future development projects may require surface water during normal, dry and multiple dry years. A discussion of water supply requirements for restoration projects are discussed below. As detailed below, these projects are not anticipated to result in insufficient water supplies by meeting existing regulatory requirements (e.g., existing Biological Opinions on the Long-Term Operations of the Central Valley Project and State Water Project). Future restoration projects would need to comply with relevant federal, state, and local regulations and ordinances (including demonstrating there are sufficient water supplies, if needed), as would reasonably foreseeable future development projects. Therefore, implementing future restoration projects permitted under the Order would not result in insufficient water supplies to serve reasonably foreseeable future development during normal, dry, and multiple dry years.

In addition, as described in Section 3.15, Population and Housing, restoration projects would not include the development of housing or commercial structures and/or induce substantial population growth that would increase demand for water supply during normal, dry, and multiple dry years.

The use of water during construction activities and the potential need for water during operations and maintenance is discussed below.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Construction-related impacts would be temporary and short-term, and the water needed for construction and construction workers could be provided by existing municipal and non-municipal systems (such as water wells or water trucks).

Restoration projects may require a water supply for maintenance activities. For example, irrigation water may be needed for the initial establishment of native plant revegetation. However, the water supply needed for maintenance would be limited and could be met by existing municipal and non-municipal systems.

Constructed facilities, including expansion or modification of floodplains and fish passage improvements, could have effects on water supply availability if water levels

are reduced near diversion intakes. However, anticipated changes in water levels resulting from constructed facilities would need to comply with relevant federal, state, and local regulations and ordinances and would not impede operations of existing diversion facilities or substantially change water supply availability to water users. In addition, as described in Section 3.11, Hydrology and Water Quality, some of the long-term effects of restoration projects permitted under the Order on groundwater recharge are expected to be beneficial (e.g., stream, floodplain, and riparian restoration projects typically would improve groundwater recharge).

Therefore, construction and operations and maintenance activities would not result in an increase in water use or demand, nor would they result in insufficient water supplies available to serve the project during normal, dry, and/or multiple dry years. Impacts on water supplies would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Impact 3.19-3: Future restoration projects permitted under the Order could be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs and could fail to comply with federal, state, and local statutes and regulations related to solid waste.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order could temporarily increase the amount of solid waste hauled to local landfills. The magnitude of the increase in solid waste generation would depend on the size, number, location, and nature of the projects, and their ability to recycle, reuse, or dispose of materials on-site.

Most projects permitted under the Order that would involve earthmoving activities would not generate large amounts of construction waste (e.g., organic materials from borrow areas and restoration construction sites, excavated material, and soil not suitable for earthen structures) that would require disposal at a landfill. Most excess organic material would be used to reclaim borrow areas and temporarily disturbed sites or would be provided to local farmers for incorporation into their land to help improve soil quality. Debris generated during project clearing and grubbing operations would be disposed of based on the type of material and local conditions.

The materials generated would be hauled off-site to landfills (e.g., building demolition waste); delivered to recycling facilities (e.g., concrete); sold (e.g., organic material to cogeneration facilities); or reused onsite or nearby (e.g., restoration project or other projects needing fill material). Thus, construction waste is unlikely to cause the permitted capacity of local landfills to be exceeded or would not be in compliance with federal, state, and local regulations related to solid waste. Impacts related to solid waste disposal needs and compliance would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Restoration projects permitted under the Order would result in the construction of facilities (whether natural facilities or infrastructure). Depending on the nature of the

project, operations and maintenance of these facilities could produce solid waste. As mentioned above, debris generated during operations and maintenance would be disposed of via methods that would vary by the type of material and local conditions. Furthermore, the magnitude of the increased generation of solid waste would depend on the size, number, location, and nature of projects. The amount of solid waste likely to be generated by these uses would be very small relative to landfill capacity. Thus, the restoration projects permitted under the Order are unlikely to cause the permitted capacity of local landfills to be exceeded, or to create conflicts with federal, state, and local regulations related to solid waste. Therefore, impacts related to solid waste disposal needs and compliance would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Impact 3.19-4: Implementing future restoration projects permitted under the Order could result in substantial adverse physical impacts associated with construction of new or modified fire protection, police protection, schools, and other public facilities.

The need for new or altered police and fire protection services, emergency medical facilities, and school and library facilities is prompted by increased demand, typically as a result of new land development or population growth. Construction activities for future restoration projects permitted under the Order would not include new land development or occupied structures that would increase population and add new public service demands. However, potential impacts on public services during construction, operations, and maintenance activities for the restoration projects that would be permitted under the Order are discussed below.

Effects of Project Construction Activities

Construction activities for future restoration projects permitted under the Order would not include the construction of new or modified fire or police protection facilities, schools, or other public facilities and would not increase population or add new public service demands. Construction activities could result in a temporary increase in the need for construction crews. However, any increase in the regional population resulting from project construction would be negligible because the number of workers needed for any given project would be a tiny fraction of the overall population of urban and suburban areas, and thus a less than measurable increase in demand for housing. In rural areas, the increase in residents may create a local demand for housing; however, such areas typically do not have the housing shortages associated with urban areas, and the demand would typically be temporary. Housing shortages in areas that have recently been subject to natural disasters, such as wildfire and flooding, may be a factor for some possible permitted restoration projects, but these are also unlikely to constitute a measurable proportion of overall demand, and project workers would not add substantial new demands to public services or require new or altered public service facilities. Any increases in demand for law enforcement, fire protection, and medical services related to this small change in population in any one county are expected to be negligible.

Construction activities for restoration projects permitted under the Order could temporarily increase response times for fire protection, law enforcement, and

emergency medical services because the transportation and relocation of construction materials could increase traffic levels. Waterside restoration projects may use barges to transport construction materials, workers, and equipment, which could reduce impacts on response times. However, the extent of project components (i.e., the number, location, and project specifics) that would be implemented, which would factor into the potential for increased response times, is not known at this time. Project-related increases in demands for public services (e.g., from jobsite accidents and jobsite security during construction) related to future actions would be temporary or short-term and likely would not require new or altered public service facilities.

Construction activities for restoration projects permitted under the Order would not add substantial new demands to existing fire or police protection facilities, schools, or other public facilities. Increases in demands for public services, such as from jobsite accidents or jobsite security during construction of future project actions, would be temporary or short-term and are unlikely to require new or altered public service facilities because the overall numbers of workers at permitted projects would typically be a small portion of the population in any given project area. Furthermore, implementing restoration projects permitted under the Order would not result in the construction or modification of fire or police protection facilities, schools, or other public facilities. Thus, this impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Operation of some restoration projects permitted under the Order would require maintenance and monitoring activities to support successful project establishment. However, routine maintenance activities would not result in substantially adverse physical traffic impacts that would lead to increased response times for fire protection, police protection, schools, and other public facilities. Therefore, operations and maintenance activities would not result in substantial adverse physical impacts associated with construction of new or modified fire or police protection facilities, schools, or other public facilities. This impact would be **less than significant**. The Order does not include any general protection measures applicable to this impact.

3.20 Wildfire

3.20.1 Introduction

This section describes the potential for restoration projects permitted under the Order to be located in or near state responsibility areas or lands classified as Very High Fire Hazard Severity Zones, and to result in wildfire impacts. These impacts include the potential to affect adopted emergency response or evacuation plans; exacerbate fire risks; or expose people or structures as a result of runoff, post-fire slope instability, or drainage changes.

The environmental setting and evaluation of impacts are based on a review of existing published documents, including city and county general plans; information about example projects similar to the Order that may be implemented by other agencies; and other information sources listed in Chapter 8, *References*.

Potential impacts related to the following topics are described and evaluated in Section 3.10, *Hazards and Hazardous Materials*, of this PEIR:

- Potential to interfere with emergency access or with an adopted emergency response or evacuation plan
- Potential to expose people or structures, either directly or indirectly, to significant loss, injury, or death due to wildland fires

No comments specifically addressing wildfire were received in response to the notice of preparation (NOP). See Appendix B for the NOP comment letters.

3.20.2 Environmental Setting

In the past decades, the average wildfire season in the West has lengthened from 5 months to 7 months, the number of large wildfires (affecting more than 1,000 acres) has increased from 140 to 250 per year, and wildfires now burn year-round in California (SBFFP and CAL FIRE 2018). In addition, with the ever-increasing number of people and structures exposed to wildland fire risks, California has seen its largest and most destructive fires in the last few years.

Wildfire behavior is a product of several variables, primarily climate, vegetation, topography, and human influences, which intermix to produce regional and local fire regimes that affect how, when, and where fires burn. The fire regime in any area is defined by several factors, including fire frequency, intensity, severity, and area burned. All of these factors are important to an understanding of how the variables that affect fire behavior produce fire risks. *Fire frequency* refers to the number of fires that occur in a given area over a given period of time, *fire intensity* refers to the speed at which fire travels and the heat that it produces, *fire severity* involves the extent to which ecosystems and existing conditions are affected or changed by a fire, and *area burned* is the size of the area burned by wildfire.

Although wildfire has historically been a key component in ecosystem dynamics, several factors have disrupted the natural fire regime in many of California's ecosystems. In many cases, the type of wildland fire and the pattern of its occurrence—when compared

to historical conditions—are adversely affecting ecosystem composition, structure, and function. Factors such as fire suppression, land use, exotic invasive species, and climate change all place stresses on the manner in which fire interacts with ecosystem health, function (such as biodiversity), and sustainability.

Warming and drying resulting from human-caused climate change are estimated to have approximately doubled the total area burned by forest fire in the western United States between 1984 and 2015, compared to the total area expected to have burned without climate change (Abatzoglou and Williams 2016). Frequent wildfires reduce the recovery of shrubs and trees—especially shrubs and trees that must produce seeds to regenerate after fire—and increase invasion by nonnative grasses (USGS 2012). Nonnative grasses are generally more flammable than the chaparral and sage scrub vegetation they replace; thus, such conversion exacerbates wildfire hazards (UC DANR 2009).

The California Department of Forestry and Fire Protection (CAL FIRE) is responsible for managing and protecting California's natural resources. Of the 85 million acres classified as wildlands in the state, 33 million acres are forest lands, with 38 percent privately owned and 62 percent tribally owned or government-owned. The state's wildlands provide critical watersheds, wildlife habitat, and recreation resources in addition to valuable commercial timberland.

CAL FIRE responds to nearly 6,000 wildland fires that burn, on average, more than 260,000 acres each year (CAL FIRE 2019). Through cooperative agreements, mutual aid, and the state's emergency plan, CAL FIRE personnel respond to more than 450,000 incidents annually, including structure fires, automobile accidents, medical emergencies, swift-water rescues, civil disturbances, search and rescues, hazardous material spills, train wrecks, floods, and earthquakes.

3.20.3 Regulatory Setting

No federal regulations that pertain to wildfire are applicable to the Order. This section discusses state and regional and local plans, policies, regulations, and laws, and ordinances pertaining to wildfire.

Future permitted restoration projects that would be implemented under the Order may be subject to the laws and regulations listed below, as well as other local or individual restoration projects requirements, depending on the project location.

State

California Department of Forestry and Fire Protection

CAL FIRE is dedicated to the fire protection and stewardship of more than 31 million acres of California's wildlands. The Office of the State Fire Marshal supports CAL FIRE's mission to protect life and property through fire prevention engineering programs, law and code enforcement, and education. The State Fire Marshal enforces fire-related laws in state-owned or operated buildings; investigates arson fires in California; licenses entities that inspect and service fire protection systems; approves fireworks as safe and sane for use in California; regulates the use of chemical flame retardants; evaluates building materials against fire safety standards; regulates

hazardous liquid pipelines; and tracks incident statistics for state and local government emergency response agencies.

CAL FIRE identifies Fire Hazard Severity Zones throughout California for both State Responsibility Areas (SRAs) and Local Responsibility Areas (LRAs). SRAs are the areas of the state where the State of California is financially responsible for preventing and suppressing wildfires. SRAs do not include lands within city boundaries or in federal ownership. LRAs include lands on which neither the state nor the federal government has any legal responsibility for providing fire protection.

CAL FIRE classifies zones within SRAs and LRAs as Moderate, High, or Very High Fire Hazard. Zone classifications are based on characteristics that affect the probability of an area burning and potential fire behavior in the area. Many factors are considered such as fire history, existing and potential fuels, flame length, blowing embers, terrain, weather, and the likelihood that buildings will ignite. Each area receives a score for flame length, embers, and the likelihood of the area burning. Scores are then averaged over the zone areas. Final zone class (Moderate, High, and Very High) is based on the average scores for the zone (CAL FIRE 2015).

The State Board of Forestry and Fire Protection (SBFFP) is a government-appointed body within CAL FIRE. The SBFFP is responsible for developing the state’s general forest policy, determining CAL FIRE’s guidance policies, and representing the state’s interest in federal forestland in California. Together, the SBFFP and CAL FIRE work to carry out the California Legislature’s mandate to protect and enhance the state’s unique forest and wildland resources.

The SBFFP is charged with protecting all wildland forest resources in California that are not under federal jurisdiction. These resources include major commercial and noncommercial stands of timber, areas reserved for parks and recreation, woodlands, brush-range watersheds, and private and state lands that contribute to California's forest resource wealth.

Government Code Sections 51175–51189 direct CAL FIRE to identify areas of very high fire hazard within LRAs. Mapping of Very High Fire Hazard Severity Zones (VHFHSZs) is based on data and models of potential fuels over a 30- to 50-year time horizon and their expected fire behavior and burn probabilities to quantify the likelihood and nature of vegetation fire exposure (including firebrands) to buildings.

Maps of VHFHSZs in Local Responsibility Areas were initially developed in the mid-1990s and are now being updated based on improved science, mapping techniques, and data.

In late 2005, effective in 2008, the California Building Commission adopted California Building Code (CBC) Chapter 7A, which required that new buildings in VHFHSZs use ignition-resistant construction methods and materials. CBC Chapter 7A applies to building materials, systems, and/or assemblies used in the exterior design and construction of new buildings in a Wildland-Urban Interface Fire Area as defined in CBC Section 702A. Chapter 7A establishes the minimum standards for the protection of life and property by increasing the ability of a building in any fire hazard severity zone in

SRAs or any Wildland-Urban Interface Fire Area to resist the intrusion of flames or burning embers projected by a vegetation fire. By doing so, Chapter 7A contributes to a systematic reduction in losses from conflagrations.

VHFHSZs are delineated and used to identify properties whose owners must disclose natural hazards when selling their property and must provide a defensible-space clearance of 100 feet.

2018 Strategic Fire Plan for California

The SBFFP has adopted strategic fire plans for California since the 1930s and updates the plans periodically to reflect the current and anticipated needs of California's wildlands. The Strategic Fire Plan is the state's road map for reducing wildfire risks through planning and prevention to reduce firefighting costs and property losses, increase firefighter safety, and contribute to ecosystem health. The Strategic Fire Plan is adopted to better respond to the changes of the environmental, social, and economic landscape of California's wildlands, and to provide CAL FIRE with appropriate guidance for adequate statewide fire protection of state responsibility areas.

CAL FIRE implements and enforces the SBFFP's policies and regulations. The 2018 Strategic Fire Plan reflects CAL FIRE's focus on: (1) fire prevention and suppression activities to protect lives, property, and ecosystem services; and (2) natural resource management to maintain the state's forests as a resilient carbon sink to meet California's climate change goals and to serve as important habitat for adaptation and mitigation.

California Office of Emergency Services

The California Emergency Management Agency was incorporated into the Governor's Office on January 1, 2009, by Assembly Bill 38 (Nava), which also merged the duties, powers, purposes, and responsibilities of the Governor's Office of Emergency Services (Cal OES) with those of the Governor's Office of Homeland Security. Cal OES coordinates the overall state government response to major disasters in support of local governments. The agency is responsible for ensuring the state's readiness to respond to and recover from all hazards—natural or man-made emergencies and disasters—and for assisting local governments in their emergency preparedness, response, recovery, and hazard mitigation efforts.

The Cal OES Fire and Rescue Division coordinates the statewide response of fire and rescue mutual-aid resources to all types of emergencies, including hazardous materials. The Fire and Rescue Division's Operations Section coordinates the California Fire and Rescue Mutual Aid System. Coordinated response through the Mutual Aid System includes responses to major fires, earthquakes, tsunamis, hazardous materials, and other disasters.

California Building Code

The CBC (California Code of Regulations Title 24, Part 2) identifies building design standards, including those for fire safety. The CBC is based on the International Building Code but has been amended for conditions in California. The CBC is updated every 3 years; the current (2019) CBC went into effect January 1, 2020. It is effective statewide, but a local jurisdiction may adopt more restrictive standards based on local

conditions under specific amendment rules prescribed by the California Building Standards Commission. Commercial and residential buildings are plan-checked by city and county building officials for compliance with the CBC. Typical fire safety requirements of the CBC include installing fire sprinklers in all new residential, high-rise, and hazardous materials buildings; establishing fire resistance standards for fire doors, building materials, and particular types of construction; and clearing debris and vegetation within a prescribed distance from occupied structures in wildfire hazard areas.

California Fire Code

The California Fire Code (CFC) (California Code of Regulations Title 24, Part 9) incorporates by adoption the International Fire Code of the International Code Council, with California amendments. The CFC is updated every 3 years; the current (2019) CFC went into effect January 1, 2020. It is effective statewide, but a local jurisdiction may adopt more restrictive standards based on local conditions under specific amendment rules prescribed by the California Building Standards Commission. The CFC regulates building standards in the CBC, fire department access, fire protection systems and devices, fire and explosion hazards safety, storage and use of hazardous materials, and standards for building inspection.

Regional and Local

The study area encompasses multiple counties with multiple cities throughout California. Each county and city has local regulations and a general plan with health and safety goals and policies that guide development and encourage conformance with fire regulations.

3.20.4 Impacts and Mitigation Measures

Methods of Analysis

Wildfire impacts from the types of restoration projects permitted under the Order are evaluated in terms of how typical construction and operation of project components could impact wildfires. However, the precise locations and detailed characteristics of potential future individual restoration projects are not yet determined. Therefore, this analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future consistent with the level of detail appropriate for a program-level analysis.

Permanent impacts are considered those that would continue through the life of a proposed restoration project as a result of the environmental conditions created by the project (e.g., ongoing maintenance in a wildland area). Temporary impacts are considered those that would be temporary in nature (e.g., construction-related activities).

The approach to assessing wildfire impacts was to identify and review existing environmental studies, data, model results, and other information for projects that are consistent with those identified in Section 2.6, *Categories of Restoration Projects in the Order*, and Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, an impact related to wildfire is considered significant if the restoration projects permitted under the Order would be located in or near state responsibility areas or lands classified as VHFHSZs and would do any of the following:

- Substantially impair an adopted emergency response plan or emergency evacuation plan
- Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire
- Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment
- Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes

For an evaluation of how restoration projects permitted under the Order could interfere with emergency response access or with an adopted emergency response or evacuation plan, see Section 3.10, *Hazards and Hazardous Materials*.

Impacts and Mitigation Measures

Table 3.20-1 summarizes the impact conclusions presented in this section for easy reference.

Table 3.20-1
Summary of Impact Conclusions—Wildfire

Impact Statement	Construction Activities	Constructed Facilities and Operations and Maintenance
3.20-1: Implementing restoration projects permitted under the Order could exacerbate fire risk.	LTSM	LTSM
3.20-2: Implementing restoration projects permitted under the Order could result in downslope or downstream risks as a result of runoff, post-fire slope instability, or drainage changes.	LTSM	LTSM

SOURCE: Data compiled by Environmental Science Associates in 2019 and 2010
NOTE: LTSM = less than significant with mitigation

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures listed below would be required when applicable to a given project. Not all general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Impact 3.20-1: Implementing projects permitted under the Order could exacerbate fire risk.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order could be located in areas with a High or Very High Fire Hazard Severity rating. Construction work could occur or staging areas could be located in or near areas with dense vegetation and/or be susceptible to high winds. For example, heavy construction equipment and passenger vehicles could drive on vegetated areas before clearing and grading, which could increase the fire danger. Construction equipment or heated mufflers could throw sparks, or oils, lubricants, and other combustible materials could accidentally ignite, resulting in a fire. Construction activities such as steel cutting and welding, while uncommon for most restoration project types, are also potential sources of ignition.

The specific locations of possible future permitted restoration projects are not known at this time. Therefore, the risk associated with a wildfire cannot be determined. Factors necessary to identify the risk include the locations of facilities relative to areas rated as High and Very High Fire Hazard Severity Zones and overgrown or dry vegetation. Because of the potential for wildfire associated with construction activities for restoration projects permitted under the Order, this impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure FIRE-1 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

Mitigation Measure FIRE-1: Develop and Implement a Fire Prevention Plan

The following measures shall be implemented before and during construction of restoration projects permitted under the Order, where applicable:

- For restoration projects in areas designated as Very High or High Fire Hazard Severity Zones, a project-specific fire prevention plan for construction and operation of the project shall be prepared and submitted to the CEQA lead agency for review before the start of construction.

- The draft copy of the fire prevention plan shall be provided to each fire agency (e.g., CAL FIRE and county or local municipal fire agencies) before the start of any construction activities in areas designated as Very High or High Fire Hazard Severity Zones.

Implementing Mitigation Measure FIRE-1 would reduce the impacts of the construction of restoration projects related to fire risk to a **less-than-significant** level.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Similar to construction activities, operations and maintenance (O&M) of restoration projects permitted under the Order could occur in areas subject to the threat of wildfires. A restoration project may include reestablishment of native vegetation in areas where vegetation had previously been removed. In such cases, fuel loading may increase after the native vegetation has grown in and may result in an increase in fire danger. In addition, vegetation could be present in or near the locations of restoration projects or facilities, and equipment and vehicles used during O&M activities could come into contact with vegetated areas and be exposed to high winds, potentially igniting dry vegetation and causing a fire. As a result, project occupants (O&M workers) could be exposed to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.

The specific locations of possible future permitted restoration projects are not known at this time. Therefore, the risk of a wildfire cannot be determined. Factors necessary to identify the risk include the location of the facilities relative to areas rated as High and Very High Fire Hazard Severity Zones and the degree of overgrown or dry vegetation in the restoration project area. Because of the potential for wildfire from O&M activities for future projects permitted under the Order, this impact would be **potentially significant**. The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure FIRE-1 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. Implementing Mitigation Measure FIRE-1 would reduce the impacts of project O&M activities related to fire risk to a **less-than-significant** level.

Impact 3.20-2: Implementing future restoration projects permitted under the Order could result in downslope or downstream risks as a result of runoff, post-fire slope instability, or drainage changes.

Effects of Project Construction Activities

Construction activities for restoration projects permitted under the Order would include grading and drainage changes and removal of nonnative vegetation. Construction work for restoration projects permitted under the Order could result in a reduction of vegetation in the study area. Plant roots stabilize the soil and above-ground plant pars slow the flow of water, allowing it to percolate into the soil. Removing plants during construction activities for restoration projects permitted under the Order could increase runoff.

Restoration projects could also be located in areas with a High or Very High Fire Hazard Severity rating. Removal of surface vegetation by a wildfire reduces the ability of the soil surface to absorb rainwater and can cause an increase in runoff that may include large amounts of debris. Slope failures, mudflows, and landslides are common in areas where steep hillsides and embankments are present; such conditions would be exacerbated in a post-fire environment where vegetative cover has been removed and could occur in many parts of the state.

Increased surface runoff and erosion is also possible in a post-fire environment where surface vegetation has been removed and steep slopes can increase the velocity of runoff flows. For example, one category of restoration projects involves removing nonnative terrestrial and aquatic invasive species and revegetating with native plants, which could lead to unstable soil conditions or increased runoff.

However, as described in Section 3.11, *Hydrology and Water Quality*, these restoration projects would not increase the rate or amount of surface runoff in a manner that would increase flooding on- or off-site, thereby resulting in downslope or downstream risk, because general protection measures regarding site stabilization and erosion control would be implemented on permitted projects, including but not limited to WQHM-3 and WQHM-6; IWW-3 and IWW-6; and VHDR-2, VHDR-3, and VHDR-4. In addition, these changes would likely have relatively localized effects on site and immediately downstream or downslope of the site. Therefore, floodplain restoration improvements are not expected to increase surface elevations or the chance of flooding in adjacent floodplains.

In addition, many of the restoration projects permitted under the Order would involve revegetating with native plants in areas where nonnative plant communities have been removed, which would restore soil stability and slow the rate of runoff. Further, many restoration project types permitted under the Order would improve the health and resiliency of vegetation communities, including communities in riparian and adjacent upslope areas that evolved with wildfire. The restoration of native vegetation communities that are more healthy and resilient would reduce downslope or downstream risks from runoff, post-fire slope instability, or drainage changes.

Construction activities for restoration projects permitted under the Order are not expected to increase the rate or amount of surface runoff or changes to drainage in a manner that would result in downslope or downstream risks. However, the exact locations and extent of restoration projects that would be permitted under the Order are not yet determined. Factors necessary to identify the risk include the location of the facilities relative to areas rated as High and Very High Fire Hazard Severity Zones and the degree of overgrown or dry vegetation in the restoration project area. Therefore, it is not possible to conclude that such projects would not result in post-fire slope instability. Therefore, this impact would be **potentially significant**.

The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board’s issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure FIRE-1 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of

the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. Implementation of Mitigation Measure FIRE-1 and the applicable general protection measures would reduce the impact related to post-fire slope instability to a **less-than-significant** level.

Effects of Constructed Facilities (Natural or Artificial Infrastructure) and Operations and Maintenance of those Facilities

Similar to construction activities, O&M activities for restoration projects permitted under the Order could occur in areas subject to the threat of wildfires, leading to post-fire slope instability. Removal of surface vegetation by a wildfire reduces the ability of the soil surface to absorb rainwater and can cause an increase in runoff that may include large amounts of debris. Slope failures, mudflows, and landslides are common in areas where steep hillsides and embankments are present; such conditions would be exacerbated in a post-fire environment where vegetative cover has been removed and could occur in many parts of the state.

Increased surface runoff and erosion is also possible in a post-fire environment where surface vegetation has been removed and steep slopes can increase the velocity of runoff flows. For example, one category of restoration projects involves removing nonnative terrestrial and aquatic invasive species and revegetating with native plants, which could lead to unstable soil conditions or increased runoff.

Restoration projects permitted under the Order could permanently alter drainage patterns. Many of the long-term effects of these projects on drainage patterns and flood flows are expected to be beneficial or neutral, because the specific purpose of these projects would be to correct existing conditions that contribute to resource degradation. Restoration projects could alter runoff rates and timing, as local drainage patterns could change during project construction. However, these projects would likely have relatively localized effects on-site and immediately downstream (or downslope) of the floodplain restoration improvements, and would not increase surface water elevations or the chance of flooding in adjacent floodplains.

In addition, many of the restoration projects permitted under the Order would involve revegetating with native plants in areas where nonnative plants have been removed, which would restore soil stability and slow the rate of runoff. Further, as stated above, many restoration project types permitted under the Order would improve the health and resiliency of vegetation communities, including communities in riparian and adjacent upslope areas that evolved with wildfire.

The specific locations of possible future permitted restoration projects are not known at this time. Therefore, it is not possible to conclude that such projects would not result in post-fire slope instability. Factors necessary to identify the risk include the location of the facilities relative to areas rated as High and Very High Fire Hazard Severity Zones and the degree of overgrown or dry vegetation in the restoration project area. Because of the potential for post-fire slope instability from O&M activities for future projects permitted under the Order, this impact would be **potentially significant**.

The Order does not include any general protection measures applicable to this impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure FIRE-1 would be required when applicable to a given project. Implementation of this mitigation measure would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. Implementation of Mitigation Measure FIRE-1 would reduce the impacts of project O&M activities related to post-fire slope instability to a **less-than-significant** level.

Chapter 4 Cumulative Impacts

4.1 Introduction

This section describes the California Environmental Quality Act (CEQA) requirements for the cumulative impact analysis; the geographic scope of potential cumulative impacts; the projects considered and methodology used in the assessment of cumulative impacts; and the potential cumulative impacts of restoration projects that would be permitted under the Order for Clean Water Act Section 401 Water Quality Certification and Waste Discharge Requirements for Restoration Projects Statewide (Order).

4.2 CEQA Requirements

The State CEQA Guidelines require that an environmental impact report (EIR) assess the cumulative impacts of a project when its incremental effect is "cumulatively considerable" (State CEQA Guidelines Section 15130). CEQA requires that an EIR analyze the cumulative impacts of a project, either by discussing the significant cumulative impacts with respect to past, current, and probable future projects within the context of the cumulative setting, or by providing a summary of projects contained in an adopted local, regional, or statewide plan or related planning document that describes or evaluates conditions contributing to the cumulative effect.

State CEQA Guidelines Section 15355 defines "cumulative effects" as "two or more individual effects that, when considered together, are considerable or which compound or increase other environmental impacts." According to State CEQA Guidelines Section 15130(b):

> *The cumulative impacts discussion shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by the standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.*

State CEQA Guidelines Section 15130 further states that the discussion of cumulative impacts should include:

- Either: (A) a list of past, present, and probable future projects producing related cumulative impacts; or (B) a summary of projections contained in an adopted general plan or similar document, or in an adopted or certified environmental document, that describes or evaluates conditions contributing to a cumulative impact.
- A discussion of the geographic scope of the area affected.
- A summary of expected environmental effects to be produced by these projects.

- Reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects.

This cumulative impact discussion considers projects and programs identified under existing conditions (which include the current effects of past projects) and reasonably foreseeable and probable future projects. Therefore, this program environmental impact report (PEIR) uses the list of projects approach authorized by State CEQA Guidelines Section 15130(b)(1)(A). In this PEIR, the criterion for considering whether a project is reasonably foreseeable and probable is whether the project has been defined in adequate detail to estimate potential impacts, through the completion of either publicly available preliminary evaluations, feasibility studies, or draft environmental and engineering documents. Projects that were only in the development phase at the time this cumulative impact assessment was written, without detailed descriptions, operations criteria, or general locations, are not considered further. Table 4-2 lists and briefly describes the potential programs and projects considered in this cumulative impact assessment.

As stated in Chapter 1, *Introduction*, the Order does not involve the construction or operation of facilities or other physical actions by the State Water Resources Control Board (State Water Board). The State Water Board does not propose to construct or operate facilities or undertake other physical actions after adoption of the Order. However, the listed agencies may be CEQA responsible agencies for future actions permitted under the Order, depending on what the subsequent CEQA actions require:

- California Department of Fish and Wildlife
- California Department of Water Resources
- State Lands Commission
- California Office of Historic Preservation
- California Department of Boating and Waterways
- California Department of Transportation
- California Department of Parks and Recreation
- California Air Resources Board and regional air pollution control districts
- California Coastal Commission
- Counties, cities, and special districts (e.g., reclamation, resources conservation, water/irrigation)

The Order would be part of the Statewide Multi-Agency Program to Facilitate Implementation of Restoration Projects. This program seeks to develop programmatic regulatory processes for efficient, coordinated permitting and review of projects for the improvement of aquatic and riparian habitats and water quality in California. The Order would establish an authorization process (Figure 1-1) for environmentally beneficial restoration project types (Section 1.2, *Categories of Eligible Project Types*) and associated measures to protect species and the environment. Therefore, the analysis and conclusions of this PEIR are programmatic, focusing on the typical types of activities, actions, or potential projects that could occur in California, as defined in Chapter 2, *Background and Description of the Order*, with implementation of the Order. Once proposals for individual restoration projects consistent with the Order are developed, the lead agencies for the proposed restoration projects will evaluate whether

the impacts are permitted in this programmatic EIR, or if necessary, evaluated in project-level CEQA documents.

This cumulative impact analysis is inherently cumulative, in that it consists of reasonably foreseeable and probable future individual restoration projects that would be permitted under the Order. Therefore, the focus of this cumulative impact analysis is on how existing conditions (including the current effects of past projects) and future individual restoration projects that are not addressed interrelate with the Order and the alternatives in a manner that could result in a considerable contribution to cumulative impacts.

4.3 Geographic Scope of the Effects of the Order

The approach and geographic scope of the cumulative effects evaluation vary depending on the resource area being analyzed. Table 4-1 defines the geographic scope of the effects of the Order for each resource topic addressed in this PEIR.

Table 4-1
Geographic Context for the Cumulative Impact Analysis

Resource Topic	Geographic Area
Aesthetics	All Regional Board Jurisdictions
Agriculture and Forestry Resources	All Regional Board Jurisdictions
Air Quality and Greenhouse Gas Emissions	All Regional Board Jurisdictions
Biological Resources—Terrestrial	All Regional Board Jurisdictions
Biological Resources—Aquatic	Waterways within All Regional Board Jurisdictions
Cultural Resources	All Regional Board Jurisdictions
Energy Resources	All Regional Board Jurisdictions
Geology and Soils	All Regional Board Jurisdictions
Hazards and Hazardous Materials	All Regional Board Jurisdictions
Hydrology and Water Quality	All Regional Board Jurisdictions
Land Use and Planning	All Regional Board Jurisdictions
Mineral Resources	All Regional Board Jurisdictions
Noise	All Regional Board Jurisdictions
Population and Housing	All Regional Board Jurisdictions
Recreation	All Regional Board Jurisdictions
Transportation	All Regional Board Jurisdictions
Tribal Cultural Resources	All Regional Board Jurisdictions
Utilities and Public Service Systems	All Regional Board Jurisdictions
Wildfire	All Regional Board Jurisdictions

SOURCE: Data compiled by Environmental Science Associates in 2020
NOTE: Regional Board = Regional Water Quality Control Board

4.4 Cumulative Projects

As stated above, in this PEIR, the criterion for considering whether a project is reasonably foreseeable and probable is whether the project has been defined in adequate detail to estimate potential impacts, through the completion of either publicly available preliminary evaluations, feasibility studies, or draft environmental and engineering documents. The Order considers restoration projects that could take place throughout California and would be administered and used, in part, by the nine Regional Water Quality Control Boards (Regional Boards). Therefore, Table 4-2 includes a representative sample (not an exhaustive list, but a range) of the reasonably foreseeable and probable programs and projects located within the nine Regional Board jurisdictions that could have impacts that cumulate with the impacts of the Order, and other programs, projects, and policies included in the cumulative impact assessment.

Table 4-2
Sample of Programs and Projects Included in the Cumulative Impact Assessment for the Order

Program or Project Name	Region	Program or Project Type
Alameda Creek Fish Passage Projects	Region 2—San Francisco	Fish passage
Alamitos Bay Oyster Restoration Project	Region 4—Los Angeles	Tidal wetlands habitat
Aliso Creek Estuary Restoration Project	Region 9—San Diego	Tidal wetlands habitat
American River Gravel Augmentation Projects	Region 5—Central Valley	Stream and side channel habitat
American River Sunrise Side Channel Restoration Project	Region 5—Central Valley	Side channel habitat
Arroyo Hondo Creek Steelhead Passage Enhancement	Region 3—Central Coast	Fish passage and stream habitat
Ballona Wetlands Restoration Project	Region 4—Los Angeles	Tidal wetlands habitat
Blackwood Creek Restoration Project	Region 6—Lahontan	Stream habitat
Bouquet Canyon Creek Restoration Project	Region 4—Los Angeles	Stream and riparian habitat
Colorado Lagoon Restoration Project	Region 4—Los Angeles	Tidal lagoon habitat
Decker Island Restoration Project	Region 5—Central Valley	Tidal wetlands habitat
Deforest Wetlands Restoration	Region 4—Los Angeles	Wetlands restoration

Table 4-2
Sample of Programs and Projects Included in the Cumulative Impact Assessment for the Order

Program or Project Name	Region	Program or Project Type
Devereux Slough Restoration Project	Region 3—Central Coast	Tidal wetlands habitat
Dry Creek Restoration Project	Region 1—North Coast	Stream and riparian habitat
Dutch Slough Tidal Restoration Project	Region 5—Central Valley	Tidal wetlands habitat
Feather and Bear Rivers Levee Setback Project	Region 5—Central Valley	Floodplain habitat
Grizzly Slough Floodplain Restoration Project	Region 5—Central Valley	Floodplain habitat
Hamilton/Bel Marin Keys Wetlands Restoration Projects	Region 2—San Francisco	Tidal wetlands habitat
Huntington Beach Wetlands Restoration Project	Region 8—Santa Ana	Wetlands restoration
McCormack Williamson Tract Restoration Project	Region 5—Central Valley	Habitat restoration
Matilija Dam Ecosystem Restoration Program	Region 4—Los Angeles	Habitat restoration
Napa Creek Restoration Flood Control Improvement Project	Region 2—San Francisco	Stream and riparian habitat
Napa River Restoration Projects (multiple)	Region 2—San Francisco	Stream habitat
Salton Sea Restoration Project	Region 7—Colorado River	Habitat restoration
San Joaquin Marsh Enhancement, Phase I	Region 8—Santa Ana	Marsh habitat
Santa Ana River Restoration Project	Region 8—Santa Ana	Invasive species removal and riparian habitat
San Francisco Bay Living Shorelines Project	Region 2—San Francisco	Tidal wetlands habitat
Shasta Fish Passage Project	Region 5—Central Valley	Fish passage
Shasta River Conservation Habitat Enhancement Restoration Project	Region 1—North Coast	Stream habitat and water conservation

Table 4-2
Sample of Programs and Projects Included in the Cumulative Impact Assessment for the Order

Program or Project Name	Region	Program or Project Type
Southport West Sacramento Levee Setback	Region 5—Central Valley	Mixed floodplain and riparian habitat
Trabuco Creek Fish Passage Project	Region 9—San Diego	Fish passage
Upper Truckee River and Marsh Restoration Project	Region 6—Lahontan	Stream and freshwater marsh habitat
Winter Island Tidal Habitat Restoration Project	Region 2—San Francisco	Tidal wetland habitat
Yuba River Canyon Salmon Habitat Restoration Project	Region 5—Central Valley	Spawning habitat

4.5 Cumulative Impact Methodology and Analysis

4.5.1 Methods and Assumptions

A three-step process is followed to determine the significance of the Order's cumulative impacts.

First, the extent of the cumulative impacts without the Order is evaluated to determine whether a significant cumulative impact on a resource would exist in the future. To do so, the combined effects of past, present, and probable future projects are evaluated to determine whether there is a significant cumulative impact.

Second, a determination is made regarding whether the incremental contribution of the Order to any significant cumulative impact is cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CEQA Section 21083).

Third, a determination is made as to whether mitigation measures identified in this PEIR would reduce the contribution of the Order to the cumulative impact to a less-than-considerable level, thus resulting in a less-than-significant cumulative impact. If not, then the cumulative impact would remain significant and unavoidable.

As described in Chapter 1, *Introduction*, future individual restoration projects permitted under the Order could include but are not limited to improvements to stream crossings and fish passage; removal of small dams, tide gates, flood gates, and legacy structures; bioengineered bank stabilization; restoration and enhancement of off-channel and side-channel habitat; water conservation projects; floodplain restoration; removal of pilings and other in-water structures; removal of nonnative invasive species and revegetation with native plants; establishment, restoration, and enhancement of tidal, subtidal, and freshwater wetlands; and establishment, restoration, and enhancement of stream and

riparian habitat and upslope watershed sites. As stated in Section 3.1, all restoration projects permitted under the Order would incorporate applicable general protection measures and mitigation measures (Appendix E) to ensure the avoidance and minimization of impacts on sensitive resources.

For the purposes of this PEIR, general protection measures are intended to be implemented and enforced in the same way as mitigation measures consistent with Section 15126.4 of the State CEQA Guidelines. In addition, as stated above, the impact analysis assumes that the proposed restoration projects would be constructed and operated in compliance with relevant federal, state, and local regulations and ordinances.

In many cases, adoption of general protection measures and applicable mitigation measures would reduce impacts in this PEIR to a less-than-significant level. However, the precise locations and detailed characteristics of potential future individual restoration projects are yet to be determined, and the specific resources present within the project footprint (e.g., construction footprint, infrastructure) in California cannot be determined. Factors necessary to identify specific impacts include individual restoration activities and the project's location. Therefore, in some cases, significant impacts would remain significant and unavoidable.

As part of the State Water Board or Regional Board's issuance of a Notice of Availability (NOA) for a restoration project under the Order, compliance with the general protection measures and mitigation measures would apply to all restoration projects. The applicability of the general protection measures and mitigation measures would depend on the individual restoration activities, project location, and the potentially significant impacts of the individual restoration project. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

For many impacts, the impact conclusion presented in this PEIR is conservative. Project proponents that might propose restoration projects for coverage under the Order have a legal duty under CEQA to mitigate impacts to the extent feasible. In addition, many of the mitigation measures identified in this PEIR are standard types of mitigation, are considered generally feasible for most projects, and would reduce impacts to a less-than-significant level in many cases. Review of project plans by Regional Board staff members will ensure that the project proponent (as defined in Section 1.3.3, *Determining the Next Step under CEQA*) has incorporated all necessary and appropriate general protection measures and mitigation measures relevant to the proposed activity before enrolling the project under the Order.

4.6 Cumulative Impacts

The cumulative impact analysis is presented by resource section and in the same order as in Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*. The study area for the Order spans all nine Regional Board jurisdictions and includes all counties and cities in California. For this reason, the cumulative impact analysis for each resource section provides a general discussion of the environmental setting; restoration projects that would be permitted under the Order (Section 1.2, *Categories of Eligible*

Project Types) are not discussed separately. All impacts of the Order discussed in this chapter are described in Sections 3.2 through 3.20.

For each issue area addressed in this PEIR, the criteria applied to evaluate the significance of the overall cumulative effect are the same as the criteria used to evaluate direct and indirect impacts for that issue area.

4.6.1 Aesthetics

Construction, constructed facilities (natural or artificial infrastructure), and operations and maintenance (O&M) for the projects listed in Table 4-2, *Sample of Programs and Projects, and included in the Cumulative Impact Assessment for the Order*, would introduce new physical features into the existing landscape such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions could result in significant adverse effects on visual quality, affect scenic vistas and scenic resources, and introduce new sources of light and glare. Both temporary (construction-related) effects and long-term or permanent effects (new structures) could occur.

For example, project construction could include temporary activities such as earthmoving and construction equipment staging that could alter the existing landscape of agricultural and natural open space areas. Unless these areas are replanted or recontoured to preconstruction conditions to the extent feasible, such activities could result in significant changes to the existing visual character and quality in the vicinity of the construction site. In addition, visually prominent permanent structures such as facility components for culverts, fish screens, fencing, ponds and storage tanks, and pumps may not be of the same visual character as the surrounding landscapes. For example, a new pump used for small ponds and a stock tank for offstream storage ponds and tanks might add contrast to the area and detract from the natural setting. Adding a project feature that prominently contrasts with the existing visual qualities and character of the surrounding landscape could cause a substantial change in visual quality, scenic vistas, and scenic resources.

The use of nighttime security lighting or floodlighting could be required if construction activities extend into the nighttime hours. This temporary lighting could be visible to nearby residents and would be particularly noticeable in rural areas with lower existing levels of light pollution from sources such as street lights. Furthermore, construction and operation of some projects listed in Table 4-2 could require substantial lighting (e.g., temporary floodlighting during nighttime construction; long-term lighting for buildings or other facilities) that could result in significant temporary adverse effects. In addition, new ancillary facilities could include reflective materials (e.g., bioengineered materials to reinforce bank stability), resulting in a potential source of substantial glare. These changes associated with past, present, and planned future projects would result in a cumulatively significant impact on aesthetic and scenic resources.

Restoration projects permitted under the Order would introduce new physical features into the existing landscape. These changes could result in significant temporary or permanent adverse effects on visual quality in the project area. For example, construction-related temporary activities such as earthmoving activities and the staging of construction equipment could alter the existing landscape of agricultural and natural open space areas, and permanent structures may not be of the same visual character as surrounding landscapes. (These potential adverse effects are addressed in Impacts 3.2-1, 3.2-2, and 3.2-3.) Therefore, restoration projects permitted under the Order could result in a cumulatively considerable incremental contribution to a significant cumulative impact related to the substantial degradation of scenic vistas, scenic resources, and existing visual character.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measures AES-1 and AES-2 would be required when applicable to a given project as required by Section 15092 of the State CEQA Guidelines. Implementation of Mitigation Measures AES-1 and AES-2 is recommended to reduce potentially significant impacts from proposed lighting facilities. If necessary, impacts of individual restoration projects would be addressed in future environmental analyses that would be conducted by the appropriate project proponents. Mitigation Measures AES-1 and AES-2 would continue to be implemented as part of the restoration projects permitted under the Order.

In addition, as discussed in Section 3.2, *Aesthetics*, restoration projects permitted under the Order would incorporate several general protection measures: GPM-4, GPM-15, GPM-19, GPM-20, VHDR-1, VHDR-3, VHDR-4, and VHDR-5. Incorporating these general protection measures would further reduce adverse effects of project construction on the visual qualities of the study area.

Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. With implementation of Mitigation Measures AES-1 and AES-2 and incorporation of the general protection measures, the potential aesthetic and visual impacts of restoration projects that would be permitted under the Order would be reduced further.

Furthermore, restoration projects permitted under the Order are expected to be beneficial; they would restore the natural character of disturbed sites and result in an increase in aquatic or riparian resource areas and habitat that would attract fish and wildlife. For example, projects to remove small dams would return sites to their natural habitat and would improve visual quality. Therefore, cumulative impacts would be **less than significant**.

4.6.2 Agriculture and Forestry Resources

Construction, constructed facilities (natural or artificial infrastructure), and O&M for the projects listed in Table 4-2 would introduce new physical features such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees;

reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions could convert Farmland (Prime Farmland, Farmland of Statewide Importance, and Unique Farmland, collectively called “Special Designation Farmland”) to nonagricultural use, or convert forestland to nonforest use; could conflict with a Williamson Act contract; or could create a conflict with zoning for agricultural, forestland, or timberland use. As a result, cumulatively significant temporary, long-term, or permanent adverse effects on agriculture and forestry resources could occur.

For example, projects could be located in forestlands, Farmland, areas with agricultural zoning, or Williamson Act lands and could result in adverse effects on agriculture and forestry resources. Construction activities could include developing temporary facilities such as access haul roads, borrow sites, and areas for staging, equipment storage, and temporary work sites. Such activities could convert Farmland to nonagricultural use or forestland to nonforest use, conflict with a Williamson Act contract, or create a conflict with zoning for agricultural, forestland, or timberland use if the project is not a permitted use in the zoning or under the contracts.

In addition, unless topsoil is replaced to preconstruction conditions and the affected area is replanted to the extent feasible, these construction activities could result in a substantial long-term or permanent conversion of Farmland or in conflicts with agricultural zoning or Williamson Act requirements. Furthermore, construction activities and construction staging areas or work areas could require tree removal in forestlands; this impact could be considered long-term, given the length of time needed to reforest areas. These changes associated with past, present, and planned future projects would result in a cumulatively significant impact on agriculture and forestry resources.

Restoration projects permitted under the Order could result in significant temporary impacts (construction of staging areas or access and haul routes) or permanent impacts (from the facility footprint) related to conversion of Farmland; conflicts with Williamson Act contracts and agricultural zoning; conversion of forestland, timberland, and timber production zones to nonforest or nontimber uses; and conversion of Farmland to nonagricultural uses. (These potential adverse effects are addressed in Impacts 3.3-1, 3.3-2, and 3.3-3.) Therefore, restoration projects permitted under the Order could result in a cumulatively considerable incremental contribution to a significant cumulative impact on agriculture and forestry resources.

As part of the State Water Board or Regional Board’s issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measures AG-1, AG-2, AG-3, and GEO-6 would be required when applicable to a given project as required by Section 15092 of the State CEQA Guidelines. Implementation of Mitigation Measures AG-1, AG-2, AG-3, and GEO-6 would minimize impacts on agriculture and forestry resources. If necessary, impacts of individual restoration projects would be addressed in future environmental analyses that would be conducted by the appropriate project proponents. Mitigation Measures AG-1, AG-2, AG-3, and GEO-6 would continue to be implemented as part of the restoration projects permitted under the Order.

In addition, as described in Section 3.3, *Agriculture and Forestry Resources,* restoration projects permitted under the Order would incorporate several general protection measures: GPM-12, GPM-14, GPM-15, GPM-17, GPM-20, IWW-14, VHDR-1, VHDR-2, VHDR-3, VHDR-4, VHDR-5, and VHDR-6. Incorporating these general protection measures would further reduce adverse effects of project construction on agriculture and forestry resources.

Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. In most cases, Mitigation Measures AG-1, AG-2, AG-3, and GEO-6 and the applicable general protection measures would reduce the contribution of permitted restoration projects to less than cumulatively considerable.

The effects on agriculture and forestry resources of some restoration projects permitted under the Order are expected to be neutral or beneficial. Restoration projects may improve hydrology and connectivity to the water table (i.e., bank stabilization, restoration and enhancement of off-channel and side-channel habitat) and would reduce soil erosion, recharge groundwater, use offstream water storage during the dry season, provide natural pest control, and provide water quality buffers. Such projects also would be beneficial for existing Special Designation Farmland, forestland, timberland, or timberland zoned Timberland Production.

However, because the extent and location of such actions are yet to be determined, it is not possible to conclude that the mitigation measures, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. Therefore, cumulative impacts could remain **significant and unavoidable**.

4.6.3 Air Quality and Greenhouse Gas Emissions

Construction, constructed facilities (natural or artificial infrastructure), and O&M for the projects listed in Table 4-2 would introduce new physical features such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

Construction activities would likely require the use of diesel-powered equipment and vehicles; therefore, projects could conflict with an applicable air quality plan and result in a short- or long-term cumulatively considerable net increase in pollutants for which the region is in nonattainment. Projects also could create objectionable odors affecting a substantial number of people and expose sensitive receptors to substantial pollutant concentrations.

Construction and operation of the projects listed in Table 4-2 could result in an increase in greenhouse gas (GHG) emissions that may have a significant impact on the environment and could conflict with an applicable plan, policy, or regulation adopted for

the purpose of reducing emissions of GHGs. These significant effects could be both temporary (construction-related) and permanent (occurring during O&M of projects).

For example, during project construction, combustion of fuels by construction equipment and material transport trucks and during earthmoving activities would emit criteria air pollutants. Emissions-generating activities during project O&M would be similar to those described for project construction, potentially consisting of periodic maintenance and repairs that would require the use of heavy construction equipment; however, the level of activity would be lower during the operational phase than during construction.

In addition, some project operations could generate stationary-source emissions. For example, pumps associated with offstream storage ponds and tanks could generate pollutant emissions (e.g., from electrical generators). Although emissions would frequently be minimal, some air district thresholds are measured against daily emissions; it is reasonable to expect that some maintenance activities could involve substantial use of heavy equipment or other emissions-intensive activities.

Restoration projects permitted under the Order could result in temporary or long-term emissions of air pollutants, substantially contribute to pollutant concentrations that exceed the national ambient air quality standards and California ambient air quality standards, and conflict with a local air quality management plan, thereby resulting in conflicts with applicable air quality plans. For example, construction of restoration projects permitted under the Order could include the use of mobile diesel-powered construction equipment such as excavators, graders, scrapers, bulldozers, and backhoes, which would emit criteria air pollutants.

Project construction could temporarily emit odors from diesel exhaust; also, construction-related dredging could result in the anaerobic decay of organic material, which can generate gases (specifically hydrogen sulfide, commonly described as having a foul or “rotten-egg” smell). Emissions-generating activities during project O&M would be similar to those described for project construction, potentially consisting of periodic maintenance and repairs that would require the use of heavy construction equipment; however, the level of activity would be lower during the operational phase than during construction.

Therefore, restoration projects permitted under the Order could result in temporary or long-term emissions of air pollutants. (These potential adverse effects are addressed in Impacts 3.4-1, 3.4-2, 3.4-3, 3.4-4, 3.4-5, and 3.4-6.) Significant cumulative adverse effects on air quality in the project area could occur.

Sources of construction-related emissions generally would not remain in one location for long periods of time, and the emissions would be intermittent and would dissipate from the source rapidly over a short distance (as described in Impact 3.4-3).

In addition, as discussed in Section 3.4, *Air Quality and Greenhouse Gas Emissions*, restoration projects permitted under the Order would incorporate a general protection measure: IWW-13. Incorporating this general protection measure would further reduce adverse impacts of project construction and O&M activities that would create objectionable odors affecting a substantial number of people. Because any odors would be intermittent and would dissipate from the source rapidly over a short distance,

construction and O&M activities would not be expected to result in odorous emissions that would affect a substantial number of people or to result in a cumulatively considerable incremental contribution to a significant cumulative impact.

Construction of restoration projects permitted under the Order could emit air pollutants such as fugitive dust, carbon monoxide, and toxic air contaminants that, at high dosages, could present health risks to sensitive receptors (as described in Impact 3.4-4) and result in significant temporary adverse effects on air quality in the project area. Construction activities would be temporary, occurring in any one location for short periods of time. However, health impacts from exposure to these pollutants depend on the proximity of the pollutant to which sensitive receptors are exposed, the duration of exposure, and the toxicity of the pollutant. Because the extent and location of such actions are not known at this time, project construction could present health risks to sensitive receptors and result in significant temporary adverse effects on air quality in the project area. Routine O&M activities would not be expected to result in sufficient intensity or duration to rise to the level of chronic exposure necessary to cause health impacts and would not result in cumulatively significant impacts.

Restoration projects permitted under the Order could result in temporary and long-term GHG emissions. Such projects could conflict with GHG reduction policies, plans, and regulations as a result of GHG emissions during construction and O&M activities and emissions from stationary sources (e.g., motors for pump operation). Construction emissions could result from sources such as fuel combustion during the use of construction equipment, trucks, worker vehicles, and dredging equipment. GHG emissions during project maintenance would be similar to those during construction; however, the level of activity, and thus the emissions level, would be much lower during the operational phase than during construction because activity would not be as intense during operations. Construction- and O&M-related emissions and stationary-source emissions could result in significant adverse effects related to GHG emissions production in the project area. (These potential adverse effects are addressed in Impacts 3.4-5 and 3.4-6.)

Therefore, restoration projects permitted under the Order could result in a cumulatively considerable incremental contribution to a significant cumulative impact related to the substantial degradation of air quality and the generation of GHG emissions.

As part of the State Water Board or Regional Board’s issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measures AIR-1, AIR-2, and AIR-3 would be required when applicable to a given project as required by Section 15092 of the State CEQA Guidelines. Mitigation Measures AIR-1, AIR-2, and AIR-3 would minimize impacts on air quality and GHG emissions. If necessary, impacts of individual restoration projects would be addressed in future environmental analyses that would be conducted by the appropriate project proponents. Mitigation Measures AIR-1, AIR-2, and AIR-3 would continue to be implemented as part of the restoration projects permitted under the Order.

In addition, as discussed in Section 3.4, *Air Quality and Greenhouse Gas Emissions*, restoration projects permitted under the Order would incorporate several General

Protection Measures: GPM-8, GPM-17, and IWW-13. Incorporating these general protection measures would further reduce adverse effects of project construction and operation on air quality and GHG emissions.

Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. In most cases, Mitigation Measures AIR-1, AIR-2, and AIR-3 and the applicable general protection measures would reduce the contribution of permitted restoration projects to less than cumulatively considerable. However, because the extent and location of such actions are yet to be determined, it is not possible to conclude that the mitigation measures and applicable general protection measures would reduce the contribution of permitted actions to less than cumulatively considerable in all cases. Therefore, cumulative impacts could remain **significant and unavoidable**.

4.6.4 Biological Resources—Terrestrial

Construction, constructed facilities (natural or artificial infrastructure), and O&M for the projects listed in Table 4-2 would introduce new physical features, such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions could result in the loss or degradation of terrestrial habitats, including wetlands (e.g., tidal wetlands) for special-status species; sensitive natural communities; and designated critical habitat. For example, construction activities could result in temporary habitat disturbance and permanent habitat loss from clearing of vegetation in equipment staging areas; temporary dewatering of channel sections; and general grading, recontouring, relocation, and/or filling of portions of channels and/or wetlands to accommodate the implementation of projects.

Habitat could also be affected during construction by being disturbed by vehicle access and equipment staging. In addition, construction equipment increases the potential for accidental spills of contaminants (e.g., fuels or lubricants), which could degrade habitat. Machinery can unintentionally introduce seeds or plant parts of weeds from other areas, and many invasive weeds readily colonize soils that have been disturbed by grading or other mechanical disturbance. Thus, construction equipment could lead to the introduction or spread of invasive or noxious weeds, which could degrade the habitat quality of sensitive communities.

Construction activities could harm or kill special-status terrestrial wildlife that inhabit areas near or adjacent to levee construction sites. For example, noise from and nighttime lighting for construction equipment could disturb special-status birds and mammals. Special-status amphibians, reptiles, and small mammals could be killed by construction and earthmoving equipment. Terrestrial wildlife could be harmed by becoming entrapped in open trenches or other project facilities. Dredging activities to improve fish passage could adversely affect special-status terrestrial wildlife indirectly

by reducing the availability of prey in areas where the dredged material is deposited. Backfilling of small-mammal burrows along levee slopes could result in direct mortality of certain special-status wildlife, such as giant garter snakes, which use such habitat and thus could be unintentionally entombed within these burrows. Levee vegetation management could also disturb special-status wildlife.

Construction and O&M of the projects listed in Table 4-2 also could interfere with the movement of native resident or migratory wildlife. For example, construction could disturb natural habitat used as movement corridors by various terrestrial wildlife species. Movement could be substantially affected or even cut off completely if the entire width of the corridor were disturbed. This could affect the ability of wildlife to move between areas important to different life history functions, such as reproduction and feeding behaviors.

In addition, construction activities may include high-intensity lighting to facilitate night work. Such lighting can pose a risk to flying birds, including shorebirds, waterfowl, and raptors that occur in the vicinity of the project sites. Most impacts of construction on wildlife movement are expected to be temporary. However, there could be a longer term impact on local and migratory movement by wildlife if existing vegetation were to be permanently removed during construction or if a structure were to create a physical barrier to migration and movement.

Construction and O&M of the projects listed in Table 4-2 have the potential to conflict with local policies or ordinances protecting biological resources or the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat protection plan. These cumulatively significant effects could be both temporary during construction and operation and permanent during operation. These changes associated with past, present, and planned future projects would result in a cumulatively significant impact on terrestrial biological resources.

Restoration projects permitted under the Order could include new and or/rehabilitated existing setback levees, meadow restoration, conveyance facilities, and offstream storage ponds and tanks. Such restoration projects could result in significant temporary or permanent adverse effects on sensitive natural communities, special-status plant species, and special-status wildlife species and their habitat in the project area. (These potential adverse effects are addressed in Impacts 3.5-1, 3.5-2, 3.5-3, 3.5-4, 3.5-5, 3.5-6, and 3.5-7.)

Specifically, construction activities could result in temporary habitat disturbance and permanent habitat loss from clearing of vegetation within equipment staging areas; temporary dewatering of channel sections; and general grading, recontouring, relocation, and/or filling of portions of channels and/or wetlands to accommodate implementation of restoration projects. (These potential adverse effects are addressed in Impacts 3.5-1, 3.5-2, and 3.5-3.)

In addition, restoration projects permitted under the Order could result in significant temporary or permanent adverse effects on state and federally protected wetlands through direct removal, hydrological interruption, or other means. For example, infrastructure improvements to improve fish passage (e.g., installing a new bridge

footing to replace an undersized culvert) could result in minor amounts of fill of rivers or streambeds. This new infrastructure may require installing the minimum amount of rock slope protection along the channel banks (including below the ordinary high-water mark) needed to ensure that flows do not undermine the foundations of the new infrastructure. (This potential adverse effect is addressed in Impact 3.5-4.)

Similarly, construction adjacent to wetlands or other waters of the United States could indirectly or directly affect these resources through increased erosion, sedimentation from soil disturbance, or spills of hazardous materials. Such construction could also temporarily affect wildlife movement and migration conditions and alter the foraging patterns of resident wildlife species in the project area. For example, ground disturbance could temporarily disrupt movement by amphibians and reptiles. Construction activities, including movement of equipment and personal vehicles and vegetation removal, could interfere with the movement of other terrestrial wildlife species, such as large mammals or birds. (These potential adverse effects are addressed in Impact 3.5-5.)

Projects also have the potential to conflict with local policies, ordinances, and the provisions of an adopted habitat conservation plan or natural community conservation plan for terrestrial biological resources in the project area. (These potential adverse effects are addressed in Impacts 3.5-6 and 3.5-7.)

Therefore, projects permitted under the Order could result in a cumulatively considerable incremental contribution to a significant cumulative impact related to substantial adverse effects on terrestrial biological resources.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure TERR-1 would be required when applicable to a given project as required by Section 15092 of the State CEQA Guidelines. Mitigation Measure TERR-1 would minimize impacts on terrestrial biological resources. If necessary, impacts of individual restoration projects would be addressed in future environmental analyses that would be conducted by the appropriate project proponents. Mitigation Measure TERR-1 would continue to be implemented as part of the restoration projects permitted under the Order.

In addition, as described in Section 3.5, *Biological Resources—Terrestrial,* restoration projects permitted under the Order would incorporate several general protection measures: GPM-3, GPM-4, GPM-5, GPM-6, GPM-7, GPM-8, GPM-9, GPM-10, GPM-11, GPM-12, GPM-14, GPM-16, GPM-17, GPM-18, GPM-20, IWW-6, WQHM-1, WQHM-2, WQHM-4, WQHM-5, WQHM-6, VHDR-1, VHDR-2, VHDR-3, VHDR-4, and VHDR-5. Incorporating these general protection measures would further reduce adverse effects of project construction on terrestrial biological resources.

Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. Generally, many of the measures discussed above are commonly employed to reduce impacts on terrestrial biological resources, and in many cases, would reduce identified impacts to less than cumulatively considerable in most cases.

Furthermore, the effects on terrestrial biological resources of most of the restoration projects permitted under the Order are expected to be neutral or beneficial, because the specific purpose of these projects would be to correct existing conditions that contribute to resource degradation. For example, seasonal restoration and setback levee projects would result in benefits by causing more frequent and longer flood inundation, which would promote the establishment of more vigorous wetland and riparian communities in areas that currently may be too dry or otherwise unsuitable to support those natural communities. Restoration projects (i.e., seasonal wetland or tidal wetland restoration projects) would improve the quality of both wetland and upland habitats, which would result in a beneficial effect on wildlife movement and avian migratory corridors. Expanding riparian habitat would result in a beneficial effect on functionality for the movement of many riparian species, particularly those whose distribution is restricted to riparian habitat.

However, because the extent and location of such actions are yet to be determined, it is not possible to conclude that mitigation measures and applicable general protection measures would reduce the contribution of permitted actions to less than cumulatively considerable in all cases. Therefore, cumulative impacts could remain **significant and unavoidable**.

4.6.5 Biological Resources—Aquatic

Construction, constructed facilities (natural or artificial infrastructure), and O&M for the projects listed in Table 4-2 would introduce new physical features, such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions could adversely affect habitat associated with special-status fish species, result in adverse direct effects on special-status fish species, and interfere with the movement of native resident fish species. These significant adverse effects could be both temporary and permanent.

For example, construction activities such as earthmoving, vegetation removal, equipment staging, and stockpiling of materials could indirectly affect special-status fish species in multiple ways, including disturbance of benthic prey species, mobilization of sediment, disturbance of riparian habitat, or chemical contamination. In addition, construction activities could temporarily disturb special-status fish in the vicinity, causing them to avoid using adjacent habitat. In-water construction and maintenance activities have the potential to injure or kill fish indirectly by altering their habitat.

In-water and near-shore construction activities also have the potential to cause adverse effects on special-status species through water quality degradation from increased turbidity, inadvertent spills of hazardous materials, and disruption of contaminated sediments. Construction activities could also lead to the introduction or spread of invasive species or noxious weeds in sensitive communities.

In addition, construction and O&M activities may require temporary dewatering or lowering of water levels in the areas to be maintained or repaired. During dewatering, special-status fish may be stranded, injured, or killed. Water pumping to dewater construction sites could result in entrainment or impingement of fish at the pumps.

Operation of conveyance projects could result in direct impacts on special-status fish species, depending on the extent to which the operation influences the flows in connecting rivers or streams. Changes in water operations could result in impingement or entrainment of special-status fish species.

Contiguous riparian and riverine habitats provide suitable cover, prey resources, and water to support local movement and migration of special-status fishes. Riparian corridors and rivers often serve as the main routes for movement and migration of numerous fish and wildlife species; thus, the loss, fragmentation, or alteration of riparian and riverine habitats could limit access to habitats for breeding (e.g., seasonal spawning areas for fish), rearing, foraging, and other needs. Construction and O&M of facilities located along waterways, such as offstream storage ponds and tanks, could cause long-term or permanent interruptions to migratory fish habitat corridors. Depending on the types of facilities constructed and their operational criteria, operations could block or delay the migration or movement of migratory fish species. Alteration of flow patterns and water quality in the project area or its tributaries could also disrupt migratory cues for these species.

These changes associated with past, present, and planned future projects would result in a cumulatively significant impact on aquatic biological resources. Restoration projects permitted under the Order could result in significant temporary and permanent adverse impacts on special status-fish species and their habitats in the project area.

Projects permitted under the Order could include, for example, dewatering, excavation, fill, and placement of materials. These activities could affect the juvenile and adult life stages of special-status fish species by causing direct injury or mortality, or by displacing fish or disrupting their normal behaviors. Projects permitted under the Order could result in short- and long-term increases in turbidity and suspended sediment levels during construction that may negatively affect fish populations and other aquatic organisms.

Several types of restoration projects permitted under the Order could generate noise, motion, and vibration from the use of heavy equipment during activities such as pile driving or the use of explosives for removal of small dams. Projects permitted under the Order could result in significant temporary and permanent adverse impacts on special-status fish species and their habitats through construction-related disturbance of benthic prey species; mobilization of sediment; disturbance of riparian habitat; chemical contamination of water bodies used by special-status fish species; and operational changes in the timing and magnitude of flows and water quality (including temperature and salinity) in downstream water bodies used by special-status fish species. (These potential adverse effects are addressed in Impact 3.6-1.)

Restoration projects permitted under the Order could result in significant temporary and permanent adverse direct effects on the movement of native resident or migratory fish. For example, installing a cofferdam to facilitate construction would have the potential to

temporarily impede or delay migrating adults, limiting their ability to reach spawning and/or rearing areas. This action could also hinder migration by juveniles, potentially exposing them to increased predation and unsuitable aquatic habitat conditions. (These potential adverse effects are addressed in Impact 3.6-2.)

Instream construction activities also could impede upstream passage of fishes by causing altered hydrologic conditions (e.g., increased stream velocity). However, the long-term effects of restoration projects permitted under the Order are expected to be beneficial or neutral. For example, removing artificial structures, improving fish passage, restoring habitat, and revegetating with native plants would all provide benefits for the migration of native fishes, either by directly creating new passage or by indirectly creating more suitable habitat, thus providing an improved migratory corridor for fish. Therefore, projects permitted under the Order could result in a cumulatively considerable incremental contribution to a significant cumulative impact related to the substantial degradation or elimination of special-status fish species and their habitat and the movement of native resident fish species.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures listed below would be required when applicable to a given project as required by Section 15092 of the State CEQA Guidelines. As discussed in Section 3.6, *Aquatic Biological Resources,* restoration projects permitted under the Order would incorporate several general protection and species protection measures: GPM-2, GPM-3, GPM-4, GPM-5, IWW-1, IWW-2, IWW-3, IWW-4, IWW-5, IWW-6, IWW-7, IWW-8, IWW-9, IWW-10, IWW-11, IWW-12, IWW-13, SPM-3, FISH-1, FISH-2, FISH-3, FISH-4, VHDR-1, VHDR-2, VHDR-3, VHDR-4, VHDR-5, VHDR-6, VHDR-7, VHDR-8, WQHM-1, WQHM-2, WQHM-3, WQHM-4, WQHM-5, and WQHM-6. Incorporating these general protection measures would reduce adverse effects of project construction and operation on aquatic biological resources. If necessary, impacts of individual restoration projects would be addressed in future environmental analyses that would be conducted by the appropriate project proponents.

Implementation of the general protection measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing agency. Generally, many of the measures discussed above are commonly employed to reduce impacts associated with aquatic biological resources, and in many cases, would reduce identified impacts to less than cumulatively considerable in most cases.

Restoration projects permitted under the Order could result in significant effects on aquatic resources. However, construction-related impacts would be temporary. Implementation and enforcement of the general protection and species protection measures would be the responsibility and jurisdiction of the appropriate project proponents. In addition, the general protection and species protection measures discussed above would reduce the contribution of permitted restoration projects to less than cumulatively considerable. In some cases, restoration projects (i.e., removing artificial structures, improving fish passage, restoring habitat, and revegetating with native plants) would result in beneficial or neutral changes to fish movement because

they would either directly create new passage or indirectly create more suitable habitat that would improve migratory corridors for fish. Therefore, cumulative impacts would be **less than significant**.

4.6.6 Cultural Resources

Construction, constructed facilities (natural or artificial infrastructure), and O&M for the projects listed in Table 4-2 would introduce new physical features, such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions could disturb or destroy prehistoric and historic-era archaeological resources, or buried human remains, which could result in significant permanent adverse effects on cultural and archaeological resources. For example, projects could result in significant adverse changes to significant built properties by altering an existing historic resource or introducing new visual elements to the historic setting of a significant resource.

Impacts on historic resources could occur as a result of construction activities through the introduction of new elements to a historic setting or the alteration of a significant built resource. The installation of conveyance facilities could involve the construction of intakes and water management facilities with the potential to damage historic structures and features, such as historic canals themselves or associated historic-period ancillary features (e.g., bridges, weirs). Construction activities such as pile driving have the potential to cause vibration that could physically damage or alter nearby historic buildings and structures or linear features.

In addition, construction could require the use of heavy equipment, such as excavators, graders, scrapers, bulldozers, backhoes, and concrete mixing and pumping trucks. Earthmoving activities during project construction have the potential to disturb surficial and subsurface archaeological resources. Constructed facilities and operations of new infrastructure or modifications to existing infrastructure could cause vibration that could physically damage or alter nearby architectural resources. For example, new infrastructure or modifications to existing infrastructure such as fishways and screens could cause vibration that could physically damage or alter nearby architectural resources. Project-related ground-disturbing activities have the potential to uncover prehistoric archaeological resources and human remains not documented in archival sources or identified during field surveys. These changes associated with past, present, and planned future projects would result in a cumulatively significant impact on cultural resources.

Restoration projects permitted under the Order could include new and/or modified impoundments, tanks, ancillary buildings and structures (e.g., bridges, culverts, fishways and screens, dams, levees, and water conveyance features). These projects could result in significant permanent impacts on historic built resources, archaeological

resources, and human remains in the project area through their damage or destruction. (These potential adverse effects are addressed in Impacts 3.7-1, 3.7-2, and 3.7-3.)

Specifically, construction of restoration projects could involve ground disturbance, vibration, and removal of architectural resources. For example, construction of culverts could result in ground-disturbance construction activities that could alter existing landscapes. (This potential adverse effect is addressed in Impact 3.7-1.) Constructed facilities and operations of new infrastructure or modification to existing infrastructure, such as bridges, culvert, and fishways and screens, could physically damage or alter nearby architectural resources. In addition, construction-related earthmoving has the potential to disturb surficial and subsurface archaeological resources and to uncover prehistoric archaeological resources and human remains not documented in archival sources or identified during field surveys. (These potential adverse effects are addressed in Impacts 3.7-2 and 3.7-3.)

Therefore, restoration projects permitted under the Order could result in a cumulatively considerable incremental contribution to a significant cumulative impact related to the substantial degradation or destruction of cultural resources.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measures CUL-1, CUL-2, CUL-3, and CUL-4 would be required when applicable to a given project as required by Section 15092 of the State CEQA Guidelines. Mitigation Measures CUL-1, CUL-2, CUL-3, and CUL-4 would minimize impacts on cultural resources. If necessary, impacts of individual restoration projects would be addressed in future environmental analyses that would be conducted by the appropriate project proponents. Mitigation Measures CUL-1, CUL-2, CUL-3, and CUL-4 would continue to be implemented as part of the restoration projects permitted under the Order.

Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. In addition, Mitigation Measures CUL-1, CUL-2, CUL-3, and CUL-4 would reduce the contribution of permitted projects to less than cumulatively considerable in all cases. However, because the extent and location of such actions are yet to be determined, it is not possible to conclude that the mitigation measures would reduce significant impacts to less than cumulatively considerable in most cases. Therefore, cumulative impacts could remain **significant and unavoidable**.

4.6.7 Energy Resources

Construction, constructed facilities (natural or artificial infrastructure), and O&M for the projects listed in Table 4-2 would introduce new physical features, such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions could result in changes in energy resources, including substantial inefficient, wasteful, or unnecessary long-term consumption of energy, or changes to hydropower generation. In addition, implementation of the projects listed in Table 4-2 could conflict with applicable local, county, and/or state plans, policies, or regulations for renewable energy or energy efficiency. These significant effects could be both temporary (e.g., from construction activities) and permanent (e.g., from operational activities such as conveyance of water).

As is, California uses a substantial amount of energy annually, primarily because of the state's size, and not because of its efficient or inefficient use of energy. Multiple laws, regulations, and programs in the state require or promote the efficient use of energy. Section 3.4, *Air Quality and Greenhouse Gas Emissions*, includes a summary of state laws and executive orders that address GHG emissions, many of which have the effect of promoting or requiring the efficient use of energy in the state and the expansion of renewable-energy generation and use. California's building codes (California Code of Regulations, Title 24) also contain stringent energy efficiency standards, and the State has adopted a specific California Green Building Standards Code that both includes energy efficiency requirements and addresses renewable energy generation (e.g., rooftop photovoltaic solar panels).

Given these conditions, a cumulative adverse effect is not expected to occur within the project area related to the substantially inefficient, wasteful, or unnecessary long-term consumption of energy, and a substantial reduction in the generation of renewable energy.

Restoration projects permitted under the Order could result in inefficient, wasteful, or unnecessary long-term consumption of energy, and changes to hydropower generation. (This potential adverse effect is addressed in Impact 3.8-1.) In addition, restoration projects permitted under the Order could conflict with applicable plans, policies, or regulations in local, county, and/or state energy standards that have been adopted for renewable energy or energy efficiency. (These potential adverse effects are addressed in Impact 3.8-2.)

However, as stated above, multiple laws, regulations, and programs within the state require or promote the efficient use of energy. Also, California's building codes (California Code of Regulations, Title 24) contain stringent energy efficiency standards, and the State has adopted a specific California Green Building Standards Code that both includes energy efficiency requirements and addresses renewable energy generation (e.g., rooftop photovoltaic solar panels).

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with general protection measures and mitigation measures would be required when applicable to a given project as required by Section 15092 of the State CEQA Guidelines.

Implementation of the mitigation measures and general protection measures would be the responsibility and jurisdiction of the appropriate project proponents. Because the extent and location of restoration projects are yet to be determined, restoration projects permitted under the Order could result in cumulative impacts on energy resources.

However, as stated above, in California there are multiple laws, regulations, and programs that require or promote the efficient use of energy. Restoration projects permitted under the Order must be compliant with California's building codes. Therefore, restoration projects permitted under the Order would not result in a cumulatively considerable incremental contribution to a cumulative impact related to energy, and cumulative impacts would be **less than significant**.

4.6.8 Geology and Soils

Construction, constructed facilities (natural or artificial infrastructure), and O&M for the projects listed in Table 4-2 would introduce new physical features, such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions could result in significant adverse effects associated with the rupture of known earthquake faults, strong seismic groundshaking, and substantial soil erosion or loss of topsoil, and they could expose people or structures to hazards associated with unstable soil conditions. Restoration projects could also result in the direct or indirect loss of a unique paleontological or geological resource. Construction projects on or adjacent to a known fault could expose such resources to risks associated with fault rupture or seismic groundshaking.

For example, levee, berms, and dike setbacks placed in areas subject to fault rupture or seismic groundshaking could be damaged during an earthquake, which could lead to flooding of the surrounding areas, potentially exposing people and structures to flood hazards. Linear improvements such as pipelines and canals are particularly susceptible to impacts of unstable soils because they must meet stringent tolerances for line and grade. If not accounted for in project design, expansive soils could lead to the degradation or even structural failure of facilities.

In addition, construction activities could disturb large volumes of soil through excavating, earthmoving, grading, filling, and stockpiling of soil material. These disturbed soils could be more susceptible to wind and water erosion and a loss of topsoil could occur.

Construction activities could also result in the loss of unique paleontological or geologic resources. For example, construction activities could disrupt or destroy fossil remains or sites during excavation and site preparation. Impacts could include a permanent loss of information and potential destruction of nonrenewable paleontological resources.

In general, impacts associated with soil disturbance (loss of topsoil) would occur primarily as a result of construction activities and would not increase in severity following the completion of construction. These significant effects could be temporary during construction and permanent from placement of new buildings or large earthen structures. These changes associated with past, present, and planned future projects could result in a cumulatively significant impact on geology and soils.

Restoration projects permitted under the Order could expose people or structures to the risk of loss, injury, or death due to rupture of known earthquake faults, and could result in significant adverse effects associated with strong seismic groundshaking. (These potential adverse effects are addressed in Impacts 3.9-1 and 3.9-2.) For example, a restoration project involving hydraulic reconnection, levee setbacks, and floodplain restoration could be located in a seismically active region, near several known active and potentially active faults, and could expose people or structures to potential fault rupture hazards.

Also, projects could result in significant adverse effects on people or structures from unstable soil conditions, or could result in unstable soil conditions including landslides, expansive soils, subsidence, high organic matter soils, and nuisance water, and could result in significant adverse effects associated with soil erosion and loss of topsoil. (These potential adverse effects are addressed in Impacts 3.9-3 and 3.9-4.) For example, floodplain restoration projects permitted under the Order could require constructing new levees to facilitate the removal or breaching of existing levees and the creation of aquatic or riparian habitat. The new levees could be damaged if constructed on unstable soils, potentially exposing the surrounding areas to flooding.

Construction and O&M activities for restoration projects permitted under the Order could result in the loss of a unique paleontological or geological resource. (This potential adverse effect is addressed in Impact 3.9-5.) For example, construction activities for restoration projects such as grading, excavation, and drilling could result in the permanent loss of paleontological resources if construction activities were to disrupt or destroy fossil remains or sites, or to create a loss of information and potential destruction of nonrenewable paleontological resources. Therefore, restoration projects permitted under the Order could result in a cumulatively considerable incremental contribution to a significant cumulative impact related to geology and soils.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measures GEO-1, GEO-2, GEO-3, GEO-4, GEO-5, GEO-6, GEO-7, GEO-8, GEO-9, and GEO-10 would be required when applicable to a given project as required by Section 15092 of the State CEQA Guidelines. Mitigation Measures GEO-1, GEO-2, GEO-3, GEO-4, GEO-5, GEO-6, GEO-7, GEO-8, GEO-9, and GEO-10 would minimize impacts on geology and soils. If necessary, impacts of individual restoration projects would be addressed in future environmental analyses that would be conducted by the appropriate project proponents. Mitigation Measures GEO-1, GEO-2, GEO-3, GEO-4, GEO-5, GEO-6, GEO-7, GEO-8, GEO-9, and GEO-10 would continue to be implemented as part of the restoration projects permitted under the Order.

In addition, as discussed in Section 3.9, *Geology and Soils*, restoration projects permitted under the Order would incorporate several general protection measures: GPM-15, WQHM-1, WQHM-2, WQHM-3, WQHM-4, VHDR-1, VHDR-3, and VHDR-4. Incorporating these general protection measures would further reduce adverse effects of project construction and O&M on geology and soil resources.

Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. In addition, Mitigation Measures GEO-1, GEO-2, GEO-3, GEO-4, GEO-5, GEO-6, GEO-7, GEO-8, GEO-9, and GEO-10 and the applicable general protection measures would reduce the contribution of permitted restoration projects to less than cumulatively considerable in most cases.

In some cases, the effects on geology and soils of restoration projects permitted under the Order could be neutral or beneficial. For example, restoration projects (i.e., bank stabilization, berm construction, and levee bank stability projects) would reduce the potential for injuries, seepage, and seepage-related levee failures and would increase channel bank stability.

Although cumulative impacts would be less than significant in most cases, the extent and location of such actions are yet to be determined, and for impacts on paleontological and geological resources, it is not possible to conclude that the mitigation measures would reduce significant impacts to less than cumulatively considerable in all cases. Therefore, cumulative impacts could remain **significant and unavoidable**.

4.6.9 Hazards and Hazardous Materials

Construction, constructed facilities (natural or artificial infrastructure), and O&M for the projects listed in Table 4-2 would introduce new physical features such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered bank stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions could involve the routine transport, use, or disposal of hazardous materials and result in the accidental release of hazardous materials, which could create a hazard to the public or the environment. If this were to occur within one-quarter mile of a school, it could result in significant adverse effects involving the exposure of construction workers, the public, and the environment to existing soil and/or groundwater contamination. (These potential adverse effects are addressed in Impacts 3.10-1 and 3.10-2.)

For example, a restoration project to establish, restore, and enhance tidal, subtidal, and freshwater wetlands could require grading (e.g., excavating breaks in levees, dikes, and/or berms) and plowing or disking for the preparation of seed beds. Such project construction may have a potentially significant impact related to hazards to human health from exposure to existing on-site hazardous materials. In addition, a school may be present within one-quarter mile of the construction of a floodplain restoration project and project construction activities could result in the accidental release of hazardous materials.

Construction activities could also include ground-disturbing activities such as excavation that could result in the release of previously unidentified contaminated soil and/or groundwater that could expose construction workers, the public, and the environment to

risks associated with hazardous materials. The types and quantities of hazardous materials would vary at each construction site depending on the location and the facility or infrastructure being constructed.

Implementation of restoration projects also could result in airport safety hazards by placing projects within 2 miles of an airport, resulting in a safety hazard. (This potential adverse effect is addressed in Impact 3.10-3.) For example, restoration or improvement sites could be located in areas that could have the potential to create a safety hazard for people by placing them at construction sites or operational facilities near airports. The construction and operation of projects near airports also could produce light, glare, or other distractions from lighting and/or reflection off of detained water that interfere with airport operations. Projects constructed in these areas likely would be subject to the consistency requirements of an airport land use plan.

In addition, the operation of restoration projects permitted under the Order could adversely affect airport safety by increasing the potential for collisions between aircraft and wildlife. For example, routine O&M activities for restoration projects permitted under the Order could occur within 2 miles of an airport. Such activities (e.g., use of lights for a constructed fish screen) could produce light, glare, or other distractions; however, the light and glare would most likely be minimal and would conform to the requirements of the local airport land use plan.

Project construction and heavy equipment use could temporarily interfere with emergency response access near projects by interfering with an adopted emergency response or evacuation plan. (This potential adverse effect is addressed in Impact 3.10-4.) For example, street closures or lane blockages could reduce the number of travel lanes and require rerouting of traffic. Traffic levels could increase during transportation and relocation of construction materials. As a result, construction activities for future restoration projects permitted under the Order could temporarily increase emergency response times or interfere with adopted emergency response or evacuation plans, depending on project locations. The effect of future individual projects on emergency response times would be a cumulatively significant impact.

Projects permitted under the Order could expose people or structures to a significant loss, injury, or death due to wildland fires. (This potential adverse effect is addressed in Impact 3.10-5.) The study area for the Order includes all counties and cities in California; therefore, restoration projects could be located in areas with moderate to high fire risk, or where fuel loads are present. For example, construction equipment and vehicles used for restoration projects could come into contact with vegetated areas, potentially igniting dry vegetation by accidental discharge of sparks. Construction and operation of permitted restoration projects could create a vector habitat that could pose a significant health hazard to the public. (These potential adverse effects are addressed in Impact 3.10-6.) For example, restoration projects permitted under the Order could involve activities, such as setting back a levee or creating offstream storage ponds, that could create new areas of standing water that would support mosquito habitat. As described above, these effects could be both temporary during construction and permanent during O&M. The effects of wildfires and creation of vector habitat could be a cumulatively significant impact.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measures HAZ-1, HAZ-2, HAZ-3, HAZ-4, HAZ-5, HAZ-6, and FIRE-1 would be required when applicable to a given project as required by Section 15092 of the State CEQA Guidelines. Mitigation Measures HAZ-1, HAZ-2, and HAZ-3 would minimize impacts related to potential discovery of previously unidentified contaminated soil and/or groundwater. Mitigation Measure HAZ-4 would minimize impacts on established airport operation areas and buffer zones. Mitigation Measure HAZ-5 would minimize impacts on emergency response access or adopted emergency response and evacuation plans. HAZ-6 would minimize impacts related to public health hazards from new vector habitat. Mitigation Measure FIRE-1 would minimize exposure to wildland fires.

If necessary, impacts of individual restoration projects would be addressed in future environmental analyses that would be conducted by the appropriate project proponents. Mitigation Measures HAZ-1, HAZ-2, HAZ-3, HAZ-4, HAZ-5, HAZ-6 and FIRE-1 would continue to be implemented as part of the restoration projects permitted under the Order.

In addition, as described in Section 3.10, *Hazards and Hazardous Materials,* restoration projects permitted under the Order would incorporate several general protection measures: GPM-6, GPM-7, GPM-10, GPM-11, GPM-12, GPM-14, WQHM-1, WQHM-2, WQHM-4, WQHM-5, WQHM-6, IWW-1, IWW-2, IWW-3, IWW-6, IWW-13, and VHDR-6. Incorporating these general protection measures would further reduce adverse effects of project construction and operation on hazards and hazardous materials.

Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. In addition, Mitigation Measures HAZ-1, HAZ-2, HAZ-3, HAZ-4, HAZ-5, HAZ-6 and FIRE-1 and the applicable general protection measures would reduce the contribution of permitted restoration projects to less than cumulatively considerable in most cases.

However, because the locations of future restoration projects that would be permitted under the Order are yet to be determined, it is not possible to conclude that restoration projects would be outside 2 miles from an airport and that Mitigation Measure HAZ-5 would reduce significant impacts to a less than cumulatively considerable level in all cases. Therefore, cumulative impacts could remain **significant and unavoidable**.

4.6.10 Hydrology and Water Quality

Construction, constructed facilities (natural or artificial infrastructure), and O&M for the projects listed in Table 4-2 would introduce new physical features such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions could result in changes to hydrology and water quality, including changes to surface water and/or groundwater supply and quality, drainage patterns and impervious surface cover, and flooding and inundation.

Construction, constructed facilities, and O&M of restoration projects could result in changes to surface water and/or groundwater quality. For example, construction activities, including construction in waterways, could include earthmoving activities that could adversely affect water quality through temporary sediment disturbance and resuspension that may cause siltation, as well as enhanced bioavailability of sediment-associated pollutants (e.g., trace metals, heavy metals, pesticides) in affected waterways. This work could temporarily disturb streambed sediments and cause the resuspension of sediment-associated pollutants (e.g., trace metals, heavy metals, pesticides) associated with either legacy activities (e.g., gold mining) or contemporary activities (e.g., watershed urbanization).

In addition, localized degradation of groundwater quality could result from construction activities if hazardous materials were to be discharged to the land surface or surface waters during these activities and they were to travel to underlying aquifers. If the volume of discharge were sufficient, such hazardous materials could degrade local groundwater quality to a sufficient degree to impair its continued use. In addition, operation of projects could result in changes to water quality as a result of changes in flow volume and timing.

However, long-term effects on water quality from restoration projects permitted under the Order are expected to be beneficial or sometimes neutral (in the case of fish screens or ladders), because the specific purpose of these projects would be to correct existing conditions that contribute to resource degradation. For example, projects implementing bioengineered bank stabilization would reduce the input of fine sediment, which would improve water quality. Other restoration projects, such as those to remove pilings and other in-water structures, would improve water quality by removing potential contaminant sources and hazards such as untreated and chemically treated wood pilings, piers, and vessels.

In addition, restoration projects permitted under the Order could establish, restore, and enhance tidal, subtidal, and freshwater wetlands. For example, living shorelines provide a natural alternative to “hard” shoreline stabilization methods like stone sills or bulkheads, and provide numerous ecological benefits including water quality improvements. Floodplain restoration would also improve water quality because floodplains, when inundated with water, act as natural filters by removing excess sediment and nutrients.

Projects could affect groundwater supply through construction-related activities that could include temporary dewatering to facilitate construction of necessary infrastructure. Ground-disturbing activities could increase impervious surfaces (e.g., paved surfaces, soil compaction), which could impair groundwater recharge, potentially resulting in decreases in groundwater recharge throughout the project life cycle. Conjunctive-use projects that integrate the operation of surface water storage and conveyance projects have the potential to benefit groundwater levels by providing additional surface water

supplies that replace pumping of groundwater. Surface water or groundwater conjunctive use increases recharge with surface water supplies, which in turn improves groundwater levels as well as dry-year water supplies.

Project construction could temporarily change the availability of water supplies by temporarily affecting water quality to the degree that supplies could be unusable, or it could result in a temporary loss of access to manually operated agricultural intakes. In addition, dewatering activities during construction could temporarily affect groundwater elevations, which could limit the ability of some water users to access groundwater. Furthermore, operation of projects could result in changes to water supply as a result of changes in flow volume and timing.

Construction activities such as paving, soil compacting, and grading of land slopes could increase the imperviousness of the soils. This change would result in relatively localized decreases in infiltration rates and associated increases in the amount of land and rate of surface runoff on-site and immediately downstream (or downslope) of the site, which could persist at any of the facilities that have permanent changes in land cover. These changes in the rate of surface runoff could exceed the capacity of existing or planned stormwater drainage systems and/or result in localized flooding.

As described above, these significant effects could be both temporary (e.g., construction dewatering activities) and permanent (e.g., new or expanded storage or conveyance). These changes associated with past, present, and planned future projects would result in a cumulatively significant impact on water resources.

Restoration projects permitted under the Order could result in the release of pollutants into surface water and/or groundwater. Such a release could substantially degrade water quality as a result of project construction (e.g., localized degradation of surface water and groundwater quality from the discharge of hazardous materials during construction) and project operations (e.g., localized degradation of surface water and groundwater quality from a release of pollutants during operation). (These potential adverse effects are addressed in Impact 3.11-1.)

Projects permitted under the Order could deplete groundwater supplies or interfere substantially with groundwater recharge during project construction (e.g., changes in groundwater recharge from altered drainage patterns during construction when land grading, stockpiling dredged or other in-water material before disposal, stockpiling construction materials, or constructing structures). (These potential adverse effects are addressed in Impact 3.11-2.)

In addition, projects permitted under the Order could substantially alter the existing drainage pattern through the alteration of the course of a stream or river; create or contribute to runoff water which could exceed the capacity of existing or planned stormwater drainage systems; or impede or redirect flood flows (e.g., installation of constructed structures such as fish screens could change drainage patterns during construction). (These potential adverse effects are addressed in Impact 3.11-3.)

Therefore, individual restoration projects permitted under the Order could result in a cumulatively considerable incremental contribution to a significant cumulative impact related to hydrology and water quality.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with the general protection measures listed below would be required as applicable to a given project. As described in Section 3.11, *Hydrology and Water Quality,* the appropriate project proponents would be required to incorporate several general protection measures: GPM-10, GPM-11, GPM-12, WQHM-1, WQHM-2, WQHM-3, WQHM-4, WQHM-5, WQHM-6, IWW-1, IWW-2, IWW-3, IWW-4, IWW-6, IWW-10, IWW-11, IWW-12, IWW-13, VHDR-2, VHDR-3, VHDR-4, VHDR-6, VHDR-7, and VHDR-8. Incorporating these general protection measures would reduce adverse effects of project construction and operation on hydrology and water quality. If necessary, impacts of individual restoration projects would be addressed in future environmental analyses that would be conducted by the appropriate project proponents.

Implementation of the general protection measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. Restoration projects permitted under the Order could result in significant hydrology and water quality impacts.

However, construction-related impacts would be minimal and temporary. Furthermore, many of the long-term effects on hydrology and water quality of restoration projects permitted under the Order would be expected to be beneficial or, in some cases, neutral (i.e., fish screens or ladders), because the specific purpose of these projects would be to correct existing conditions that contribute to resource degradation. For example, restoration projects (i.e., bioengineered bank stabilization and removal of pilings and other in-water structures) would reduce the input of fine sediment and remove potential contaminant sources and hazards (i.e., untreated and chemically treated wood pilings, piers, and vessels), which would improve water quality. In addition, restoration projects could establish, restore, and enhance tidal, subtidal, and freshwater wetlands (i.e., floodplain restoration), which would act as natural filters by removing excess sediment and nutrients.

Restoration projects (i.e., stream, floodplain, and riparian projects) are also expected to have beneficial impacts on groundwater recharge. Large-scale floodplain restoration projects may provide for containment of reservoir releases in preparation for large storm events, which would also be beneficial. Although restoration projects could alter current conditions, such projects would be expected to have relatively localized effects on-site and immediately downstream (or downslope) of the individual restoration project site.

In addition, the general protection measures discussed above would reduce the contribution of permitted restoration projects to less than cumulatively considerable. Therefore, cumulative impacts would be **less than significant.**

4.6.11 Land Use and Planning

Construction, constructed facilities (natural or artificial infrastructure), and O&M for the projects listed in Table 4-2 would introduce new physical features, such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions could conflict with land use plans, policies, or regulations or physically divide an established community, which could result in significant temporary or permanent adverse effects related to land use. For example, stockpiling of materials and new intakes/diversions associated with subsidence reversal programs would be nonlinear and localized, and therefore would not physically divide an established community. These changes associated with past, present, and planned future projects would result in a cumulatively significant impact on land use and planning.

Restoration projects permitted under the Order could result in conflicts with land use plans, policies, and regulations adopted to avoid or mitigate an environmental impact or result in the division of an established community. (These potential adverse effects are addressed in Impacts 3.12-1 and 3.12-2.) This could result in significant temporary or permanent adverse effects on land use in the project area. Therefore, restoration projects permitted under the Order could result in a cumulatively considerable incremental contribution to a significant cumulative impact related to the substantial impact on land use and planning.

As part of the State Water Board or Regional board's issuance of a NOA for a restoration project under the Order, compliance with applicable city and county general plans and other local policies and ordinances would be required. If necessary, impacts of individual restoration projects would be addressed in future environmental analyses that would be conducted by the appropriate project proponents. Construction activities for restoration projects could temporarily physically divide a community; however, these conversions would most likely take place on the periphery of a community, rather than through the community, and would be temporary.

Implementation of the city and county general plans and other local policies and ordinances would be the responsibility of the project proponent(s) under jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. In most cases, implementation of the city and county general plans and other local policies and ordinances would reduce the contribution of permitted restoration projects to less than cumulatively considerable. However, because the extent and location of restoration projects permitted under the Order are yet to be determined, it is not possible to conclude that restoration projects would not physically divide an established community. Therefore, cumulative impacts could remain **significant and unavoidable**.

4.6.12 Mineral Resources

Construction, constructed facilities (natural or artificial infrastructure), and O&M for the projects listed in Table 4-2 would introduce new physical features, such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions could affect mineral resources designated by the California Geological Survey as resources of regional and statewide importance (MRZ-2). Active, permitted mines are present and development of the proposed restoration projects could substantially deplete already inadequate aggregate resources. Restoration projects permitted under the Order could also result in the loss of availability of a locally important mineral recovery site, if work would occur on or near mineral recovery sites that have been identified in local general plans, specific plans, or other land use plans. Many producing natural gas wells lie within delineated natural gas fields and a permitted mining operations are present in the study area. These significant impacts could be both temporary during construction and permanent from placement of new infrastructure (natural and artificial). The effect on mineral resources that would result from these changes could be a cumulatively significant impact.

Restoration projects permitted under the Order could result in the loss of availability of a known mineral resource. (This potential adverse effect is addressed in Impact 3.13-1.) For example, constructing infrastructure such as setback levees and widening floodplains would require large quantities of construction aggregate, which could limit the ability of other aggregate users in the area to obtain and use aggregate.

Projects could result in the loss of availability of locally important mineral resource recovery site. (This potential adverse effect is addressed in Impact 3.13-2.) For example, constructing setback levees and widening floodways could temporarily or permanently affect mining operations if the projects were constructed at the locations of these existing resource recovery sites. Therefore, restoration projects permitted under the Order could result in a cumulatively considerable incremental contribution to a significant cumulative impact related to mineral resources.

As part of the State Water Board or Regional Board’s issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measures MIN-1 and MIN-2 would be required when applicable to a given project as required by Section 15092 of the State CEQA Guidelines. Mitigation Measure MIN-1 would minimize impacts related to the loss of a known mineral resource. Mitigation Measure MIN-2 would minimize impacts related to the loss of a locally important mineral recovery site.

If necessary, impacts of individual restoration projects would be addressed in future environmental analyses that would be conducted by the appropriate project proponents. Mitigation Measures MIN-1 and MIN-2 would continue to be implemented as part of the restoration projects permitted under the Order.

Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing agency. In addition, Mitigation Measures MIN-1 and MIN-2 would reduce the contribution of permitted restoration projects to less than cumulatively considerable. Therefore, cumulative impacts would be **less than significant**.

4.6.13 Noise

Construction, constructed facilities (natural or artificial infrastructure), and O&M for the projects listed in Table 4-2 would introduce new physical features, such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions could expose people to noise levels in excess of standards established in applicable plans and ordinances, cause a substantial increase in ambient noise levels, and expose sensitive receptors to excessive groundborne vibrations. Restoration projects permitted under the Order could be located within 2 miles of a public airport or public use airport, within the vicinity of a private airstrip, or within an airport land use plan, or where such a plan has not been adopted, could expose people residents or workers to excessive noise levels. These significant effects could be both temporary or long-term during construction and operation and permanent during operation.

For example, some restoration projects permitted under the Order could require the use of haul trucks and heavy equipment that could expose people to elevated noise levels and groundborne vibrations, creating noise that may exceed ambient noise levels. Activities also could occur at night and close to receptors in populated areas. Actual exposure levels would depend on the intensity of the construction activity, the distance of sensitive receptors to the noise or vibration source, and any intervening structures or topography that might affect noise or vibration attenuation. These changes associated with past, present, and planned future projects would result in a cumulatively significant noise impact.

Restoration projects permitted under the Order could expose people to elevated noise levels and could result in substantial temporary or permanent increases in ambient noise levels and/or excessive groundborne noise levels. (These potential adverse effects are addressed in Impacts 3.14-1 and 3.14-3.) Projects also could expose sensitive receptors to excessive groundborne vibrations. (This potential adverse effect is addressed in Impact 3.14-2.)

Restoration projects could be located within the vicinity of a private airstrip or an airport land use plan, or where such plan has not been adopted, within 2 miles of a public airport or public use airport, and could expose people residing or working to excessive noise levels. (This potential adverse effect is addressed in Impact 3.14-4.)

For example, restoration projects involving levee deconstruction and construction may use heavy equipment during site preparation, restoration-related grading and excavation, and deconstruction. In such a case, construction activities could influence noise levels at and near the project site. These noise levels would fluctuate depending on the particular type, number, and duration of equipment used (e.g., small power tools, generators, dump trucks, graders). If, for example, the construction activity was located near single-family and multifamily residential and transient lodging, restoration activities could expose these sensitive receptors to increased noise levels.

Typical vibration levels tend to dissipate rapidly with increasing distance from the vibration source. For example, stockpiling of materials may require constructing piers for barge landings, and pier construction may use pile drivers that could generate 1.518 inches per second peak particle velocity and 112 vibration decibels at 25 feet. Applying the Federal Transit Administration's recommended procedure for determining vibration levels at various distances from the source, the predicted most-conservative ground vibration levels would exceed the threshold of 80 vibration decibels for human disturbance for pile driving at distances within 290 feet. With regard to structural damage, the threshold of 0.2 inch per second peak particle velocity would be exceeded for pile driving at distances within 96 feet.

Furthermore, restoration projects permitted under the Order could be located within 2 miles of a public airport and, depending on the location, could expose people working in the project area to excessive noise levels. However, routine O&M activities (e.g., vegetation clearing, debris removal, monitoring) would be limited and temporary, occurring yearly, monthly, weekly, or as needed. Therefore, projects permitted under the Order could result in a cumulatively considerable incremental contribution to a significant cumulative impact related to the substantial increase in noise levels and groundborne vibration.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measures NOISE-1, NOISE-2, and NOISE-3 would be required when applicable to a given project as required by Section 15092 of the State CEQA Guidelines. Mitigation Measures NOISE-1 and NOISE-2 would minimize impacts from construction-related and operational noise conflicts. Mitigation Measure NOISE-3 would minimize impacts on noise levels within the vicinity of an airport.

If necessary, impacts of individual restoration projects would be addressed in future environmental analyses that would be conducted by the appropriate project proponents. Mitigation Measures NOISE-1, NOISE-2, and NOISE-3 would continue to be implemented as part of the restoration projects permitted under the Order.

In addition, as discussed in Section 3.14, *Noise,* restoration projects permitted under the Order would incorporate several general protection measures: GPM-2, GPM-3, GPM-6, and IWW-9. Incorporating these general protection measures would further reduce adverse effects of project construction and O&M related to noise.

Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional

Board, or other authorizing regulatory agency. Mitigation Measures NOISE-1, NOISE-2, and NOISE-3 and the applicable general protection measures would reduce the contribution of permitted restoration projects to less than cumulatively considerable in most cases.

Although cumulative impacts would be less than significant in most cases, the extent and location of such actions are yet to be determined, and for construction impacts on ambient noise levels and groundborne vibration and noise levels, it is not possible to conclude that the mitigation measures would reduce significant impacts to less than cumulatively considerable in all cases. Therefore, cumulative impacts would remain **significant and unavoidable.**

4.6.14 Population and Housing

Construction, constructed facilities (natural or artificial infrastructure), and O&M for the projects listed in Table 4-2 would introduce new physical features, such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions would include construction activities for large projects such as removing levees, constructing new setback levees, and widening floodways. Projects could require workers to move to the area to support construction and O&M activities such as vegetation removal and monitoring, potentially resulting in significant population growth and increased demand for housing. Projects may also include the need for more specialized construction workers and could require construction workers to relocate to the construction area. Construction activities could also remove or relocate existing infrastructure such as boat docks, boat haul-out locations, campgrounds and campsites, day-use sites, roads/trails, and off-highway/off-road vehicle routes that could eliminate housing or displace a substantial number of people or housing, necessitating the construction of replacement housing elsewhere.

For example, fish screens, water conveyance pipelines, and the widening of floodplains could include excavation and grading activities that could result in the elimination of housing. These effects could be both temporary or long-term during construction and permanent during operation. These changes associated with past, present, and planned future projects would result in a cumulatively significant impact on population, employment, and housing.

Restoration projects permitted under the Order could require relocation by construction and operation crew members, resulting in population growth and increased demand for housing. (This potential adverse effect is addressed in Impact 3.15-1.) For example, large projects could include construction activities such as removing levees, constructing new setback levees, and widening floodways. These projects might require some more specialized construction workers who potentially would relocate to the construction area. However, impacts would be negligible because none of the restoration projects permitted under the Order would involve constructing new homes,

businesses, or other infrastructure that would provide new long-term employment opportunities or result in population growth and demand for housing.

Routine O&M of restoration projects permitted by the Order could include maintenance and cleaning of fish screens, removal of debris and sediment from stream crossings, and maintenance and operation of fishways. These O&M activities could require additional staff. However, it is anticipated that these activities would be similar to those in the project area located near a waterway. Furthermore, although temporary or longer term population increases could occur, the potential presence of existing vacant units in and around the project area would help absorb the population increases, which would be negligible and temporary.

None of the restoration projects permitted under the Order would eliminate housing. (This potential adverse effect is addressed in Impact 3.15-2.) Some construction activities (such as for projects to establish, restore, and enhance stream and riparian habitats and upslope watershed sites) could involve removing or relocating existing infrastructure such as boat docks, boat haul-out locations, campgrounds and campsites, day-use sites, roads/trails, and off-highway/off-road vehicle routes. However, as mentioned above, none of these activities for restoration projects permitted under the Order are expected to eliminate housing or displace substantial numbers of people or housing, necessitating the construction of replacement housing elsewhere. Most, if not all, projects that would be constructed and operated under the Order would be located in or near waterways. Water conservation projects could involve constructing new infrastructure (e.g., fish screens, fishways, pumps and piping, screens and head gates); however, these projects would most likely be in less urbanized or rural environments in areas with minimal housing.

As part of the State Water Board or Regional Board’s issuance of a NOA for a restoration project under the Order, compliance with the general protection measures and mitigation measures would be required when applicable to a given project as required by Section 15092 of the State CEQA Guidelines.

Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. Restoration projects permitted under the Order could result in some population and housing effects, given that the location and extent of individual restoration projects are yet to be determined. However, even though these factors are not known, these impacts would be expected to be negligible because projects would typically occur in low-density population regions near waterways, limiting the potential for the displacement of people or housing. Furthermore, none of the restoration projects permitted under the Order are expected to remove or relocate housing. Therefore, projects permitted under the Order would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to population, employment, and housing, and this cumulative impact would be **less than significant**.

4.6.15 Recreation

Construction, constructed facilities (natural or artificial infrastructure), and O&M would introduce new physical features, such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions could significantly alter, impair, degrade, or eliminate recreational resources, facilities, and opportunities, and may include the construction or expansion of recreational facilities that could result in significant environmental impacts. Construction and operation of the projects also could increase the use of existing recreational resources and facilities such that substantial physical deterioration would occur or be accelerated.

For example, work to remove small dams, tide gates, flood gates, and legacy structures could temporarily impair, degrade, or eliminate recreational resources, facilities, and opportunities with the installation of site fencing and signage, removal of soil and vegetation, excavation and grading activities, dust abatement, staging and storage of equipment and materials, vehicle parking, and construction operations. These activities also may cause recreational users to be displaced to other resources or facilities temporarily, over the long term, or permanently. Such displacement may increase the use of other existing recreational resources or facilities, potentially causing their physical condition to substantially deteriorate. Noise from construction activities also may directly detract from nearby recreational experiences and deter wildlife, thus temporarily impairing wildlife viewing opportunities. These changes associated with past, present, and planned future projects would result in a cumulatively significant impact on recreational resources.

Restoration projects permitted under the Order could result in temporary or long-term impairment, degradation, and elimination of recreational resources, facilities, and opportunities in the project area because of the presence of work sites and other construction and O&M maintenance activities. (This potential adverse effect is addressed in Impact 3.16-1.) For example, work to remove small dams, tide gates, flood gates, and legacy structures could temporarily block boaters' access to boat launches and other river access areas and adversely impair recreational opportunities for trail users. Infrastructure may be removed or relocated along streams and in riparian areas. In addition, establishing, restoring, or enhancing stream, riparian, or tidal habitats may require permanently relocating or decommissioning existing trails or roads, which could increase the use of other recreational facilities. Widening a floodway may also preclude the use of recreational facilities that could be periodically inundated.

Construction activities and constructed facilities for restoration projects permitted under the Order could alter or result in the construction or expansion of existing recreational resources, with resulting environmental impacts. (This potential adverse effect is addressed in Impact 3.16-2.) For example, constructing a floodplain restoration project could generate noise that would impair the use of a nearby recreation area.

Restoration projects permitted under the Order could temporarily or permanently impede recreational use, which could increase the use of existing recreational resources and facilities, potentially resulting in the substantial physical deterioration or the acceleration of deterioration of resources and facilities. (This potential adverse effect is addressed in Impact 3.16-3.) For example, establishing, restoring, or enhancing stream, riparian, or tidal habitats may require permanently relocating or decommissioning existing trails or roads. Recreationists who use the trails and/or roads would need to use other facilities while the trails or roads are closed. This displacement may increase the use of other existing recreational resources or facilities, potentially leading to their substantial physical deterioration. Therefore, restoration projects permitted under the Order could result in a cumulatively considerable incremental contribution to a significant cumulative impact related to the substantial impairment, degradation, and elimination of recreational resources.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure REC-1 would be required when applicable to a given project as required by Section 15092 of the State CEQA. If necessary, impacts of individual restoration projects would be addressed in future environmental analyses that would be conducted by the appropriate project proponents. Mitigation Measure REC-1 would continue to be implemented as part of the individual restoration projects permitted under the Order.

As discussed in Section 3.16, *Recreation*, restoration projects permitted under the Order would incorporate several general protection measures: GPM-8, GPM-9, GPM-14, GPM-15, GPM-15, GPM-16, GPM-17, GPM-18, GPM-19, GPM-20, WQHM-1, WQHM-2, WQHM-3, WQHM-4, WQHM-5, WQHM-6, IWW-1, IWW-2, IWW-3, IWW-5, IWW-6, IWW-8, IWW-13, VHDR-1, VHDR-2, VHDR-3, VHDR-4, and VHDR-6. Incorporating these general protection measures would further reduce adverse effects of project construction and operation on recreational resources.

Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. The mitigation measure and general protection measures listed above would reduce impacts on recreation to less than cumulatively significant levels. Therefore, cumulative impacts would be **less than significant**.

4.6.16 Transportation

Construction, constructed facilities (natural or artificial infrastructure), and O&M would introduce new physical features, such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions could conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system; substantially increase hazards due to a design feature or incompatible uses; result in inadequate emergency access; and conflict with adopted policies, plans, or

programs supporting alternative transportation. These significant effects could be temporary or long-term during construction or operation, and could be permanent during operation.

For example, several project types could affect the use of roads, highways, bridges, railroads, navigable waterways, and transit, bicycle, and pedestrian facilities if temporary, long-term, or permanent closures were necessary to accommodate the transport and use of materials and equipment, and the installation or operation of facilities. These project types include the construction and operation of culverts, fish screens, ladders, and pilings; removal of small dams, tide gates, and legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams. Depending on the project design, roads may need to be relocated, potentially resulting in the presence of new and/or rerouted traffic at intersections or road segments that are not designed to accommodate the additional traffic. Operations and construction activities such as the import and export of materials may require an increase in the numbers of trucks at intersections and on road segments, which could lead to a substantial increase in traffic congestion in those locations. These activities also may reduce emergency access and increase emergency response times. Large vehicles entering roadways from construction and operation activities could pose a hazard to oncoming vehicles, bicyclists, and pedestrians. Project facility designs could affect navigation in waterways and cause an increase in potential hazards: They could expose boaters to additional channel hazards, such as debris or collisions when multiple vessels are present in the area at the same time. These changes associated with past, present, and planned future projects could result in a cumulatively significant impact on transportation.

Restoration projects permitted under the Order could result in significant temporary, long-term, or permanent adverse effects on transportation by conflicting with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system including transit, roadways, bicycle, and pedestrian facilities. Such effects could include road closures or relocation, potentially by increasing traffic congestion from an increase in the numbers of trucks at intersections and on road segments. (These potential adverse effects are addressed in Impact 3.17-1.)

In addition, projects could conflict with or be inconsistent with State CEQA Guidelines Section 15064.3(b) and result in a significant amount and distance of automobile travel attributed to a restoration project. (This potential adverse effect is addressed in Impact 3.17-2.) Construction and operation activities associated with restoration projects permitted under the Order could substantially increase hazards due to a geometric design feature or incompatible uses. (This potential adverse effect is addressed in Impact 3.17-3.)

Therefore, projects permitted under the Order could result in a cumulatively considerable incremental contribution to a significant cumulative impact related to transportation.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measures TRA-1, TRA-2, TRA-3, TRA-4, TRA-5, TRA-6, TRA-7, and TRA-8 would be required when applicable to a given project as required by Section 15092 of State CEQA Guidelines. Mitigation Measures TRA-1, TRA-2, TRA-3, TRA-4, and TRA-5 would minimize impacts related to a conflict with a plan, ordinance, or policy addressing the circulation system. Mitigation Measure TRA-6 would minimize impacts associated with increased vehicle miles traveled. Mitigation Measures TRA-7 and TRA-8 would minimize hazards due to a geometric design feature or incompatible use.

If necessary, impacts of individual restoration projects would be addressed in future environmental analyses that would be conducted by the appropriate project proponents. Mitigation Measures TRA-1, TRA-2, TRA-3, TRA-4, TRA-5, TRA-6, TRA-7, and TRA-8 would continue to be implemented as part of the restoration projects permitted under the Order.

In addition, as discussed in Section 3.17, *Transportation,* restoration projects permitted under the Order would incorporate several general protection measures: GPM-6, GPM-10, and WQHM-1. Incorporating these general protection measures would further reduce adverse effects of project construction and O&M on transportation.

Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. In addition, Mitigation Measures TRA-1, TRA-2, TRA-3, TRA-4, TRA-5, TRA-6, TRA-7, and TRA-8 and the applicable general protection measures would reduce the contribution of permitted restoration projects to less than cumulatively considerable in most cases.

Although cumulative impacts would be less than significant in most cases, the extent and location of such actions are not yet to be determined, and because the potential exists for a restoration project to conflict or be inconsistent with State CEQA Guidelines Section 15064.3(b), it is not possible to conclude that the mitigation measures would reduce significant impacts to less than cumulatively considerable in all cases. Therefore, cumulative impacts could remain **significant and unavoidable**.

4.6.17 Tribal Cultural Resources

Construction, constructed facilities (natural or artificial infrastructure), and O&M would introduce new physical features, such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions could require the use of heavy equipment and ground disturbance, such as grading of levees for erosion control and inundation of land as part of water storage projects. Construction and operational activities could result in the disturbance or destruction of surficial and subsurface tribal cultural resources, which could result in significant permanent adverse effects on these resources. Operational

activities also may limit tribal access to sacred locations or gathering sites. Activities occurring in areas with denser concentrations of tribal cultural resources would have a higher potential to affect eligible resources. These changes associated with past, present, and planned future projects would result in a cumulatively significant impact on tribal cultural resources.

Restoration projects permitted under the Order could result in significant permanent adverse effects on tribal cultural resources, by damaging or destroying such resources through the use of heavy equipment or inundation of land as part of water storage projects. Thus, projects may disturb surficial and subsurface tribal cultural resources or limit tribal access to sacred locations or gathering sites in the project area. (This potential adverse effect is addressed in Impact 3.18-1.) Therefore, restoration projects permitted under the Order could result in a cumulatively considerable incremental contribution to a significant cumulative impact on tribal cultural resources.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measures CUL-2, CUL-3, and CUL-4 would be required when applicable to a given project as required by Section 15092 of the State CEQA Guidelines. Mitigation Measures CUL-2, CUL-3, and CUL-4 would minimize impacts on tribal cultural resources.

If necessary, impacts of individual restoration projects would be addressed in future environmental analyses that would be conducted by the appropriate project proponents. Mitigation Measures CUL-2, CUL-3, and CUL-4 would continue to be implemented as part of restoration projects permitted under the Order.

Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. In addition, Mitigation Measures CUL-2, CUL-4, and CUL-4 would reduce the contribution of permitted restoration projects to less than cumulatively considerable in most cases.

However, because the extent and location of such actions are not yet determined, it is not possible to conclude that mitigation measures would reduce the contribution of permitted projects to less than cumulatively considerable in all cases. Therefore, cumulative impacts could remain **significant and unavoidable**.

4.6.18 Utilities and Service Systems and Public Services

Construction, constructed facilities (natural or artificial infrastructure), and O&M would introduce new physical features, such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

Construction of new water systems (e.g., diversion, treatment, and distribution facilities) or expansion of existing systems is prompted by increased customer demand, typically as a result of new land development (such as development that transitions land use from rural to more urban use) or population growth. As described in Section 3.14,

Population and Housing, and Section 5.1, Growth-Inducing Impacts, restoration projects permitted under the Order would not include new land development or induce substantial population growth that would add new water customer demands or increase long-term water demand from water systems.

Implementation of the restoration projects listed in Table 4-2 are not anticipated to require the relocation of new water or expanded water facilities due to the extensive cost of relocation and potential environmental impacts from the relocation. However, future restoration projects could require the relocation of stormwater outfalls or utilities (e.g., electric power, natural gas, or telecommunication facilities) that would cause significant environmental effects.

Population changes could occur resulting in reasonably foreseeable future development (e.g., new housing or commercial development). These future development projects may require surface water during normal, dry and multiple dry years. below, these projects are not anticipated to result in insufficient water supplies by meeting existing regulatory requirements (e.g., existing Biological Opinions on the Long-Term Operations of the Central Valley Project and State Water Project). Future restoration projects would need to comply with relevant federal, state, and local regulations and ordinances (including demonstrating there are sufficient water supplies, if needed), as would reasonably foreseeable future development projects.

Constructed facilities, including expansion or modification of floodplains and fish passage improvements, could have effects on water supply availability if water levels are reduced near diversion intakes. However, anticipated changes in water levels resulting from constructed facilities would need to comply with relevant federal, state, and local regulations and ordinances and would not impede operations of existing diversion facilities or substantially change water supply availability to water users.

Implementation of the restoration projects listed in Table 4-2 would generate solid waste from construction and O&M, but the projects could be served by a landfill that has insufficient permitted capacity for the demand. Construction and O&M activities could result in adverse physical impacts by requiring the construction of new or modified fire protection and police protection facilities, schools, and other public facilities if such activities cause the population to increase. Adverse impacts would also occur if additional public facilities would be required to maintain acceptable service ratios, response times, or other performance objectives for the public services in response to the projects. These significant effects could be temporary or long-term during construction and permanent during operations. These changes associated with past, present, and planned future projects would result in a cumulatively significant impact on utilities and public service systems.

Most projects permitted under the Order that would involve earthmoving activities would not generate large amounts of construction waste (e.g., organic materials from borrow areas and restoration construction sites, excavated material, and soil not suitable for earthen structures) that would require disposal at a landfill. (This potential adverse effect is addressed in Impact 3.19-2.) Constructed facilities and O&M could also produce solid waste; however, the magnitude of waste created would be less than that

produced during construction activities and would most likely be very small relative to landfill capacity.

Restoration projects permitted under the Order could result in substantial adverse physical impacts associated with construction of new or modified fire protection, police protection, schools, and other public facilities. (This potential adverse effect is addressed in Impact 3.19-3.) However, construction activities for restoration projects permitted under the Order would not include new land development or occupied structures that would increase population and add new public service demands. Furthermore, any increases in demand for law enforcement, fire protection, and medical services related to this small change in population in any one county are expected to be negligible.

Therefore, restoration projects permitted under the Order could result in a cumulatively considerable incremental contribution to a significant cumulative impact related to the substantial degradation or destruction of utilities and public services.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with general protection measures and mitigation measures would be required when applicable to a given project as required by Section 15092 of the State CEQA Guidelines. Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency.

The extent and location of restoration projects permitted under the Order are not known at this time; however, for the reasons discussed above, projects could result in significant and unavoidable impacts resulting from relocation of stormwater outfalls or utilities (e.g., electric power, natural gas, or telecommunication facilities). Therefore, cumulative impacts could remain **significant and unavoidable**.

The extent and location of restoration projects permitted under the Order are not known at this time; however, for the reasons discussed above, projects are not anticipated to result in insufficient water supplies available to serve the project during normal, dry, or multiple dry years; result in insufficient permitted capacity of the local landfill to accommodate the project's solid wastes; or result in the construction of new or modified fire protection, police protection, schools, and other public facilities. Therefore, cumulative impacts could remain **less than significant**.

4.6.19 Wildfire

Construction, constructed facilities (natural or artificial infrastructure), and O&M would introduce new physical features, such as culverts, bridges, fish screens, ladders, or pilings. They would also involve removal of small dams, tide gates, flood gates, or legacy structures; placement of bioengineered stabilization materials; grading and excavation to reconnect, set back, or breach levees; reconnection of stream and river channels; creation of depressions, berms, and drainage features; and installation of cofferdams.

These facilities, features, and actions could result in the temporary, long-term, or permanent increases in risk for fire exacerbation or result in downslope or downstream risks due to runoff, post-fire slope instability, or drainage changes. These significant effects could be temporary or long-term during construction and permanent during

O&M. These changes associated with past, present, and planned future projects would result in a cumulatively significant wildfire impact.

Restoration projects permitted under the Order could exacerbate fire risk if located in a High or Very High Fire Hazard Severity area. (This potential adverse effect is addressed in Impact 3.20-1.) For example, heavy construction equipment and passenger vehicles could drive on vegetated areas before clearing and grading, which could increase the fire danger. Construction equipment or heated mufflers could throw sparks, or oils, lubricants, and other combustible materials could accidentally ignite, resulting in a fire. Construction activities such as steel cutting and welding, while typically used only for unanticipated equipment maintenance during most individual restoration project types, are also potential sources of ignition.

In addition, increased surface runoff and erosion is possible in a post-fire environment where surface vegetation has been removed and steep slopes can increase the velocity of runoff flows. (This potential adverse effect is addressed in Impact 3.20-2.) For example, restoration projects involving the removal of nonnative terrestrial and aquatic invasive species and revegetation with native plants could lead to unstable soil conditions or increased runoff. Therefore, restoration projects permitted under the Order could result in a cumulatively considerable incremental contribution to a significant cumulative impact related to wildfire.

As part of the State Water Board or Regional Board's issuance of a NOA for a restoration project under the Order, compliance with Mitigation Measure FIRE-1 would be required when applicable to a given project as required by Section 15092 of the State CEQA Guidelines. Mitigation Measure FIRE-1 requires restoration projects in areas designated as Very High or High Fire Hazard Safety Zones to prepare and submit a project-specific fire prevention plan for project construction and operation to the CEQA lead agency for review before the start of construction. Mitigation Measure FIRE-1 also requires that a draft of the fire prevention plant be distributed to each fire agencies (e.g., the California Department of Forestry and Fire Protection and county or local municipal fire agencies) before the start of any construction activities in areas designated as Very High or High Fire Hazard Severity Zones. Furthermore, Mitigation Measure FIRE-1 requires that the final plan be approved by these agencies before the start of construction activities and that the CEQA lead agency implement the plan during all construction and maintenance activities.

If necessary, impacts of individual restoration projects would be addressed in future environmental analyses that would be conducted by the appropriate project proponents. Mitigation Measure FIRE-1 would continue to be implemented as part of the restoration projects that would be permitted under the Order.

Implementation of the mitigation measures would be the responsibility of the project proponent(s) under the jurisdiction of the State Water Board, appropriate Regional Board, or other authorizing regulatory agency. Mitigation Measure FIRE-1 would reduce the contribution of permitted restoration projects to less than considerable in most cases.

Furthermore, in some cases, restoration projects permitted under the Order are expected to result in beneficial or neutral impacts because the specific purpose of these

projects would be to correct existing conditions that contribute to resource degradation. For example, restoration projects (i.e., bioengineered bank stabilization and removal of pilins and other in-water structures, and removal of nonnative invasive species and revegetation with native plants) would reduce the input of fine sediment and remove potential contaminant sources and hazards, which would improve water quality and fire resilience, increase bank stability, and improve overall hydrologic connection. In addition, Mitigation Measure FIRE-1 would reduce the contribution of permitted projects to less than cumulatively considerable in all cases. Therefore, cumulative impacts would be **less than significant**.

Chapter 5 Other CEQA Considerations

5.1 Growth-Inducing Impacts

5.1.1 Introduction

This section analyzes the growth inducement potential of the Order for Clean Water Act Section 401 Water Quality Certification and Waste Discharge Requirements for Restoration Projects Statewide (Order) and the associated secondary effects of growth. California Environmental Quality Act (CEQA) requirements that pertain to analyzing growth and the approach to analyzing the growth-inducing impacts of the Order are discussed below.

CEQA Requirements

The State CEQA Guidelines (Section 15126.2[e]) require that an environmental impact report (EIR) evaluate the growth-inducing impacts of a project. The EIR must:

> *Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristics of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.*

A project can have direct or indirect growth inducement potential. Direct growth inducement would result if a project were to involve construction of substantial new housing or commercial development. A project would have an indirect growth-inducement effect if it were to remove an obstacle to additional growth and development, such as removing a constraint on a required public service. For example, an increase in the capacity of utility or road infrastructure could allow either new or additional development in the surrounding area. A project can also induce population growth if economic expansion or growth occurs in an area in response to the project (e.g., changes in revenue base or employment expansion).

The purpose of this section is to evaluate the potential growth-inducing effects of restoration projects that would be permitted under the Order. As discussed in Section 2.7, *Typical Construction, Operation, and Maintenance Activities and Methods*, the Order does not involve construction or operations and maintenance of specific facilities or other specific physical actions by the State Water Resources Control Board

(State Water Board). The State Water Board does not propose to construct, operate, or undertake other specific physical actions after the adoption of the Order.

Additional analysis of the Order's potentially growth-inducing effects is provided in Section 3.15, *Population and Housing*. Section 3.15 summarizes existing information and trends regarding population, housing, and employment in the study area. Section 3.15 also evaluates restoration projects permitted under the Order that could induce substantial population growth and increase demand for housing, or that could necessitate construction of replacement housing because of displacement of people or houses.

5.1.2 Growth Inducement Potential of the Order

Direct Growth Inducement

Implementing restoration projects permitted under the Order would not involve construction of new housing or commercial or industrial development; therefore, these projects would not directly induce growth.

As described in Section 3.15, *Population and Housing*, restoration projects permitted under the Order are anticipated to result in negligible levels of permanent population growth because an adequate labor pool exists in the study area to provide the employees needed for construction and operation of restoration projects. The planning guidelines and policies of local jurisdictions would control the potential for direct economic growth to result from restoration projects permitted under the Order. Therefore, the Order would not induce substantial direct growth and growth-related impacts would be less than significant.

Indirect Growth Inducement

A project that would generate substantial new permanent employment could indirectly generate growth by creating demand for homes and services and fostering economic and population growth. Similarly, population growth induced by a short- or long-term construction effort with substantial employment opportunities could indirectly stimulate the need for additional housing and services to support the new temporary employment demand.

As described in Section 3.15, *Population and Housing*, construction and operation of restoration projects permitted under the Order could result in negligible levels of temporary and permanent population growth.

The locations and scale of potential future individual restoration projects that could be permitted under the Order and their staffing are yet to be determined. Factors necessary to identify potential impacts include the number of construction workers employed, the duration of project construction, and the locations of projects relative to populated areas.

Although many construction activities are temporary, it is reasonable to expect that construction activities associated with restoration projects permitted under the Order may be as short as a few days or as long as several years, depending on the specific project being constructed. As such, worker relocation could vary depending on the size, type, and length of construction activities. However, as described in Section 3.15, *Population and Housing*, any long-term increase in population in the region resulting

from construction of restoration projects would be negligible, and existing vacant units could absorb any population increase.

Restoration projects permitted under the Order are not anticipated to remove obstacles to growth (e.g., by facilitating population or economic growth) because construction of new residences and commercial development are not anticipated to occur as a result of the restoration projects. As described in Section 3.15, *Population and Housing*, individual restoration projects permitted under the Order could result in an increase in housing, given the aesthetic nature of a restoration project. However, restoration projects would need to be consistent with local plans and would not be expected to result in a substantial number of people or housing which would necessitate the construction of replacement housing elsewhere.

Therefore, the Order would not induce substantial indirect growth and the indirect growth-related impacts would be less than significant.

5.2 Significant Irreversible Environmental Changes

The State CEQA Guidelines (Section 15126.2[d]) require an evaluation of the significant irreversible environmental changes that would be caused by a project if implemented, as described below:

> *Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts, and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.*

The State CEQA Guidelines refer to the need to evaluate and justify the consumption of nonrenewable resources and the extent to which the project commits future generations to similar uses of nonrenewable resources. In addition, CEQA requires the evaluation of irreversible damage that could result from an environmental accident associated with the project.

Implementing restoration projects permitted under the Order could indirectly result in the commitment of nonrenewable natural resources used in the construction process and during operation, including gravel, petroleum products, steel, and other materials. Projects would also result in the commitment of slowly renewable resources, such as wood products. As discussed in Section 3.19, *Utilities and Public Services*, most projects permitted under the Order that would involve earthmoving activities would not generate large amounts of construction waste (e.g., organic materials from borrow areas and restoration construction sites, excavated material, and soil not suitable for earthen structures). As also discussed in Section 3.19, depending on the nature of the project, operations and maintenance of restoration project could produce solid waste. The increased generation of solid waste associated with construction and operation

would depend on the size, number, location, and nature of restoration projects and their ability to reuse and recycle materials. Fee schedules for disposal of construction debris could be established to promote recycling and minimize solid waste; reuse or recycling of construction debris could be required; and solid waste plans could be developed for individual projects to maximize practices that reduce and recycle solid waste and collect, recycle, or compost litter. (Impact 3.19-2 in Section 3.19.)

Implementing restoration projects permitted under the Order could also result in the commitment of energy resources such as fossil fuels. As discussed in Section 3.8, *Energy Resources*, construction and operation of restoration projects would require the direct and indirect use of energy resources. Direct energy use during construction and operation would involve using petroleum products and electricity to operate equipment, and indirect energy use would involve consuming energy to extract raw materials, manufacture items, and transport the goods and people necessary for construction and operation activities.

Construction-related energy consumption would be temporary, occurring only during the construction period. Nevertheless, construction-related and operational activities would cause irreversible and irretrievable commitments of finite nonrenewable energy resources, such as gasoline and diesel fuel (Impacts 3.8-1 and 3.8-2 in Section 3.8). However, implementation of restoration projects permitted under the Order would include all feasible control measures to improve equipment efficiency and reduce energy use as required by the applicable local air pollution control or management districts and as described in the general protection measures. These measures include best management practices regarding on-site construction vehicle efficiency standards; exhaust control plans that would reduce unnecessary equipment idling; and other policies to help reduce energy use that would be consistent with state and local legislation and policies to conserve energy.

Compliance with all applicable state, county, and local plans, policies, and regulations pertaining to energy standards would ensure that natural resources are conserved to the maximum extent possible. It is therefore concluded that the rate and amount of energy consumed during construction or operations of restoration projects would not result in the unnecessary, inefficient, or wasteful use of resources, and that energy use would be accomplished in a manner consistent with applicable laws and regulations.

To the extent that restoration projects would be constructed in currently sensitive natural communities or agricultural land (discussed in Section 3.3, *Agriculture and Forestry Resources*, and Section 3.5, *Biological Resources—Terrestrial*), they may also result in an irreversible conversion of sensitive natural communities and agricultural land.

Finally, construction and operation of restoration projects permitted under the Order have the potential to result in accidental release of hazardous materials (discussed in Impact 3.10-2 in Section 3.10, *Hazards and Hazardous Materials*), which may lead to irreversible damage.

5.3 Significant Unavoidable Impacts

The following is a summary of potentially significant and unavoidable impacts identified and discussed in the technical sections of this program EIR contained in Chapter 3 and summarized in the Executive Summary.

State CEQA Guidelines Section 15126.2(c) states that an EIR must include a description of those impacts identified as significant and unavoidable should the proposed project be implemented. These impacts are unavoidable because it has been determined that the general protection measures, species protection measures, and/or mitigation (or only partial mitigation) may not reduce the impact to less-than-significant levels. The final determination of the significance of impacts and of the feasibility of mitigation measures would be within the responsibility and jurisdiction of the appropriate project proponents. Those impacts found to be significant and unavoidable include:

5.3.1 Agriculture and Forestry Resources

Impact 3.3-1: Restoration projects permitted under the Order could convert Farmland to nonagricultural use or conflict with a Williamson Act contract or zoning for agricultural use.

5.3.2 Air Quality and Greenhouse Gas Emissions

Impact 3.4-1: Implementing future restoration projects permitted under the Order could conflict with an applicable air quality plan.

Impact 3.4-2: Emissions from future restoration projects permitted under the Order could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.

Impact 3.4-4: Emissions from future restoration projects permitted under the Order could expose sensitive receptors to substantial pollutant concentrations.

Impact 3.4-5: Implementing future restoration projects permitted under the Order could result in an increase in GHG emissions that may have a significant impact on the environment.

Impact 3.4-6: Implementing future restoration projects permitted under the Order could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.

5.3.3 Biological Resources—Terrestrial

Impact 3.5-1: Implementing restoration projects permitted under the Order could adversely affect habitat for special-status plant species.

Impact 3.5-2: Implementing restoration projects permitted under the Order could result in adverse direct effects on special-status wildlife species.

Impact 3.5-3: Implementing restoration projects permitted under the Order could result in adverse effects on riparian habitat or sensitive natural communities.

5.3.4 Cultural Resources and Tribal Cultural Resources

Impact 3.7-1: Implementing future restoration projects permitted under the Order could cause a substantial adverse change in the significance of a historical resource pursuant to State CEQA Guidelines Section 15064.5.

Impact 3.7-2: Implementing future restoration projects permitted under the Order could cause a substantial adverse change in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5.

Impact 3.7-3: Implementing future restoration projects permitted under the Order could disturb any human remains, including those interred outside of dedicated cemeteries.

5.3.5 Geology and Soils

Impact 3.9-5: Implementing future restoration projects permitted under the Order could directly or indirectly result in the loss of a unique paleontological resource or geological resource.

5.3.6 Hazards and Hazardous Materials

Impact 3.10-3: Future restoration projects permitted under the Order could be implemented within 2 miles of an airport, resulting in a safety hazard.

5.3.7 Land Use and Planning

Impact 3.12-2: Implementing restoration projects permitted under the Order could physically divide an established community.

5.3.8 Noise

Impact 3.14-1: Implementing future restoration projects permitted under the Order could result in a temporary or permanent increase in ambient noise levels in excess of standards established in applicable plans and ordinances.

Impact 3.14-2: Implementing future restoration projects permitted under the Order could expose sensitive receptors to excessive groundborne vibration.

Impact 3.14-3: Implementing future restoration projects permitted under the Order could expose sensitive receptors to excessive groundborne noise levels.

5.3.9 Transportation

Impact 3.17-2: Future restoration projects permitted under the Order could conflict with or be inconsistent with State CEQA Guidelines Section 15064.3(b).

5.3.10 Tribal Cultural Resources

Impact 3.18-1: Implementing future restoration projects permitted under the Order could cause a substantial adverse change in the significance of a tribal cultural resource, as defined in PRC Section 21074.

5.3.11 Utilities and Service Systems and Public Services

Impact 3.19-1: Implementing future restoration projects permitted under the Order could require or result in the construction or relocation of new water or expanded water, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.

Chapter 6 Alternatives

6.1 Introduction

This chapter describes alternatives to the Order for Clean Water Act (CWA) Section 401 Water Quality Certification and Waste Discharge Requirements for Restoration Projects Statewide (Order) and compares the environmental impacts of those alternatives. This chapter also describes alternatives that were considered for further consideration but rejected.

The principles used to guide selection of the alternatives analyzed in this program environmental impact report (PEIR) are provided by Section 15126.6 of the California Environmental Quality Act (CEQA) Guidelines (State CEQA Guidelines), which specifies that an environmental impact report (EIR) must do all of the following:

- Describe a reasonable range of potentially feasible alternatives to the project that could feasibly attain most of the basic objectives of the project.
- Consider alternatives that could reduce or eliminate any significant environmental impacts of the Order, including alternatives that may be costlier or could otherwise impede the project's objectives.
- Evaluate the comparative merits of the alternatives.

The focus and definition of the alternatives evaluated in this PEIR are governed by the "rule of reason," in accordance with Section 15126.6(f) of the State CEQA Guidelines. That is, the range of alternatives presented in this PEIR must permit a reasoned choice by the State Water Resources Control Board (State Water Board). The State CEQA Guidelines (Section 15126.6) require that an EIR evaluate at least one "No-Project Alternative," evaluate a reasonable range of alternatives to the project, identify alternatives that were considered during the scoping process but eliminated from detailed consideration, and identify the "environmentally superior alternative."

Although the State CEQA Guidelines (Section 15126.6[d]) require that alternatives be evaluated, they permit the evaluation to be conducted in less detail than for the Order. Consistent with Section 15126.6(d) of the State CEQA Guidelines, the information provided in this PEIR about each alternative is sufficient to allow for a meaningful evaluation, analysis, and comparison of the alternatives.

The alternatives considered but rejected are discussed in Section 6.3.3, *Alternatives Considered but Rejected*. The alternatives carried forward for analysis are discussed in Section 6.4, *Alternatives to the Order*. The State CEQA Guidelines also require that the EIR identify the environmentally superior alternative. Section 6.5, *Environmentally Superior Alternative*, identifies the environmentally superior alternative and summarizes the impacts of each alternative, and their ability to meet project objectives, as compared to the Order.

6.2 Objectives

As presented in Section 2.2.2, *Objectives*, the objective of the Order is to help expedite and make the regulatory process more efficient, and thus to allow as many restoration projects as possible statewide by interpreting state standards in a uniform manner to ensure that applicable projects are consistent with federal and state water quality laws.

6.3 Alternatives Considered and Screening Criteria

This section describes the development of a reasonable range of alternatives to the Order, the method used to screen the alternatives, and the alternatives considered but eliminated from detailed consideration in this document.

6.3.1 Development of a Reasonable Range of Alternatives

CEQA requires that an EIR describe and evaluate a reasonable range of alternatives to a project or to the location of a project that would feasibly attain most of the basic project objectives and avoid or substantially lessen significant project impacts. The alternatives to the Order considered in this PEIR were developed based on information gathered during development of the Order and during the PEIR scoping process (Section 1.3, *Public Participation and Environmental Review Process*).

In developing the Order, a range of potential actions and other ways to meet the project objectives were considered. Various draft versions of the Order were prepared based on input received from the Regional Water Quality Control Boards (Regional Boards) and technical experts. In addition, comments were received during scoping of the PEIR. See Appendix B for the comments received in response to the notice of preparation (NOP) of the PEIR.

NOP comments on the Order addressed a variety of topics and themes, including the following:

- Some comments suggested including certain restoration projects already included in the Order (e.g., process-based restoration of fluvial systems as a means to create a dynamic and self-sustaining riverine environment [e.g., Stage 0], main-channel gravel augmentation, in-channel grading activities, boulder placement, and placement of large and small woody habitat material).
- Some comments suggested including certain restoration projects not included in the Order (e.g., direct flow releases).
- Some comments supported establishing fewer requirements for the design of restoration categories and/or not including maximum upper limit size constraints or generic limits on the size of restoration projects covered under the Order.
- Some comments asked that the State Water Board specify much more narrowly the types of restoration projects that could be permitted under the Order, or that more specific criteria be required for projects to be included in the Order. Among the specific criteria requested: One of the project's primary objectives is restoration; the project is financed, at least in part, with monies set aside for the explicit purpose of restoration or stewardship; the project does not permanently

affect beneficial uses established by the applicable water quality control plan (basin plan); and/or the percentage of hardscape (e.g., concrete, unvegetated riprap) does not exceed more than a certain limited percent of the total footprint. Some comments requested a clear and reasonable definition of what level of restoration is necessary for projects to qualify for coverage, and how that level of restoration can, or should, be measured.

- Some comments suggested eliminating certain aspects of restoration projects included in the Order. For example: Eliminating bank stabilization projects that depend on extensive use of rock riprap; or restoration projects conducted in connection with a requirement for water supply development requiring any action on the part of the State Water Board's Division of Water Rights.
- Some comments suggested eliminating or excluding an entire category of restoration projects included in the Order, such as excluding all water conservation restoration projects.
- Some comments suggested allowing flexibility in the regulations regarding certain types of restoration projects. For example, it was suggested that the State Water Board should include higher thresholds for nephelometric turbidity units (NTU) during construction in the Order to allow work to continue between short work windows and during a variety of water-year types.

6.3.2 Method Used to Screen Alternatives

Potential alternatives were screened based on their ability to feasibly attain most of the basic project objectives, their feasibility within the limits of the State Water Board jurisdiction, and their ability to reduce or eliminate any significant environmental impacts of the Order.

- **Meeting project objectives—**The project objectives are listed in Section 2.2.2, *Objectives*. The State CEQA Guidelines state that alternatives must feasibly attain most of the basic objectives of the project. Alternatives that did not meet the majority of the objectives for the Order were screened out and not carried forward for further evaluation in the PEIR.
- **Feasibility—**CWA Section 401 and California Water Code Section 13000 establish certain requirements that govern the State Water Board's regulatory authority related to the Order. Alternatives that do not meet the requirements of the CWA or California Water Code, or of other applicable laws and regulations, were not carried forward for further evaluation in the PEIR.
- **Avoiding or lessening any potentially adverse environmental effect of the Order—**Consistent with the State CEQA Guidelines, alternatives should avoid or substantially lessen one or more of the significant environmental effects of the Order. Alternatives that would not lessen or avoid a potentially significant environmental impact may be eliminated from detailed evaluation in the PEIR.

6.3.3 Alternatives Considered but Rejected

The State CEQA Guidelines require an EIR to identify any alternatives that were considered by the lead agency but were rejected as infeasible, and to briefly explain the reasons underlying the lead agency's determination. Section 15126.6(c) of the State CEQA Guidelines states the following:

> *The EIR should identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination… Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts.*

The alternative that was considered but rejected is "Flexibility in regulations regarding restoration projects (e.g., higher NTU thresholds)."

As stated above, the State Water Board is governed by CWA and California Water Code requirements related to the Order. Regulations in Title 23, Division 3, Chapter 15, Article 5 of the California Code of Regulations contain the interpretation of the state's Antidegradation Policy that has been promulgated in regulations.

The State Water Board enacted the Statement of Policy with Respect to Maintaining High Quality of Waters in California, also referred to as the California Antidegradation Policy. This policy is used to ensure that high-quality water is maintained, and it limits the discharge of pollutants into high-quality water in the state (Resolution Number 68-16), as follows:

> *(1) Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.*
>
> *(2) Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.*

An alternative that requires the State Water Board to change threshold standards (such as NTUs) are outside the scope of the Order. Therefore, this alternative was rejected from further consideration.

6.4 Alternatives to the Order

Three alternatives were identified for further evaluation in the PEIR: The No Project Alternative and two potentially feasible alternatives to the Order resulting from the alternatives development and screening process described above:

- No Project Alternative
- Alternative 1—Specify more narrowly the types of restoration projects included in the Order (e.g., the project must exceed a certain limited percent of footprint)
- Alternative 2—Eliminate certain aspects of restoration categories (e.g., eliminating bank stabilization)

These alternatives are described below, along with a comparison of the impacts of the alternatives to the impacts of the Order. The alternatives were also evaluated for their ability to achieve the project objectives, which are presented in Section 2.2.2, *Objectives*.

This analysis of impacts is based on an evaluation of the potential changes to environmental resources that would result from implementation of actions in response to the alternatives, compared to the Order. However, the precise locations and detailed characteristics of potential future individual restoration projects are unknown. Therefore, this analysis focuses on reasonably foreseeable changes from implementation of the types of projects and actions that might be taken in the future, consistent with the level of detail appropriate for a program-level analysis.

Similar to the Order, impacts of the alternatives were evaluated in terms of how typical construction and operations and maintenance (O&M) of project components might cause adverse environmental impacts.

Consistent with Section 15126.6(d) of the State CEQA Guidelines, the information provided in this PEIR about each alternative is sufficient to allow for a meaningful evaluation, analysis, and comparison of the alternatives with the Order. If an alternative would cause one or more significant effects in addition to those identified for the Order, the effects are discussed, but in less detail than for the Order (State CEQA Guidelines Section 15126.6[d]). In the following sections, impacts are described with respect to whether they are likely to be similar to, more severe than, or less severe than the corresponding impacts of the Order.

6.4.1 No Project Alternative

Description of Alternative

State CEQA Guidelines Section 15126.6(e) requires consideration of a “no project” alternative. The purpose of this alternative is to allow the decision makers to compare the impacts of the Order with the impacts of not approving the Order (the project). The No Project Alternative consists of existing conditions at the time the NOP is published, and what would be reasonably expected to occur in the foreseeable future if the Order were not approved, based on current plans and consistent with available infrastructure.

Under the No Project Alternative, the State Water Board would take no action to approve the Order to expedite regulatory approval of restoration projects that fall

outside the project size limits of the Order for Small Habitat Restoration Projects (Order #SB12006GN). Restoration projects initiated by project proponents are assumed to continue to be implemented, and projects would remain subject to the requirement to file a CWA Section 401 water quality certification and/or waste discharge requirements for each restoration project. Proponents of restoration projects would continue to obtain individual CWA Section 401 water quality certifications and/or waste discharge requirements from the State Water Board and/or Regional Boards.

Restoration projects would still be carried out in a manner consistent with CWA Section 401, waste discharge requirements, and other legal requirements intended to reduce or eliminate potential significant environmental impacts. However, under the No Project Alternative, when proponents of individual restoration projects apply for a Section 401 water quality certification or waste discharge requirements, the applications would be reviewed and evaluated without the benefit of the systematic and consistent Order process provided by the Order, which could result in loss of efficiencies, less regulatory certainty, and a longer time frame for permit approval by the State Water Board and/or Regional Boards.

Recognizing that each restoration project would receive its case-by-case review by the State Water Board and/or Regional Board without the opportunity for up-front and consistent identification, selection, and application of species protection measures, general protection measures, design criteria, and/or mitigation from a program EIR, the permit applications and CEQA documentation would not benefit from the eligibility requirements or time savings associated with this program and may be repetitive from one project to the next and/or the potential for variability in mitigation approaches may exist.

Other Projects Included in the No Project Alternative

The No Project Alternative includes reasonably foreseeable projects that are funded and for which construction and operation permits had been issued at the time of the NOP. The following other projects are included in the No Project Alternative:

- Restoration projects that originate from programs and/or initiatives that guide restoration throughout the state, such as:
  - Proposition 1 and Proposition 68 funds administered by local conservancies and state agencies.
  - California Department of Fish and Wildlife Fisheries Restoration Grant Program.
  - State Water Board Comprehensive Response to Climate Change (Resolution No. 2017-0012).
  - State Water Board Non-point Source (Section 319h) grant program for restoration activities.
  - California EcoRestore.
  - Central Valley Flood Protection Plan–Conservation Strategy.
  - San Joaquin River Restoration Program.

- San Francisco Bay Restoration Authority (Measure AA).
- California State Conservancies (e.g., Coastal, Tahoe, Sierra Nevada).
- Species recovery plans published by the California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and other federal, state, and local agencies, and watershed protection and management plan implementation projects.
- Projects that are part of other restoration plans, agreements, or funding sources.

♦ Multiple-benefit projects, including those that address groundwater recharge, recreation, flood management, water quality improvement, and/or adaptation to climate change.

♦ Restoration projects that contribute to the protection of existing and potential beneficial uses identified in each of the nine Regional Boards' basin plans.

Relationship to Project Objectives

The No Project Alternative would not achieve the objective to help streamline the regulatory process for restoration projects statewide by interpreting state standards in a uniform manner to ensure that the projects are consistent with federal and state water quality laws. As stated above, when proponents of restoration projects apply for a Section 401 water quality certification or waste discharge requirements, they would be reviewed and evaluated without the benefit of a systematic and consistent Order process, which could result in the loss of efficiencies and a longer time frame for permit approval by the State Water Board and/or Regional Boards. In summary, the No Project Alternative does not meet the project objectives of the Order.

6.4.2 Alternative 1—Specify More Narrowly the Types of Restoration Projects Included in the Order

Description of Alternative

Alternative 1 would include the same categories of restoration projects in the Order as described in Chapter 2, *Project Description*, within the nine Regional Boards' jurisdictions; however, this alternative would specify more narrowly the types of projects that would be covered under the Order.

This alternative would allow for larger restoration projects than specified in the Order for Small Habitat Restoration Projects, but would be more limited than the Order. Furthermore, this alternative would define the level of restoration necessary for projects to qualify for coverage, and would indicate how that level can or should be measured. For example, projects would be limited to specific size constraints (e.g., the project must not exceed a certain size) or must meet certain criteria (e.g., the percentage of hardscape, such as concrete or unvegetated riprap, must not exceed a certain limited percentage of the total footprint).

The same authorization process for restoration projects would be implemented under Alternative 1 as under the Order. Construction activities would be similar to those listed

in the Order, and restoration projects would incorporate species protection measures, general protection measures, and design criteria as with the Order.

Because of specific size constraints or criteria limitations placed on the restoration projects covered by the Order, this alternative would reduce the types, and potentially the locations, of restoration projects that would be implemented under the Order.

Restoration projects implemented by project proponents that do not meet the size constraints or certain criteria required by Alternative 1 would not be covered under this alternative. Implementation of these restoration projects would be the same as under the No Project Alternative (as described above).

Relationship to Project Objectives

Alternative 1 would not achieve all the project objectives. This alternative includes all categories of restoration projects in the Order as described in Chapter 2, *Project Description*; however, certain projects would not be covered because of size constraints or other limitations.

Depending on the specific circumstances, project size limits may be arbitrary, and imposing such limits may not reduce temporary adverse impacts, especially if appropriate protection measures are in place. Many projects essential for ecological and environmental improvements would be delayed or require phasing (to reduce the size of single project phases). Delays and phasing would slow down project implementation and associated contributions to species recovery and water quality improvement.

In addition, if projects must meet certain criteria (e.g., the percentage of hardscape, such as concrete or unvegetated riprap, must not exceed a certain limited percentage of the total footprint), some project types—such as fish passage and road crossing improvements—may not be eligible because certain projects require a higher percentage of hardscape. Also, more resources would be spent on planning and permitting and State Water Board and Regional Board staff time, and less on project implementation.

Because Alternative 1 would limit the restoration projects covered under the Order to specific size constraints or certain criteria, this alternative would not fully achieve streamlining of the regulatory process for restoration projects statewide.

In summary, Alternative 1 partially achieves the project objectives, but many projects could be left out, and this alternative would not achieve the same degree of environmental benefits as the Order.

6.4.3 Alternative 2—Eliminate Certain Aspects of Restoration Categories

Description of Alternative

Alternative 2 would include the same categories of restoration projects in the Order as described in Chapter 2, *Project Description,* within the nine Regional Boards'

jurisdictions. However, certain elements could be removed from the categories of restoration projects under this alternative, such as the following:

- Bank stabilization projects that may depend on riprap, currently covered under the Stream and Riparian Habitat Establishment, Restoration, and Enhancement category.
- Removal, replacement, modification, retrofit, installation, or resetting of culverts, fords, bridges, and other stream crossings and water control structures of any size, currently covered under the Improvements to Stream Crossings and Fish Passage category.
- Removal of small dams, currently covered under the Removal of Small Dams, Tide Gates, Flood Gates, and Legacy Structures category.

The same authorization process for restoration projects would be implemented under Alternative 2 as under the Order. Construction activities would be similar to those listed in the Order, and restoration projects would incorporate species protection measures, general protection measures, and mitigation measures as with the Order.

Because Alternative 2 would eliminate project categories or practices within the eligible types of restoration projects permitted by the Order, this alternative would reduce the types or varieties of restoration projects that would be implemented under the Order.

Individual restoration projects that would implement categories of restoration not covered under Alternative 2 would be permitted following the same procedures as those listed for the No Project Alternative (as described above).

Relationship to Project Objectives

Alternative 2 would not achieve all the project objectives. Alternative 2 includes all categories of restoration projects in the Order as described in Chapter 2, *Project Description*; however, certain restoration projects would not be covered because this alternative would eliminate certain elements within the categories of restoration projects.

Similar to Alternative 1, depending on the specific circumstances, restricting certain project types under Alternative 2 may not result in reduced temporary adverse impacts, especially if the projects are planned and designed appropriately with protection measures in place. The Order has been developed to address these issues and concerns. Specifically, all projects permitted under the Order must incorporate applicable general protection measures (identified in Chapter 2, Section 2.8.2) into their designs to ensure that the projects avoid and minimize impacts on sensitive resources. See also Appendix E for full descriptions of these general protection measures.

In addition, the Order identifies a requirement for a pre-application consultation meeting with the approving Water Board, unless the consultation is waived by contacting the approving Water Board (Section 2.8.3):

- Removal of small dams
- Permanent removal of flashboard dam abutments and sills
- Placement of weirs within existing concrete-lined channels

- Ecotone levees
- Bioengineered bank stabilization
- Beneficial reuse of dredged material
- Climate change adaptation measures
- Projects in Outstanding National Resource Waters
- Application of pesticides to surface waters
- Live stream diversions with pumping
- Projects requiring a Basin Plan Prohibition Exemption

All project types included in the Order are essential for ecological and environmental improvements. Removing projects from eligibility under the Order would cause such projects to be delayed, slowing down their implementation and associated contributions to species recovery and water quality improvement.

Because Alternative 2 would limit the restoration projects covered under the Order, this alternative would not fully achieve streamlining of the regulatory process for restoration projects statewide.

In summary, Alternative 2 achieves or partially achieves most of the project objectives, though not to the same degree as the Order.

6.4.4 Alternative 3—Exclude Entire Categories of Restoration Projects

Description of Alternative

This alternative would include some of the same categories of restoration projects in the Order as described in Chapter 2, *Project Description,* within the nine Regional Boards' jurisdictions; however, this alternative would exclude entire categories of restoration projects that would be covered under the Order. For example, under this alternative, all restoration projects associated with the Water Conservation and Floodplain Restoration categories under the Order would not be implemented.

The same authorization process for restoration projects would be implemented under Alternative 3 as under the Order. Construction activities would be similar to those listed in the Order, and restoration projects would incorporate species protection measures, general protection measures, and mitigation measures as with the Order.

Because Alternative 3 would eliminate certain categories of restoration projects covered by the Order, this alternative would reduce the types of restoration projects that would be implemented under the Order.

Restoration projects implemented by project proponents that that include certain aspects of the categories of restoration not covered under this alternative would be implemented the same as under the No Project Alternative (as described above).

Relationship to Project Objectives

Alternative 3 would not achieve all the project objectives. This alternative does not include all categories of restoration projects in the Order as described in Chapter 2, *Project Description*; entire categories of restoration projects would be removed.

Similar to Alternatives 1 and 2, depending on specific project circumstances, restricting certain project types under Alternative 3 may not result in reduced temporary adverse impacts, especially if the projects are planned and designed appropriately with protection measures in place. The Order has been developed to address these issues and concerns; specifically, all projects permitted under the Order must incorporate *applicable* general protection measures (identified in Chapter 2, Section 2.8.2) into their designs so that the projects avoid and minimize impacts on sensitive resources. See also Appendix E for full descriptions of these general protection measures.

In addition, the Order requires a pre-application consultation meeting with the approving Water Board, unless the consultation is waived by contacting the approving Water Board (Section 2.8.3). All project types included in the Order are essential for ecological and environmental improvements. Removing projects from eligibility under the would cause such projects to be delayed, slowing down their implementation and associated contributions to species recovery and water quality improvement. More resources would be spent on planning and permitting, and State Water Board and Regional Board staff time, and less for project implementation.

Because Alternative 3 would limit the restoration projects covered under the Order, this alternative would not fully achieve an efficient regulatory process for a wide range of restoration projects statewide.

In summary, Alternative 3 achieves or partially achieves most of the project objectives, though not to the same degree as the Order.

6.4.5 Comparative Impact Analysis

This section compares the environmental impacts of the alternatives to the impacts of the Order.

Comparative Impact Analysis for the No Project Alternative

This section compares the impacts of the No Project Alternative to those of the Order.

Impacts Identified as Less Severe than Impacts of the Order

No impacts of the No Project Alternative have been identified as being less severe than impacts of the Order.

Impacts Identified as the Same as or Similar to Impacts of the Order

Construction and O&M impacts of the No Project Alternative in the study area would be similar to construction and O&M impacts of the Order because the State of California encourages the implementation of actions or activities to construct, operate, and maintain restoration projects. With the No Project Alternative, it could take longer for the State Water Board and Regional Boards to process CWA Section 401 permits for restoration projects, but the types of restoration projects and construction activities occurring would be similar to those under the Order. For example, there may be less or more construction activity in different portions of the study area with the No Project Alternative, as compared to the Order. Construction and operation of these types of

projects could result in significant and unavoidable environmental impacts similar to those described for the Order in Chapter 3.

- **Aesthetics:** The visual character of the project area is the same for the No Project Alternative as for the Order and is defined by all counties and cities in California. The No Project Alternative would still involve construction work for restoration projects; O&M activities of restoration projects could change the character of the project vicinity relative to current conditions. Like the Order, the No Project Alternative would include the presence of construction equipment and materials, vehicles, and crews, along with the construction of natural or artificial infrastructure. The Order's general protection measures GCM-11, GCM-14, GCM-15, VHDR-1, VHDR-3, VHDR-4, and VHDR-5 and Mitigation Measures AES-1 and AES-2 would reduce impacts of the No Project Alternative on visual resources to less-than-significant levels.

  For these reasons, similar to the impacts of the Order, aesthetics impacts of the No Project Alternative could be less than significant.

- **Agriculture and forestry resources:** Like the Order, the No Project Alternative would involve implementation of restoration projects that could require the conversion of farmland or forestland to accommodate new project features, and could conflict with existing agricultural or forest zoning and Williamson Act contracts (Impacts 3.3-1, 3.3-2, and 3.3-2). The Order's general protection measures GCM-8, GCM-10, GCM-11, GCM-12, GCM-15, IWW-14, VHDR-1, VHDR-2, VHDR-3, VHDR-4, VHDR-5, and VHDR-6 and Mitigation Measures AG-1, AG-2, and GEO-6 would reduce some impacts on agriculture and forestry resources.

  Therefore, similar to the impacts of the Order, impacts of the No Project Alternative on agriculture and forestry resources could be significant and unavoidable.

- **Air quality and greenhouse gas (GHG) emissions:** As under the Order, restoration projects undertaken under the No Project Alternative could conflict with adopted air quality plans, contribute to a cumulatively considerable net increase of criteria pollutants, and result in other emissions (e.g., those leading to odors) (Impacts 3.4-1, 3.4-2, and 3.4-3). The No Project Alternative could expose sensitive receptors to substantial pollutant concentrations and increase GHG emissions that could significantly affect the environment (Impacts 3.4-4 and 3.4-5). Similarly, the No Project Alternative could conflict with applicable plans, policies, and regulations adopted for the purpose of reducing GHG emissions from construction and O&M activities (Impact 3.4-6).

  Like the Order, the No Project Alternative would include construction and O&M activities that would require the use of equipment that would contribute to pollutants. The Order's general protection measures GCM-8 and GCM-17 and Mitigation Measures AIR-1, AIR-2, and AIR-3 would reduce impacts on air quality and GHG emissions.

Therefore, similar to the impacts of the Order, impacts of the No Project Alternative on air quality and GHG emissions could be significant and unavoidable.

- **Terrestrial biological resources:** As under the Order, construction and O&M activities for individual restoration projects under the No Project Alternative could affect sensitive natural communities, special-status species, wildlife habitat, or movement of native resident and migratory wildlife species (Impacts 3.5-1, 3.5-2, 3.5-3, and 3.5-5). Restoration projects could also result in the removal, hydrological interruption, or other actions that adversely affect protected wetlands (Impact 3.5-4). They could also conflict with local policies, ordinances, or adopted habitat conservation plans or natural community conservation plans (Impacts 3.5-6 and 3.5-7).

  Like the Order, the No Project Alternative would include construction and O&M activities that could cause adverse impacts on terrestrial biological resources. Impacts on terrestrial biological resources would be reduced with incorporation and implementation of the following protection measures and mitigation measure from the Order:

  - General protection measures GCM-2, GCM-3, GCM-4, GCM-5, GCM-6, GCM-7, GCM-8, GCM-9, GCM-10, GCM-11, GCM-12, GCM-13, GCM-14, GCM-15, GCM-17, GCM-18, GCM-20, IWW-1, IWW-2, IWW-3, IWW-4, IWW-6, IWW-8, IWW-11, IWW-13, WQHM-1, WQHM-2, WQHM-3, WQHM-4, WQHM-5, WQHM-6, VHDR-1, VHDR-2, VHDR-3, VHDR-4, and VHDR-5.
  - General species protection measures SPM-1, SPM-2, SPM-3, SPM-4, SPM-5, and SPM-6.
  - Plant species protection measures PLANT-1, PLANT-2, PLANT-3, PLANT-4, PLANT-5, PLANT-6, and PLANT-7[1].
  - Amphibian species protection measures AMP-1, APM-2, AMP-3, AMP-4, AMP-5, AMP-6, AMP-7, AMP-8, AMP-9, AMP-10, AMP-11, and AMP-12.
  - Reptile species protection measures REP-1, REP-2, REP-3, REP-4, REP-5, REP-6, and REP-7.
  - Bird species protection measures BIRD-1, BIRD-2, BIRD-3, BIRD-4, and BIRD-5.
  - Mammal species protection measures MAM-1, MAM-2, MAM-3, MAM-4, and MAM-5.
  - Invertebrate species protection measures INVERT-1, INVERT-2, INVERT-3, and INVERT-4.
  - Mitigation Measure TERR-1.

  However, similar to the impacts of the Order, impacts of the No Project Alternative on terrestrial biological resources could be significant and unavoidable.

[1] Staff Note: The PEIR listed Plant-7 in error. There is not a Plant-7 protection measure.

- **Aquatic biological resources:** Like the Order, the No Project Alternative could directly or indirectly affect special-status fish species or the movement of native resident or migratory fish (Impacts 3.6-1 and 3.6-2). Typically, long-term impacts of restoration projects would be expected to be beneficial or neutral because the specific purpose of all project types would be to restore and enhance existing conditions. In addition, impacts on aquatic biological resources would be avoided and/or reduced with incorporation of the following protection measures from the Order:

  - General protection measures GCM-2, GCM-3, GCM-4, GCM-5, IWW-1, IWW-2, IWW-3, IWW-4, IWW-5, IWW-6, IWW-7, IWW-8, IWW-9, IWW-10, IWW-11, IWW-12, IWW-13, WQHM-1, WQHM-2, WQHM-3, WQHM-4, WQHM-5, WQHM-6, VHDR-1, VHDR-2, VHDR-3, VHDR-4, VHDR-5, VHDR-6, VHDR-7, VHDR-8, VHDR-9, VHDR-10, VHDR-11, VHDR-12, and VHDR-13.
  - Species protection measures SPM-1, SPM-3, FISH-1, FISH-2, FISH-3, FISH-4, and FISH-5.

  Therefore, similar to the impacts of the Order, impacts of the No Project Alternative on aquatic biological resources could be less than significant.

- **Cultural and tribal cultural resources:** As under the Order, restoration projects undertaken under the No Project Alternative could disturb or destroy prehistoric or historic archaeological resources; tribal cultural resources; historic buildings, structures, and linear features; unrecorded human remains; and paleontological resources. Construction projects also could result in the alteration or removal of character-defining features of a cultural landscape. The Order's Mitigation Measures CUL-1, CUL-2, CUL-3, CUL-4, TCR-1, and TCR-2 would reduce impacts on cultural and tribal cultural resources.

  Therefore, similar to the impacts of the Order, impacts of the No Project Alternative on cultural and tribal cultural resources could be significant and unavoidable.

- **Energy resources:** As under the Order, construction and O&M activities for the No Project Alternative could result in substantial inefficient, wasteful, or unnecessary long-term consumption of energy resources or conflict with a state or local plan for renewable energy or energy efficiency (Impacts 3.8-1 and 3.8-2). However, like the Order, the No Project Alternative would not result in the inefficient, wasteful, or unnecessary long-term consumption of energy or changes to hydropower generation because local air pollution control or management districts require that construction activities for restoration projects improve equipment efficiency and reduce energy use. Routine O&M activities would require energy use; however, they would be consistent with current uses in the project area.

  In addition, the No Project Alternative would not conflict with applicable plans, policies, or regulations of local, county, and/or state energy standards that have been adopted for the purpose of improving energy efficiency or reducing consumption of fossil fuels. Multiple laws, regulations, and programs in California

require or promote the efficient use of energy, many of which have the effect of promoting or requiring the efficient use of energy and the expansion of renewable-energy generation and use. California's building codes (California Code of Regulations Title 24) also contain stringent energy efficiency standards. In addition, the state has adopted a specific California Green Building Standards Code that includes energy efficiency requirements and addresses the generation of renewable energy (e.g., rooftop photovoltaic solar panels).

Therefore, similar to the impacts of the Order, impacts of the No Project Alternative on energy resources could be less than significant.

- **Geology and soils:** Like the Order, the No Project Alternative could include the construction of surface storage infrastructure and flood management projects that could expose people or structures to seismic hazards, including fault rupture and strong ground motion (Impact 3.9-1). Restoration projects also may expose people or structures to unstable geological conditions; result in a loss of topsoil associated with ground disturbance, with resulting erosion and sedimentation impacts; and result in a loss of a unique paleontological or geological resource (Impacts 3.9-2, 3.9-3, 3.9-4, and 3.9-5). The Order's general protection measures GCM-15, WQHM-1, WQHM-2, WQHM-3, WQHM-4, VHDR-1, VHDR-3, and VHDR-4 and Mitigation Measures GEO-1, GEO-2, GEO-3, GEO-4, GEO-5, GEO-6, GEO-7, GEO-8, GEO-9, and GEO-10 would reduce the impacts of the No Project Alternative related to geology and soils.

  However, similar to the impacts of the Order, impacts of the No Project Alternative related to geology and soils could be significant and unavoidable.

- **Hazards and hazardous materials:** Like the Order, the No Project Alternative could result in exposure of the environment and sensitive receptors to unidentified contaminated soil and/or groundwater, and some of the impacts could occur within one-quarter mile of a school or within 2 miles of an airport (Impacts 3.10-1, 3.10-2, and 3.10-3). Restoration projects could also interfere with emergency response access or adopted emergency response or evacuation plans (Impact 3.10-4). In addition, they could expose people or structures to wildland fires or vector habitats (Impacts 3.10-5 and 3.10-6). The Order's general protection measures GCM-6, GCM-7, GCM-10, GCM-11, GCM-12, GCM-14, WQHM-1, WQHM-2, WQHM-4, WQHM-5, WQHM-6, IWW-1, IWW-2, IWW-3, IWW-6, IWW-13, and VHDR-6 and Mitigation Measures HAZ-1, HAZ-2, HAZ-3, HAZ-4, HAZ-5, HAZ-6, and FIRE-1 would reduce the impacts of the No Project Alternative related to hazards and hazardous materials.

  However, similar to the impacts of the Order, impacts of the No Project Alternative related to hazards and hazardous materials could be significant and unavoidable.

- **Hydrology and water quality:** Like the Order, the No Project Alternative could result in the release of pollutants into surface water and/or groundwater that could substantially degrade water quality, deplete groundwater supplies or interfere substantially with groundwater recharge, or contribute to runoff water (Impacts 3.11-1, 3.11-2, and 3.11-3). The No Project Alternative would have the

same impacts from construction and O&M activities as the Order. In addition, the Order's protection measures GCM-10, GCM-11, GCM-12, WQHM-1, WQHM-2, WQHM-3, WQHM-4, WQHM-5, WQHM-6, IWW-1, IWW-2, IWW-3, IWW-4, IWW-6, IWW-10, IWW-11, IWW-12, IWW-13, VHDR-2, VHDR-3, VHDR4, VHDR-6, VHDR-7, VHDR-8, VHDR-9, VHDR-10, VHDR-11, VHDR-12, and VHDR-13 would reduce impacts on hydrology and water quality.

Therefore, similar to the impacts of the Order, impacts of the No Project Alternative on hydrology and water quality could be less than significant.

- **Land use and planning:** Like the Order, the No Project Alternative could potentially conflict with existing land use plans, policies, and regulations and divide an established community (Impacts 3.12-1 and 3.12-2). The No Project Alternative would have the same construction and O&M activities as the Order.

  Therefore, similar to the impacts of the Order, impacts of the No Project Alternative related to land use and planning could be significant and unavoidable.

- **Mineral resources:** Like the Order, the No Project Alternative could result in the loss of availability of a known mineral resource or locally important mineral resource recovery site (Impacts 3.13-1 and 3.13-2). The No Project Alternative would have the same construction and O&M activities as the Order.

  Therefore, similar to the impacts of the Order, impacts of the No Project Alternative on mineral resources could be less than significant.

- **Noise:** As under the Order, sensitive receptors could be exposed to excessive noise and groundborne vibrations associated with construction-related and operational improvements under the No Project Alternative Order (Impacts 3.14-1, 3.14-2, and 3.14-3). In addition, as under the Order, construction of restoration projects under the No Project Alternative could be located in the vicinity of a private airstrip or an airport land use plan, or within 2 miles of a public airport or public use airport (Impact 3.14-4). The Order's general protection measures GCM-2, GCM-3, and IWW-9 and Mitigation Measures Noise-1, Noise-2, and Noise-3 would reduce the noise impacts of the No Project Alternative; however, as under the Order, noise impacts could remain significant and unavoidable.

  Therefore, similar to the impacts of the Order, noise impacts of the No Project Alternative could be significant and unavoidable.

- **Population and housing:** As under the Order, restoration projects undertaken under the No Project Alternative could displace housing and/or people; however, as under the Order, these impacts would be expected to be less than significant and there would be sufficient housing units to accommodate any displaced people.

  Therefore, similar to the impacts of the Order, impacts of the No Project Alternative related to population and housing could be less than significant.

- **Recreation:** With the No Project Alternative, recreational facilities and activities could be impaired, degraded, or eliminated. As under the Order, restoration projects undertaken under this alternative could place additional demands on recreation facilities by attracting more users or displacing people from existing recreation facilities, requiring construction of new facilities or the expansion of existing facilities. The Order's general protection measures GCM-6, GCM-7, GCM-10, GCM-11, GCM-12, GCM-13, GCM-14, GCM-15, WQHM-1, WQHM-2, WQHM-4, WQHM-5, WQHM-6, IWW-1, IWW-2, IWW-3, IWW-5, IWW-6, IWW-8, IWW-13, VHDR-1, VHDR-2, VHDR-3, VHDR-4, and VHDR-6 and Mitigation Measures Rec-1, Rec-2, and Noise-2 would reduce the impacts of the No Project Alternative on recreational resources; however, as under the Order, recreation impacts of the No Project Alternative could be less than significant.

- **Transportation:** As under the Order, restoration projects undertaken under the No Project Alternative could conflict with adopted plans and policies for roadway performance; bicycle and pedestrian paths and trails; rail and transit performance; and navigation, ports, waterways, and ferries. They also could increase traffic hazards as a result of road relocation, increase navigation hazards related to design features, and result in inadequate emergency access by blocking access or otherwise interfering with established emergency service routes (including boat access). The Order's general protection measures GCM-6, GCM-10, and WQHM-1 and Mitigation Measures TRA-1, TRA-2, TRA-3, TRA-4, TRA-5, TRA-6, TRA-7, and TRA-8 would reduce impacts of the No Project Alternative on transportation; however, as under the Order, impacts could remain significant and unavoidable.

  Therefore, similar to the impacts of the Order, impacts of the No Project Alternative related to transportation could be significant and unavoidable.

- **Utilities and service systems and public services:** Like the Order, the No Project Alternative is not anticipated to require the relocation of new water or expanded water facilities due to the extensive cost of relocation and potential environmental impacts from the relocation. However, future restoration projects could require the relocation of stormwater outfalls or utilities (e.g., electric power, natural gas, or telecommunication facilities) that would cause significant environmental effects. Like the Order, the No Project Alternative is not anticipated to change in water levels resulting from constructed facilities and would need to comply with relevant federal, state, and local regulations and ordinances and would not impede operations of existing diversion facilities or substantially change water supply availability to water users.

  In addition, like the Order, the No Project Alternative would not include the construction of new or modified fire or police protection facilities, schools, or other public facilities and would not increase population or add new public service demands.

Therefore, similar to the impacts of the Order, impacts of the No Project Alternative on utilities and service systems could be significant and unavoidable and impacts to public services could be less than significant.

- **Wildfire:** Like the Order, the No Project Alternative could exacerbate fire risk or result in downslope or downstream risks as a result of runoff, post-fire slope instability, or drainage changes. The Order's Mitigation Measure FIRE-1 would reduce the wildfire impacts of the No Project Alternative to less than significant.

  Therefore, similar to the impacts of the Order, wildfire impacts of the No Project Alternative could be less than significant.

Impacts Identified as More Severe than Impacts of the Order

No impacts of the No Project Alternative have been identified as being more severe than impacts of the Order.

Comparative Impact Analysis for Alternatives 1, 2, and 3

This section compares the impacts of Alternatives 1, 2, and 3 to the impacts of the Order.

Impacts Identified as the Same as or Similar to Impacts of the Proposed Project

Construction and O&M impacts of Alternatives 1, 2, and 3 in the study area would be similar to construction and O&M impacts of the Order because Alternatives 1, 2, and 3 include implementation of restoration projects. Under these alternatives, the impacts in each category could be of a lesser magnitude than the impacts under the Order (e.g., smaller restoration projects, different components within a type of restoration project, or implementation of fewer categories of restoration projects). However, the general types of construction and O&M activities would be similar to those under the Order. For example, less overall construction may occur under Alternative 1, 2, or 3, but the construction impact conclusions related to noise, air quality, etc., would be the same as under the Order (as described below).

- **Aesthetics:** Construction and O&M activities under Alternative 1, 2, or 3 could be of a lesser magnitude than under the Order. This would be the case because these alternatives would limit the size of or place other restrictions on restoration projects, eliminate certain elements of restoration projects, and/or exclude entire categories of restoration projects that would be permitted under the Order.

  However, Alternatives 1, 2, and 3 would still involve construction work for restoration projects, and O&M activities for these projects could change the character of the project vicinity relative to current conditions. Like the Order, Alternatives 1, 2, and 3 would include the presence of construction equipment and materials, vehicles, and crews along with the construction of natural or artificial infrastructure. The Order's general protection measures GCM-11, GCM-14, GCM-15, VHDR-1, VHDR-3, VHDR-4, and VHDR-5 and Mitigation Measures AES-1 and AES-2 would reduce the impacts of Alternatives 1, 2, and 3 on visual resources to less-than-significant levels.

  For these reasons, aesthetics impacts of Alternatives 1, 2, and 3 would be similar to those of the Order, and impacts would be less than significant.

- **Agriculture and forestry resources:** Construction and O&M activities for Alternative 1, 2, or 3 could be of a lesser magnitude than under the Order. This would be the case because these alternatives would limit the size of or place other restrictions on restoration projects, eliminate certain elements of restoration projects, and/or exclude entire categories of restoration projects that would be permitted under the Order.

  Restoration projects associated with Alternative 1, 2, or 3 could require the conversion of farmland or forestland to accommodate new project features, and could conflict with existing agricultural or forest zoning and Williamson Act contractions (Impacts 3.3-1, 3.3-2, and 3.3-3). However, while there could be less conversion of agricultural land and forestland to other uses in the project area due to the reduced scale of restoration projects compared to the Order, the potential for significant impacts still exist. The Order's general protection measures GCM-8, GCM-10, GCM-11, GCM-12, GCM-15, IWW-14, VHDR-1, VHDR-2, VHDR-3, VHDR-4, VHDR-5, and VHDR-6 and Mitigation Measures AG-1, AG-2, and GEO-6 would reduce some impacts on agriculture and forestry resources from Alternatives 1, 2, and 3.

  Therefore, similar to the Order, impacts of Alternatives 1, 2, and 3 on agriculture and forestry resources would be significant and unavoidable.

- **Air quality and GHG emissions:** Construction and O&M activities for Alternative 1, 2, or 3 could be of a lesser magnitude than under the Order. This would be the case because these alternatives would limit the size of or place other restrictions on restoration projects, eliminate certain elements of restoration projects, and/or exclude entire categories of restoration projects that would be permitted under the Order.

  However, like the Order, Alternative 1, 2, or 3 could conflict with adopted air quality plans, contribute to a cumulatively considerable net increase of criteria pollutants, and result in other emissions (e.g., those leading to odors) (Impacts 3.4-1, 3.4-2, and 3.4-3). Alternative 1, 2, or 3 could expose sensitive receptors to substantial pollutant concentrations and increase GHG emissions that could significantly affect the environment (Impacts 3.4-4 and 3.4-5).

  Similarly, like the Order, Alternative 1, 2, or 3 could conflict with applicable plans, policies, and regulations adopted for the purpose of reducing GHG emissions due to construction and O&M activities (Impact 3.4-6). However, it would be expected that there would be fewer short-term conflicts with applicable air quality plans during construction because there likely would be lower levels of construction emissions with less construction activity. However, the potential to result in temporary or long-term emissions of air pollutants and GHGs and cause significant adverse effects on air quality in the project area would still exist with Alternatives 1, 2, and 3.

  Like the Order, Alternative 1, 2, or 3 would include construction and O&M activities that would require the use of equipment that would contribute to pollutants. However, such activities would occur at a reduced scale because

these alternatives would limit restoration sizes and impose additional confinements on the types of restoration projects that would be permitted under the Order. The Order's general protection measures GCM-8 and GCM-17 and Mitigation Measures AIR-1, AIR-2, and AIR-3 would further reduce impacts of Alternatives 1, 2, and 3 on air quality and GHG emissions.

Therefore, impacts on air quality and GHG emissions would be less severe under Alternatives 1, 2, and 3 than under the Order; however, impacts could still be significant and unavoidable.

- **Terrestrial biological resources:** Construction and O&M activities for Alternative 1, 2, or 3 could be of a lesser magnitude than under the Order. This would be the case because these alternatives would limit the size of or place other restrictions on restoration projects, eliminate certain elements of restoration projects, and/or exclude entire categories of restoration projects that would be permitted under the Order.
  However, as under the Order, construction and O&M activities for individual restoration projects under Alternative 1, 2, or 3 could affect sensitive natural communities, special-status species, wildlife habitat, or movement of native resident and migratory wildlife species (Impacts 3.5-1, 3.5-2, 3.5-3, and 3.5-5). Restoration projects could also result in the removal, hydrological interruption, or other actions that adversely affect protected wetlands (Impact 3.5-4). They could also conflict with local policies, ordinances, or adopted habitat conservation plans or natural community conservation plans (Impacts 3.5-6 and 3.5-7). However, less construction activity would occur within the project area and these alternatives would be expected to reduce the likelihood of adverse impacts on special-status species and their habitats, sensitive natural communities, and wildlife migratory corridors in the short term.
  Furthermore, impacts of Alternatives 1, 2, and 3 on terrestrial biological resources would be reduced with incorporation and implementation of the following protection measures and mitigation measure from the Order:

  - General protection measures GCM-2, GCM-3, GCM-4, GCM-5, GCM-6, GCM-7, GCM-8, GCM-9, GCM-10, GCM-11, GCM-12, GCM-13, GCM-14, GCM-15, GCM-17, GCM-18, GCM-20, IWW-1, IWW-2, IWW-3, IWW-4, IWW-6, IWW-8, IWW-11, IWW-13, WQHM-1, WQHM-2, WQHM-3, WQHM-4, WQHM-5, WQHM-6, VHDR-1, VHDR-2, VHDR-3, VHDR-4, and VHDR-5.
  - General species protection measures SPM-1, SPM-2, SPM-3, SPM-4, SPM-5, and SPM-6.
  - Plant species protection measures PLANT-1, PLANT-2, PLANT-3, PLANT-4, PLANT-5, PLANT-6, and PLANT-7[2].
  - Amphibian species protection measures AMP-1, APM-2, AMP-3, AMP-4, AMP-5, AMP-6, AMP-7, AMP-8, AMP-9, AMP-10, AMP-11, and AMP-12.

[2] Staff Note: The PEIR listed Plant-7 in error. There is not a Plant-7 protection measure.

- Reptile species protection measures REP-1, REP-2, REP-3, REP-4, REP-5, REP-6, and REP-7.
- Bird species protection measures BIRD-1, BIRD-2, BIRD-3, BIRD-4, and BIRD-5.
- Mammal species protection measures MAM-1, MAM-2, MAM-3, MAM-4, and MAM-5.
- Invertebrate species protection measures INVERT-1, INVERT-2, INVERT-3, and INVERT-4.
- Mitigation Measure TERR-1.

Therefore, impacts on terrestrial biological resources could be of a lesser magnitude under Alternatives 1, 2, and 3 than under the Order; however, impacts could be significant and unavoidable.

- **Aquatic biological resources:** Construction and O&M activities for Alternative 1, 2, or 3 could be of a lesser magnitude than under the Order. This would be the case because these alternatives would limit the size of or place other restrictions on restoration projects, eliminate certain elements of restoration projects, and/or exclude entire categories of restoration projects that would be permitted under the Order.

  However, like the Order, Alternative 1, 2, or 3 could directly or indirectly affect special-status fish species or the movement of native resident or migratory fish (Impacts 3.6-1 and 3.6-2). Typically, long-term impacts associated with restoration projects are expected to be beneficial or neutral because the specific purpose of all project types would be to restore and enhance existing conditions. Furthermore, with Alternative 1, 2, or 3, fewer construction activities for restoration projects would occur because of the alternatives' limitation on project size, which would be expected to reduce the likelihood of adverse impacts on special-status fish and their habitat and migratory corridors. In addition, impacts on aquatic biological resources would be avoided and/or reduced with incorporation of the following protection measures from the Order:

  - General protection measures GCM-2, GCM-3, GCM-4, GCM-5, IWW-1, IWW-2, IWW-3, IWW-4, IWW-5, IWW-6, IWW-7, IWW-8, IWW-9, IWW-10, IWW-11, IWW-12, IWW-13, WQHM-1, WQHM-2, WQHM-3, WQHM-4, WQHM-5, WQHM-6, VHDR-1, VHDR-2, VHDR-3, VHDR-4, VHDR-5, VHDR-6, VHDR-7, VHDR-8, VHDR-9, VHDR-10, VHDR-11, VHDR-12, and VHDR-13.
  - Species protection measures SPM-1, SPM-3, FISH-1, FISH-2, FISH-3, FISH-4, and FISH-5.

  Therefore, impacts on aquatic biological resources could be of a lesser magnitude under Alternatives 1, 2, and 3 than under the Order, and impacts could be less than significant.

- **Cultural and tribal cultural resources:** Construction and O&M activities for Alternative 1, 2, or 3 could be of a lesser magnitude than under the Order. This would be the case because these alternatives would limit the size of or place other restrictions on restoration projects, eliminate certain elements of restoration projects, and/or exclude entire categories of restoration projects that would be permitted under the Order.

  However, as under the Order, restoration projects under Alternative 1, 2, or 3 could disturb or destroy prehistoric or historic archaeological resources; tribal cultural resources; historic buildings, structures, and linear features; unrecorded human remains; and paleontological resources. Construction projects also could result in the alteration or removal of character-defining features of a cultural landscape. However, construction and ground-disturbing activities would occur at a reduced scale because these alternatives would reduce project sizes and impose additional confinements on restoration projects. The Order's Mitigation Measures CUL-1, CUL-2, CUL-3, CUL-4, TCR-1, and TCR-2 would further reduce impacts on cultural and tribal cultural resources.

  Therefore, impacts on cultural and tribal cultural resources would be of a lesser magnitude under Alternatives 1, 2, and 3 than those of the Order; however, impacts could be significant and unavoidable.

- **Energy resources:** Construction and O&M activities for Alternative 1, 2, or 3 could be of a lesser magnitude than under the Order. This would be the case because these alternatives would limit the size of or place other restrictions on restoration projects, eliminate certain elements of restoration projects, and/or exclude entire categories of restoration projects that would be permitted under the Order.

  However, as under the Order, construction and O&M activities for Alternative 1, 2, or 3 could result in substantial inefficient, wasteful, or unnecessary long-term consumption of energy resources or conflict with a state or local plan for renewable energy or energy efficiency (Impacts 3.8-1 and 3.8-2). Like the Order, Alternative 1, 2, or 3 would not result in the inefficient, wasteful, or unnecessary long-term consumption of energy or changes to hydropower generation because local air pollution control or management districts require that construction activities for restoration projects improve equipment efficiency and reduce energy use. Routine O&M activities would require energy use; however, they would be consistent with current uses in the project area.

  In addition, Alternative 1, 2, or 3 would not conflict with applicable plans, policies, or regulations of local, county, and/or state energy standards that have been adopted for the purpose of improving energy efficiency or reducing consumption of fossil fuels. Multiple laws, regulations, and programs in California require or promote the efficient use of energy, many of which have the effect of promoting or requiring the efficient use of energy in the state and the expansion of renewable-energy generation and use. California's building codes (California Code of Regulations Title 24) also contain stringent energy efficiency standards, and the state has adopted a specific California Green Building Standards Code

that includes energy efficiency requirements and addresses renewable energy generation (e.g., rooftop photovoltaic solar panels).

Alternative 1, 2, or 3 could result in reduced impacts on energy resources because these alternatives would reduce project sizes and impose additional confinements on the types of restoration projects permitted.

Therefore, impacts on energy resources could occur at a lesser magnitude under Alternatives 1, 2, and 3 than under the Order; however, impacts would still be less than significant.

- **Geology and soils:** Construction and O&M activities for Alternative 1, 2, or 3 could be of a lesser magnitude than under the Order. This would be the case because these alternatives would limit the size of or place other restrictions on restoration projects, eliminate certain elements of restoration projects, and/or exclude entire categories of restoration projects that would be permitted under the Order.

  However, like the Order, Alternative 1, 2, or 3 could include the construction of surface storage infrastructure and flood management projects that could expose people or structures to seismic hazards, including fault rupture and strong ground motion (Impact 3.9-1). Alternative 1, 2, or 3 may expose people or structures to unstable geological conditions; result in a loss of topsoil associated with ground disturbance, with resulting erosion and sedimentation impacts; and result in a loss of a unique paleontological or geological resource (Impacts 3.9-2, 3.9-3, 3.9-4, and 3.9-5). However, Alternative 1, 2, or 3 would involve less construction activity in the project area than the Order and would result in fewer short-term impacts on geology and soils because fewer ground disturbance activities would occur. In addition, the Order's general protection measures GCM-15, WQHM-1, WQHM-2, WQHM-3, WQHM-4, VHDR-1, VHDR-3, and VHDR-4 and Mitigation Measures GEO-1, GEO-2, GEO-3, GEO-4, GEO-5, GEO-6, GEO-7, GEO-8, GEO-9, and GEO-10 would further reduce the impacts of Alternatives 1, 2, and 3 on geology and soils.

  Therefore, impacts on geology and soils could occur at a lesser magnitude under Alternatives 1, 2, and 3 than under the Order; however, impacts could still be significant and unavoidable.

- **Hazards and hazardous materials:** Construction and O&M activities for Alternative 1, 2, or 3 could be of a lesser magnitude than under the Order. Like the Order, Alternative 1, 2, or 3 could result in exposure of the environment and sensitive receptors to unidentified contaminated soil and/or groundwater, and some of the impacts could occur within one-quarter mile of a school or within 2 miles of an airport (Impacts 3.10-1, 3.10-2, and 3.10-3). Restoration projects under Alternative 1, 2, or 3 could also interfere with emergency response access or adopted emergency response or evacuation plans (Impact 3.10-4). They could also expose people or structures to wildland fires or vector habitats (Impacts 3.10-5 and 3.10-6).

The Order's general protection measures GCM-6, GCM-7, GCM-10, GCM-11, GCM-12, GCM-14, WQHM-1, WQHM-2, WQHM-4, WQHM-5, WQHM-6, IWW-1, IWW-2, IWW-3, IWW-6, IWW-13, and VHDR-6 and Mitigation Measures HAZ-1, HAZ-2, HAZ-3, HAZ-4, HAZ-5, HAZ-6, and FIRE-1 would further reduce impacts of Alternatives 1, 2, and 3 related to hazards and hazardous materials.

Therefore, impacts of Alternatives 1, 2, and 3 related to hazards and hazardous materials would be similar to those of the Order, but would occur at a lesser magnitude; however, impacts could still be significant and unavoidable.

- **Hydrology and water quality:** Construction and O&M activities for Alternative 1, 2, or 3 could be of a lesser magnitude than under the Order. This would be the case because these alternatives would limit the size of or place other restrictions on restoration projects, eliminate certain elements of restoration projects, and/or exclude entire categories of restoration projects that would be permitted under the Order.

  However, like the Order, Alternative 1, 2, or 3 could result in the release of pollutants into surface water and/or groundwater that could substantially degrade water quality, deplete groundwater supplies or interfere substantially with groundwater recharge, or contribute to runoff water (Impacts 3.11-1, 3.11-2, and 3.11-3). The Order's protection measures GCM-10, GCM-11, GCM-12, WQHM-1, WQHM-2, WQHM-3, WQHM-4, WQHM-5, WQHM-6, IWW-1, IWW-2, IWW-3, IWW-4, IWW-6, IWW-10, IWW-11, IWW-12, IWW-13, VHDR-2, VHDR-3, VHDR-4, VHDR-6, VHDR-7, VHDR-8, VHDR-9, VHDR-10, VHDR-11, VHDR-12, and VHDR-13 would reduce impacts on hydrology and water quality. Alternatives 1, 2, and 3 would have the same impacts on construction and O&M activities as the Order.

  Therefore, like the impacts of the Order, hydrology and water quality impacts of Alternatives 1, 2, and 3 could be less than significant.

- **Land use and planning:** Construction and O&M activities for Alternative 1, 2, or 3 could be of a lesser magnitude than under the Order. This would be the case because these alternatives would limit the size of or place other restrictions on restoration projects, eliminate certain elements of restoration projects, and/or exclude entire categories of restoration projects that would be permitted under the Order.

  However, Alternative 1, 2, or 3 could potentially conflict with existing land use plans, policies, and regulations and divide an established community (Impacts 3.12-1 and 3.12-2). Alternatives 1, 2, and 3 would have the same construction and O&M activities as the Order.

  Therefore, like the impacts of the Order, land use and planning impacts of Alternatives 1, 2, and 3 could be significant and unavoidable.

- **Mineral resources:** Construction and O&M activities for Alternative 1, 2, or 3 could be of a lesser magnitude than under the Order. This would be the case because these alternatives would limit the size of or place other restrictions on

restoration projects, eliminate certain elements of restoration projects, and/or exclude entire categories of restoration projects that would be permitted under the Order.

However, like the Order, Alternatives 1, 2, and 3 could result in the loss of availability of a known mineral resource or locally important mineral resource recovery site (Impacts 3.13-1 and 3.13-2). Alternatives 1, 2, and 3 would have the same construction and O&M activities as the Order.

Therefore, impacts of Alternatives 1, 2, and 3 on mineral resources would be similar to those of the Order, and impacts could be less than significant.

- **Noise:** Construction and O&M activities for Alternative 1, 2, or 3 could be of a lesser magnitude than under the Order. This would be the case because these alternatives would limit the size of or place other restrictions on restoration projects, eliminate certain elements of restoration projects, and/or exclude entire categories of restoration projects that would be permitted under the Order.

  However, as under the Order, sensitive receptors could be exposed to excessive noise and groundborne vibrations associated with construction and operation under Alternative 1, 2, or 3 (Impacts 3.14-1, 3.14-2, and 3.14-3). In addition, as under the Order, construction of restoration projects under Alternative 1, 2, or 3 could be located in the vicinity of a private airstrip or an airport land use plan, or within 2 miles of a public airport or public use airport (Impact 3.14-4).

  The Order's general protection measures GCM-2, GCM-3, and IWW-9 and Mitigation Measures Noise-1, Noise-2 and Noise-3 would further reduce the noise impacts of Alternatives 1, 2, or 3; however, as under the Order, noise impacts could remain significant and unavoidable.

  Therefore, similar to the impacts of the Order, noise impacts of Alternatives 1, 2, and 3 could be significant and unavoidable.

- **Population and housing:** As under the Order, restoration projects associated with Alternative 1, 2, or 3 could displace housing and/or people; however, as under the Order, these impacts are expected to be less than significant, and there would be sufficient housing units to accommodate any displaced people.

  Therefore, similar to the impacts of the Order, impacts of Alternatives 1, 2, and 3 related to population and housing could be less than significant.

- **Recreation:** With Alternative 1, 2, or 3, recreational facilities and activities could be impaired, degraded, or eliminated. As under the Order, restoration projects undertaken under these alternatives could place additional demands on recreation facilities by attracting more users or displacing people from existing recreation facilities, requiring construction of new facilities or expansion of existing facilities. The Order's general protection measures GCM-6, GCM-7, GCM-10, GCM-11, GCM-12, GCM-13, GCM-14, GCM-15, WQHM-1, WQHM-2, WQHM-4, WQHM-5, WQHM-6, IWW-1, IWW-2, IWW-3, IWW-5, IWW-6, IWW-8, IWW-13, VHDR-1, VHDR-2, VHDR-3, VHDR-4, and VHDR-6 and Mitigation

Measures Rec-1, Rec-2, and Noise-2 would further reduce impacts of Alternatives 1, 2, and 3 on recreational resources; however, as under the Order, impacts could remain significant and unavoidable.

Therefore, similar to the impacts of the Order, recreation impacts of Alternatives 1, 2, and 3 could be less than significant.

- **Transportation:** As under the Order, restoration projects undertaken under Alternatives 1, 2, or 3 could conflict with adopted plans and policies for roadway performance; bicycle and pedestrian paths and trails; rail and transit performance; and navigation, ports, waterways, and ferries. They also could increase traffic hazards as a result of road relocation, increase navigation hazards related to design features, and result in inadequate emergency access by blocking access or otherwise interfering with established emergency service routes (including boat access). The Order's general protection measures GCM-6, GCM-10, and WQHM-1 and Mitigation Measures TRA-1, TRA-2, TRA-3, TRA-4, TRA-5, TRA-6, TRA-7, and TRA-8 would further reduce impacts of Alternatives 1, 2, and 3 on transportation; however, as under the Order, impacts could remain significant and unavoidable.

  Therefore, similar to the impacts of the Order, impacts of Alternatives 1, 2 and 3 related to transportation could be significant and unavoidable.

- **Utilities and service systems and public services:** Like the Order, Alternative 1, 2, or 3 is not anticipated to require the relocation of new water or expanded water facilities due to the extensive cost of relocation and potential environmental impacts from the relocation. However, future restoration projects could require the relocation of stormwater outfalls or utilities (e.g., electric power, natural gas, or telecommunication facilities) that would cause significant environmental effects. In addition, like the proposed project, Alternative 1, 2, or 3 would not include the construction of new or modified fire or police protection facilities, schools, or other public facilities and would not increase population or add new public service demands. Like the Order, Alternative 1, 2 or 3 is not anticipated to change in water levels resulting from constructed facilities and would need to comply with relevant federal, state, and local regulations and ordinances and would not impede operations of existing diversion facilities or substantially change water supply availability to water users.

  Therefore, similar to the impacts of the Order, impacts of Alternatives 1, 2, and 3 on utilities and service systems could be significant and unavoidable and impacts to public services could be less than significant.

- **Wildfire:** Like the Order, Alternatives 1, 2, or 3 could exacerbate fire risk or result in downslope or downstream risks as a result of runoff, post-fire slope instability, or drainage changes. The Order's Mitigation Measure FIRE-1 would reduce the wildfire impacts of Alternatives 1, 2, and 3 to less-than-significant levels.

  Therefore, similar to the impacts of the Order, wildfire impacts of Alternatives 1, 2, and 3 could be less than significant.

Impacts Identified as More Severe than Impacts of the Order

No impacts of Alternative 1, 2, or 3 have been identified as being more severe than impacts of the Order.

6.5 Environmentally Superior Alternative

CEQA requires identification of the environmentally superior alternative—that is, the alternative that has the least significant impacts on the environment. State CEQA Guidelines Section 15126.6(e)(2) states: “If the environmentally superior alternative is the ‘no project’ alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives.”

Table 6-1 presents a comparison of impacts by resource issue area, after mitigation, for the Order and alternatives when compared to the Order. In Table 6-1, the most conservative environmental impact was used for the entire resource area section.

As shown in Table 6-1, and as discussed in the alternatives analysis above, Alternatives 1, 2, and 3 would result in similar impacts compared to the proposed project, but potentially at a lesser magnitude. Alternative 3 excludes entire categories of restoration projects, which, depending on the excluded restoration category, could result in less construction activity than under the other alternatives. Therefore, Alternative 3 would be the environmentally superior alternative.

However, as described above, Alternative 3 would not fully achieve most of the project objectives. All project types included in the Order are essential for ecological and environmental improvements, and removing them from Order eligibility would cause delays in environmentally beneficial restoration projects, thus slowing down project implementation and associated contributions to species recovery and water quality improvement.

Implementation of appropriate general protection measures, species protection measures, and mitigation measures would minimize the potential for significant impacts of Alternative 3. However, as with the Order, the exact location and extent of projects that would be permitted under Alternative 3 are not known at this time. Therefore, construction-related impacts would still be considered significant and unavoidable.

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.2 Aesthetics	**3.2-1:** Implementing future restoration projects permitted under the Order could result in substantial degradation of visual qualities.	LTS	Similar	Similar *	Similar *	Similar *
	3.2-2: Implementing future restoration projects permitted under the Order could result in substantial adverse effects on scenic vistas and scenic resources.	LTSM	Similar	Similar *	Similar *	Similar *
	3.2-3: Implementing future restoration projects permitted under the Order could result in new sources of substantial light or glare.	LTSM	Similar	Similar *	Similar *	Similar *
3.3 Agriculture and Forestry Resources	**3.3-1**: Restoration projects permitted under the Order could convert Special Designation Farmland to nonagricultural use or conflict with a Williamson Act contract or zoning for agricultural use.	SU	Similar	Similar *	Similar *	Similar *

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.3 Agriculture and Forestry Resources (cont.)	**3.3-2:** Restoration projects permitted under the Order could conflict with existing zoning for forestland, timberland, or timberland zoned Timberland Production, or could result in the loss of forestland from conversion of land to non-forest use.	LTS	Similar	Similar *	Similar *	Similar *
	3.3-3: Restoration projects permitted under the Order could involve other changes in the existing environment that, because of their location or nature, could indirectly result in the conversion of Special Designation Farmland to nonagricultural use or conversion of forestland to non-forest use.	LTSG	Similar	Similar *	Similar *	Similar *
3.4 Air Quality and Greenhouse Gases	**3.4-1:** Implementing future restoration projects permitted under the Order could conflict with an applicable air quality plan.	SU	Similar	Similar *	Similar *	Similar *

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.4 Air Quality and Greenhouse Gases (cont.)	**3.4-2:** Emissions from future restoration projects permitted under the Order could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.	SU	Similar	Similar *	Similar *	Similar *
	3.4-3: Emissions from future restoration projects permitted under the Order could result in other emissions (such as those leading to odors) that would adversely affect a substantial number of people.	LTS	Similar	Similar *	Similar *	Similar *
	3.4-4: Emissions from future restoration projects permitted under the Order could expose sensitive receptors to substantial pollutant concentrations.	SU	Similar	Similar *	Similar *	Similar *
	3.4-5: Implementing future restoration projects permitted under the Order could result in an increase in GHG emissions that may have a significant impact on the environment.	SU	Similar	Similar *	Similar *	Similar *

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.4 Air Quality and Greenhouse Gases (cont.)	**3.4-6:** Implementing future restoration projects permitted under the Order could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.	SU	Similar	Similar *	Similar *	Similar *
3.5 Biological Resources—Terrestrial	**3.5-1:** Implementing restoration projects permitted under the Order could adversely affect habitat for special-status plant species.	SU	Similar	Similar *	Similar *	Similar *
	3.5-2: Implementing restoration projects permitted under the Order could result in adverse direct effects on special-status wildlife species.	SU	Similar	Similar *	Similar *	Similar *
	3.5-3: Implementing restoration projects permitted under the Order could result in adverse effects on riparian habitat or sensitive natural communities.	SU	Similar	Similar *	Similar *	Similar *

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.5 Biological Resources—Terrestrial (cont.)	**3.5-4:** Implementing restoration projects permitted under the Order could result in adverse effects on state and federally protected wetlands through direct removal, hydrological interruption, or other means.	LTSG	Similar	Similar *	Similar *	Similar *
	3.5-5: Implementing restoration projects permitted under the Order could interfere with the movement of native resident and migratory wildlife species.	LTSG	Similar	Similar *	Similar *	Similar *
	3.5-6: Implementing restoration projects permitted under the Order could conflict with local policies or ordinances protecting biological resources.	LTSM	Similar	Similar *	Similar *	Similar *
	3.5-7: Implementing restoration projects permitted under the Order could conflict with the provisions of an adopted habitat conservation plan or natural community conservation plan.	LSM	Similar	Similar *	Similar *	Similar *

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.6 Biological Resources—Aquatic	**3.6-1:** Implementing future restoration projects permitted under the Order could result in substantial adverse effects to special-status fish species directly, or indirectly through habitat modifications.	SU	Similar	Similar *	Similar *	Similar *
	3.6-2: Implementing future restoration projects permitted under the Order could result in substantial adverse direct effects on the movement of native resident or migratory fish.	LTS	Similar	Similar *	Similar *	Similar *
3.7 Cultural Resources	**3.7-1:** Implementing future restoration projects permitted under the Order could cause a substantial adverse change in the significance of a historical resource pursuant to State CEQA Guidelines Section 15064.5.	SU	Similar	Similar *	Similar *	Similar *
	3.7-2: Implementing future restoration projects permitted under the Order could cause a substantial adverse change in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5.	SU	Similar	Similar *	Similar *	Similar *

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.6 Cultural Resources (cont.)	**3.7-3**: Implementing future restoration projects permitted under the Order could disturb any human remains, including those interred outside of dedicated cemeteries.	SU	Similar	Similar *	Similar *	Similar *
3.8 Energy Resources	**3.8-1:** Implementing restoration projects permitted under the Order could result in substantial inefficient, wasteful, or unnecessary long-term consumption of energy resources or changes to hydropower generation.	LTS	Similar	Similar *	Similar *	Similar *
	3.8-2: Implementing restoration projects permitted under the Order could conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	LTS	Similar	Similar *	Similar *	Similar *
3.9 Geology and Soils	**3.9-1:** Implementing future restoration projects permitted under the Order could cause direct or indirect adverse effects on people or structures related to risk of loss, injury, or death due to a fault rupture.	LTSM	Similar	Similar *	Similar *	Similar *

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.9 Geology and Soils (cont.)	**3.9-2:** Implementing future restoration projects permitted under the Order could directly or indirectly result in adverse effects on people or structures related to risk of loss, injury, or death due to strong seismic ground shaking.	LTSM	Similar	Similar *	Similar *	Similar *
	3.9-3: Implementing future restoration projects permitted under the Order could directly or indirectly cause adverse effects on people or structures from unstable soil conditions.	LTSM	Similar	Similar *	Similar *	Similar *
	3.9-4: Implementing future restoration projects permitted under the Order could result in substantial soil erosion or loss of topsoil.	LTSG	Similar	Similar *	Similar *	Similar *
	3.9-5: Implementing future restoration projects permitted under the Order could directly or indirectly result in the loss of a unique paleontological resource or geological resource.	SU	Similar	Similar *	Similar *	Similar *

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.10 Hazards and Hazardous Materials	**3.10-1:** Implementing future restoration projects permitted under the Order could involve the routine transport, use, or disposal of hazardous materials that, if accidentally released, could create a hazard to the public or the environment, or that could be located within one-quarter mile of a school.	LTSG	Similar	Similar *	Similar *	Similar *
	3.10-2: Ground-disturbing activities for construction of future restoration projects permitted under the Order could encounter previously unidentified contaminated soil and/or groundwater, potentially exposing construction workers, the public, and the environment to risks associated with hazardous materials.	LTSM	Similar	Similar *	Similar *	Similar *
	3.10-3: Future restoration projects permitted under the Order could be implemented within 2 miles of an airport, resulting in a safety hazard.	SU	Similar	Similar *	Similar *	Similar *

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.10 Hazards and Hazardous Materials (cont.)	**3.10-4:** Implementing future restoration projects permitted under the Order could interfere with emergency response access or with an adopted emergency response or evacuation plan.	LTSM	Similar	Similar *	Similar *	Similar *
	3.10-5: Implementing future restoration projects permitted under the Order could expose people or structures, either directly or indirectly, to a significant loss, injury, or death due to wildland fires.	LTSM	Similar	Similar *	Similar *	Similar *
	3.10-6: Implementing future restoration projects permitted under the Order could create vector habitat that would pose a significant public health hazard.	LTSM	Similar	Similar *	Similar *	Similar *

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.11 Hydrology and Water Quality	**3.11-1:** Implementing restoration projects permitted under the Order could result in the release of pollutants into surface water and/or groundwater that could violate water quality standards or waste discharge requirements, substantially degrade water quality, or obstruct implementation of a water quality control plan.	LTSG	Similar	Similar *	Similar *	Similar *
	3.11-2: Implementing restoration projects permitted under the Order could substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that a project may impede sustainable groundwater management of the basin or obstruct implementation of a sustainable groundwater management plan.	LTS	Similar	Similar *	Similar *	Similar *

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.11 Hydrology and Water Quality (cont.)	**3.11-3:** Implementing restoration projects permitted under the Order could substantially alter the existing drainage pattern of a site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces in a manner that could substantially increase the rate of runoff; create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems; or impede or redirect flood flows.	LTS	Similar	Similar *	Similar *	Similar *
3.12 Land Use and Planning	**3.12-1:** Restoration projects permitted under the Order could conflict with a land use plan, policy, or regulation adopted to avoid or mitigate an environmental effect.	SU	Similar	Similar *	Similar *	Similar *
	3.12-2: Implementing restoration projects permitted under the Order could physically divide an established community.	SU	Similar	Similar *	Similar *	Similar *

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.13 Mineral Resources	**3.13-1:** Implementing restoration projects permitted under the Order could result in the loss of availability of a known mineral resource.	LTSM	Similar	Similar *	Similar *	Similar *
	3.13-2: Implementing restoration projects permitted under the Order could result in the loss of availability of a locally important mineral resource recovery site.	LTSM	Similar	Similar *	Similar *	Similar *
3.14 Noise	**3.14-1:** Implementing future restoration projects permitted under the Order could result in a temporary or permanent increase in ambient noise levels in excess of standards established in applicable plans and ordinances.	SU	Similar	Similar *	Similar *	Similar *
	3.14-2: Implementing future restoration projects permitted under the Order could expose sensitive receptors to excessive groundborne vibration.	SU	Similar	Similar *	Similar *	Similar *
	3.14-3: Implementing future restoration projects permitted under the Order could expose sensitive receptors to excessive groundborne noise levels.	SU	Similar	Similar *	Similar *	Similar *

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.14 Noise (cont.)	**3.14-4:** Implementing future restoration projects permitted under the Order that are located within the vicinity of a private airstrip, an airport land use plan, or where such a plan has not been adopted, within 2 miles of a public airport or public use airport, could expose people residing or working in the project area to excessive noise levels.	LTSM	Similar	Similar *	Similar *	Similar *
3.15 Population and Housing	**3.15-1:** Implementing restoration projects permitted under the Order could require relocation by construction and operation crews, resulting in population growth and demand for housing.	LTS	Similar	Similar *	Similar *	Similar *
	3.15-2: Implementing restoration projects permitted under the Order may displace substantial numbers of people or housing, necessitating the construction of replacement housing elsewhere.	LTS	Similar	Similar *	Similar *	Similar *

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.16 Recreation	**3.16-1:** Implementing future restoration projects permitted under the Order could directly impair, degrade, or eliminate recreational resources, facilities, and opportunities.	LTSM	Similar	Similar *	Similar *	Similar *
	3.16-2: Future restoration projects permitted under the Order could alter recreational resources or facilities or require the construction or expansion of recreational facilities that could result in environmental impacts.	LTSM	Similar	Similar *	Similar *	Similar *
	3.16-3: Implementing future restoration projects permitted under the Order could increase the use of existing recreational resources and facilities such that substantial physical deterioration would occur or be accelerated.	LTSM	Similar	Similar *	Similar *	Similar *
3.17 Transportation	**3.17-1:** Future restoration projects permitted under the Order could conflict with a plan, ordinance, or policy addressing the circulation system including transit, roadways, bicycle, and pedestrian facilities.	LTSM	Similar	Similar *	Similar *	Similar *

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.17 Transportation (cont.)	**3.17-2:** Future restoration projects permitted under the Order could conflict with or be inconsistent with State CEQA Guidelines Section 15064.3(b).	SU	Similar	Similar *	Similar *	Similar *
	3.17-3: Implementing future restoration projects permitted under the Order could substantially increase hazards due to a geometric design feature or incompatible uses.	LTSM	Similar	Similar *	Similar *	Similar *
3.18 Tribal Cultural Resources	**3.18-1:** Implementing future restoration projects permitted under the Order could cause a substantial adverse change in the significance of a tribal cultural resource, as defined in PRC Section 21074.	SU	Similar	Similar *	Similar *	Similar *
3.19 Utilities and Service Systems and Public Services	**3.19-1:** Implementing future restoration projects permitted under the Order could result in insufficient water supplies available to serve the project during normal, dry, and multiple dry years.	SU	Similar	Similar *	Similar *	Similar *

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

Resource Topic		Order	No Project Alternative	Alternative 1—Specify More Narrowly Types of Restoration Projects	Alternative 2—Eliminate Certain Aspects of Restoration Projects	Alternative 3—Exclude Entire Categories of Restoration Projects
3.19 Utilities and Service Systems and Public Services (cont.)	**3.19-2:** Future restoration projects permitted under the Order could be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs and could fail to comply with federal, state, and local statutes and regulations related to solid waste.	LTS	Similar	Similar *	Similar *	Similar *
	3.19-3: Implementing future restoration projects permitted under the Order could result in substantial adverse physical impacts associated with construction of new or modified fire protection, police protection, schools, and other public facilities.	LTS	Similar	Similar *	Similar *	Similar *
3.20 Wildfire	**3.20-1:** Implementing restoration projects permitted under the Order could exacerbate fire risk.	LTSM	Similar	Similar *	Similar *	Similar *
	3.20-2: Implementing restoration projects permitted under the Order could result in downslope or downstream risks as a result of runoff, post-fire slope instability, or drainage changes.	LTSM	Similar	Similar *	Similar *	Similar *

SOURCE: Data compiled by Environmental Science Associates in 2020.

Table 6-1
Summary Comparison of the Environmental Impacts of the Alternatives to the Impacts of the Order

* The impact related to the alternative could be at a lesser magnitude than the impact of the Order; however, it is assumed the final impact conclusion (e.g., LTSM, SU) will be the similar to the conclusion for the Order. For example, there may be less overall construction related to the alternative, but the construction impacts related to noise, air quality, etc., could result in the same final impact conclusion as for the Order.

NOTES: LTS—Less than significant; LTSG—Less than significant after application of general protection measure(s); LTSM—Less than significant after application of feasible mitigation measure(s).

Chapter 7 Contributors and Reviewers

State Water Resources Control Board

Division of Water Quality

Jessica Nadolski – Senior Environmental Scientist (point of contact)

Sustainable Conservation

Erika Lovejoy, Director - Accelerating Restoration

Katie Haldeman, Senior Project Manager - Accelerating Restoration

Stephanie Falzone, Project Manager - Accelerating Restoration

Consultant: Environmental Science Associates (ESA)

Chris Fitzer, Vice President, Project Manager

Meredith Parkin, Principal Associate, CEQA Lead

Jill Sunahara, Permitting Program Manager, Order Lead

May Lau, Program Manager, Order Support

Michael Newland, Director, Cultural Resources and Tribal Cultural Resources

Robin Hoffman, Senior Managing Associate, Cultural Resources and Tribal Cultural Resources

Paul Bergman, Managing Associate, Biological Resources - Aquatic

Daniel Huang, Senior Associate II, Biological Resources - Terrestrial

Todd Gordon, Senior Associate I, Various resource areas

Raiyna Villasenor, Associate I, Various resource areas

Kristine Olsen, Senior Admin, Publications

Frank (Eryn) Pimentel, Senior Associate I, GIS

Julie Nichols, Senior Associate II, Editing

James Songco, Senior Graphic Designer, Graphics

Chapter 8 References

Executive Summary

U.S. Department of Agriculture (USDA). 2019. National Agricultural Statistics Service, Land Vales 2019 Summary. August 2019.

U.S. Fish and Wildlife Service (USFWS). 2013. California: A hot spot for Rare Species. Accessed on March 6, 2020. Available: https://www.fws.gov/endangered/map/ESA_success_stories/CA/CA_story2/index.html.

Chapter 1, *Introduction*

No references cited in this section.

Chapter 2, *Background and Description of the General Order*

California Natural Resources Agency (CNRA). 2018. *Safeguarding California Plan: California's Climate Adaptation Strategy*. January 2018.

California State Coastal Conservancy (SCC). 2011. Climate Change Policy. Adopted June 4, 2009; revised November 10, 2011. Available: https://scc.ca.gov/climate-change/climate-change-policy/. Accessed December 20, 2019.

Cramer 2012. Stream Habitat Restoration Guidelines. Co-Published by the Washington Departments of Fish and Wildlife, Natural Resources, Transportation and Ecology, Washington State Conservation and Recreation Office, Puget Sound Partnership, and the US Fish and Wildlife Service, Olympia, WA.

Flosi, G., S. Downie, J. Hopelain, M. Bird, R. Coey, and B. Collins. (Flosi et al.) 2010. *California Salmonid Stream Habitat Restoration Manual*, Fourth Edition. Volumes I and II. California Department of Fish and Game, Wildlife and Fisheries Division. July 2010.

Myers, N., R. A. Mittermeier, C. G. Mittermeier, G. A. B. da Fonseca, and J. Kent. (Myers et al.) 2000. Biodiversity Hotspots for Conservation Priorities. *Nature* 403:853–858. February 24, 2000.

National Marine Fisheries Service (NMFS). 1997. *NMFS Fish Screening Criteria for Anadromous Salmonids.* Southwest Region. January 1997.

———. 2001. *Guidelines for Salmonid Passage at Stream Crossings*. NMFS Southwest Region. Available: https://archive.fisheries.noaa.gov/wcr/publications/hydropower/fish_passage_at_stream_crossings_guidance.pdf.

———. 2011. *Anadromous Salmonid Passage Facility Design.* Northwest Region, Portland, OR. July 2011.

———. 2012. *Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery and Management Act Essential Fish Habitat*

Consultation for Program to fund, permit (or both), restoration projects within the NOAA Restoration Center's Northern California Office jurisdictional area. Prepared by, NMFS, Southwest Region.

———. 2015. *Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery and Management Act Essential Fish Habitat Consultation for Programmatic Consultation on funding and permitting restoration projects within watersheds of San Luis Obispo, Santa Barbara, Ventura, Orange, and San Diego counties, California*. Prepared by, NMFS, Southwest Region.

———. 2016. *Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery and Management Act Essential Fish Habitat Consultation for Program to fund, permit (or both), restoration projects within the NOAA Restoration Center's Central Coastal California Office jurisdictional area*. Prepared by, NMFS, Southwest Region.

———. 2018. *Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response and Fish and Wildlife Coordination Act Recommendations for the NOAA Restoration Center's Program to Facilitate Implementation of Restoration Projects in the Central Valley of California*. Prepared by, NMFS, Southwest Region.

National Oceanic and Atmospheric Administration (NOAA). 2008. *Screening Quick Reference Table Guidelines*. Washington, D.C.

Skidmore, P., Thorne, C.R, Cluer, B.L., Pess, G.R., Castro, J.M., Beechie, T., Chea, C. 2011. Science Base and Tools for Evaluating Stream Engineering, Management, and Restoration Proposals Science Base and Tools for Evaluating Stream Engineering, Management, and Restoration Proposals. October 2011.

U.S. Fish and Wildlife Service (USFWS). 2013. California: A hot spot for Rare Species. Accessed on March 6, 2020. Available: https://www.fws.gov/endangered/map/ESA_success_stories/CA/CA_story2/index.html.

Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*

Section 3.1, Approach to the Environmental Analysis

No references cited in this section.

Section 3.2, Aesthetics

National Wild and Scenic Rivers System. 2020. About the WSR Act. Available: https://www.rivers.gov/wsr-act.php. Accessed January 7, 2020.

U.S. Bureau of Land Management (BLM). 2008. *Sierra Resource Management Plan and Record of Decision*. February 2008. Available: https://eplanning.blm.gov/epl-front-office/projects/lup/72554/96713/116819/Sierra_ROD_12172007.pdf. Accessed April 2017.

U.S. Forest Service (USFS). 1974. *National Forest Landscape Management*. Volume 2, Chapter 1: The Visual Management System. Agriculture Handbook Number 462.

Section 3.3, Agriculture and Forestry Resources

California Department of Conservation (DOC). 2015. *California Farmland Conversion Report 2010–2012.* Available: http://www.conservation.ca.gov/dlrp/fmmp/Pages/FMMP_2010-2012_FCR.aspx. Accessed January 14, 2020.

———. 2016. *The California Land Conservation Act of 1965, 2016 Status Report.* December 2016.

———. 2018. *Important Farmland in California, 2016*. October 2018.

California Department of Food and Agriculture (CDFA). No date. *California Agricultural Statistics Review 2017–2018.* Available: https://www.cdfa.ca.gov/statistics/PDFs/2017-18AgReport.pdf. Accessed January 8, 2020.

California Department of Forestry and Fire Protection (CAL FIRE). 2010. *California's Forests and Rangelands: 2010 Assessment*.

Congressional Research Service (CRS). 2020. *Federal Land Ownership: Overview and Data.* Available: https://fas.org/sgp/crs/misc/R42346.pdf/. Accessed November 10, 2020.

Public Policy Institute of California (PPIC). 2019a. *Water and the Future of the San Joaquin Valley—Overview*. February 2019.

———. 2019b. *Water and the Future of the San Joaquin Valley*. February 2019.

U.S. Bureau of Reclamation and U.S. Fish and Wildlife Service (Reclamation and USFWS). 2014. *Central Valley Project Improvement Act, Public Law 102-575, Annual Report, Fiscal Year 2013.* January 2014.

U.S. Department of Agriculture (USDA). 2016. *California's Forest Resources: Forest Inventory and Analysis, 2001–2010.* February 2016.

———. 2019. National Agricultural Statistics Service, Land Vales 2019 Summary. August 2019.

U.S. Natural Resources Conservation Service (NRCS). 2017a. Farmland Protection Program. Available: https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/landuse/fppa/. Accessed April 13, 2017.

———. 2017b. Land Evaluation and Site Assessment. Available: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/?cid=nrcs143_008438. Accessed April 13, 2017.

Section 3.4, Air Quality and Greenhouse Gas Emissions

Bay Area Air Quality Management District (BAAQMD). 2010. *California Environmental Quality Act Air Quality Guidelines.* San Francisco, CA. May 2010.

https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/draft_baaqmd_ceqa_guidelines_may_2010_final.pdf.

———. 2011. *California Environmental Quality Act Air Quality Guidelines.* San Francisco, CA. Updated May 2011. Page 8-6.

———. 2017. *California Environmental Quality Act Air Quality Guidelines*. San Francisco, CA. May 2017.

California Air Pollution Control Officers Association (CAPCOA). 2010. *Quantifying Greenhouse Gas Mitigation Measures. A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures.* Sacramento, CA. August 2010. Pages 210–232.

California Air Resources Board (CARB). 2000. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*. Stationary Source Division and Mobile Source Control Division. October 2000.

———. 2008. *Climate Change Scoping Plan: A Framework for Change*. December 2008.

———. 2009. CARB Fact Sheet: Air Pollution Sources, Effects and Control. Available: http://www.arb.ca.gov/research/health/fs/fs2/fs2.htm. Last updated December 2, 2009. Accessed January 27, 2020.

———. 2014. *First Update to the Climate Change Scoping Plan: Building on the Framework*. May 2014.

———. 2016. Ambient Air Quality Standards. Available: https://www.arb.ca.gov/research/aaqs/aaqs2.pdf. Last updated May 4, 2016. Accessed January 27, 2020.

———. 2017. *California's 2017 Climate Change Scoping Plan*. November 2017.

———. 2018. *Ambient Air Quality Standards and Area Designation Maps—State and National.* Available: https://ww3.arb.ca.gov/desig/adm/adm.htm. Last updated October 2018. Accessed November 25, 2019.

———. 2019. California Greenhouse Gas Emission Inventory—2019 Edition. Available: https://ww3.arb.ca.gov/cc/inventory/data/data.htm. Accessed January 15, 2020.

———. 2020a. Area Designations Maps/State and National. Available: https://ww3.arb.ca.gov/desig/adm/adm.htm. Accessed January 15, 2020.

———. 2020b. Toxic Air Contaminant Identification List. Available: https://ww3.arb.ca.gov/toxics/id/taclist.htm. Accessed January 24, 2020.

———. 2020c. An Inventory of Ecosystem Carbon in California's Natural & Working Lands. February 2020.

Intergovernmental Panel on Climate Change (IPCC). 2013. *Climate Change 2013: The Physical Science Basis*. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Eds. T. F. Stocker, D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia,

V. Bex, and P. M. Midgley. Cambridge, UK, and New York: Cambridge University Press.

———. 2014. *Climate Change 2014: Synthesis Report*. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Eds. R. K. Pachauri and L. A. Meyer, Core Writing Team. Geneva, Switzerland.

National Cancer Institute (NCI). 2017. Table 2.12: Risk of Being Diagnosed with Cancer in 10, 20 and 30 Years, Lifetime Risk of Being Diagnosed with Cancer Given Alive and Cancer-Free at Current Age, and Lifetime Risk of Dying from Cancer Given Alive at Current Age, Both Sexes, 2012–2014 By Race/Ethnicity. April 2017. Available: https://seer.cancer.gov/csr/1975_2014/browse_csr.php. Accessed January 17, 2020.

Office of Environmental Health Hazard Assessment (OEHHA). 2015. *Air Toxics Hot Spots Program Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments.* Air, Community, and Environmental Health Research Branch. California Environmental Protection Agency. February 2015.

U.S. Environmental Protection Agency (EPA). 2011. *PSD and Title V Permitting Guidance for Greenhouse Gases*. Office of Air Quality Planning and Standards, Research Triangle Park, NC. March 2011.

———. 2020. Initial List of Hazardous Air Pollutants with Modifications. Available: https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications. Updated March 16, 2017. Accessed January 24, 2020.

Zhu, Y., W. C. Hinds, S. Kim, and S. Shen. 2002. *Study of Ultrafine Particles Near a Major Highway with Heavy-duty Diesel Traffic. Atmospheric Environment* 36:4323–4335.

Section 3.5, Biological Resources—Terrestrial

California Assembly Resources Subcommittee on Status and Trends (California Assembly). 1984. *Status and Trends of California Wetlands*. Paper 410. Available: http://digitalcommons.law.ggu.edu/cgi/viewcontent.cgi?article=1390&context=caldocs_assembly. Accessed November 22, 2019.

California Department of Fish and Wildlife (CDFW). 2015. *California State Wildlife Action Plan: 2015 Update*. *A Conservation Legacy for Californians.* September 30, 2015. Available: https://www.wildlife.ca.gov/SWAP/Final.

California Invasive Plant Council (Cal-IPC). 2020. The Cal-IPC Inventory. Available: https://www.cal-ipc.org/plants/inventory/. Accessed December 7, 2020.

California Native Plant Society (CNPS). 2020. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Available: http://rareplants.cnps.org/.

California Natural Diversity Database (CNDDB). 2020a. Special Animals List. Periodic publication. California Department of Fish and Wildlife. Updated November 9, 2020.

———. 2020b. Special Vascular Plants, Bryophytes, and Lichens List. Quarterly publication. California Department of Fish and Wildlife. Updated September 14, 2020.

DellaSala, D. A., S. B. Reid, T. J. Frest, J. R. Strittholt, and D. M. Olson. 1999. A Global Perspective on the Biodiversity of the Klamath-Siskiyou Ecoregion. *Natural Areas Journal* 19(4):300–319.

McNab, W. H., and P. E. Avers. 1994. Cascade Mixed Forest–Coniferous Forest–Alpine Meadow. In *Ecological Subregions of the United States*, Chapter 25. U.S. Forest Service, WO-WSA-5. Available: http://www.fs.fed.us/land/pubs/ecoregions/ch25.html.

Sawyer, J. O. 2007. Why Are the Klamath Mountains and Adjacent North Coast Floristically Diverse? *Fremontia* 35(3):3–11.

Skinner, C. N., and C. Chang. 1996. Fire Regimes, Past and Present. In *Sierra Nevada Ecosystem Project: Final Report to Congress, Vol. II, Assessments and Scientific Basis for Management Options*, 1041–1069. Davis: University of California, Centers for Water and Wildlands Research.

U.S. Census Bureau. 2020. State & County Quickfacts. U.S. Census Bureau database. Available: https://www.census.gov/quickfacts/fact/table/US/PST045218. Accessed December 9, 2020.

U.S. Geological Survey (USGS). 2012. *Status and Trends of Land Change in the Western United States—1973 to 2000*. USGS Professional Paper 1794-A.

Whittaker, R. H. 1960. Vegetation of the Siskiyou Mountains, Oregon and California. *Ecological Monographs* 30:279–338.

Section 3.6, Biological Resources—Aquatic

Berg, L., and T. G. Northcote. 1985. Changes in Territorial, Gill-Flaring, and Feeding Behavior in Juvenile Coho Salmon (*Oncorhynchus kisutch*) following Short-Term Pulses of Suspended Sediment. *Canadian Journal of Fisheries and Aquatic Sciences* 42:1410–1417.

California Department of Fish and Game (CDFG). 2008. *California Aquatic Invasive Species Management Plan*. January 2008.

California Department of Fish and Wildlife (CDFW). 2015. California State Wildlife Action Plan, 2015 Update: A Conservation Legacy for Californians. Edited by Armand G. Gonzales and Junko Hoshi, PhD. Prepared with assistance from Ascent Environmental, Inc., Sacramento, CA.

California Department of Transportation (Caltrans). 2009. *Technical guidance for assessment and mitigation of the hydroacoustic effects of pile driving on fish* (http://ter.ps/3xk). Appendix I, revised 2012, Compendium of pile driving sounds (http://ter.ps/3xl).

Cushman, R. M. 1985. Review of Ecological Effects of Rapidly Varying Flows Downstream from Hydroelectric Facilities. *North American Journal of Fisheries Management* 5:330–339.

Fisheries Hydroacoustic Working Group. 2008. Agreement in Principal for Interim Criteria for Injury to Fish from Pile Driving Activities. Memorandum. June 12, 2008.

Gregory, R. S., and T. G. Northcote. 1993. Surface, Planktonic, and Benthic Foraging by Juvenile Chinook Salmon (*Oncorhynchus tshawytscha*) in Turbid Laboratory Conditions. *Canadian Journal of Fisheries and Aquatic Sciences* 50:233–240.

Harvey, B. C. 1986. Effects of Suction Gold Dredging on Fish and Invertebrates in Two California Streams. *North American Journal of Fisheries Management* 6:401–409.

Hastings, M.C., and A.N. Popper, 2005. *Effects of sound on fish*. Prepared for California Department of Transportation. 82 pp.

LaChance, S., M. Dube, R. Dostie, and P. Berube. 2008. Temporal and Spatial Quantification of Fine-Sediment Accumulation Downstream of Culverts in Brook Trout Habitat. *Transactions of the American Fisheries Society* 137:1826–1838.

National Marine Fisheries Service (NMFS). 2012. *Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery and Management Act Essential Fish Habitat Consultation for Program to fund, permit (or both), restoration projects within the NOAA Restoration Center's Northern California Office jurisdictional area*. Prepared by, NMFS, Southwest Region.

———. 2015. *Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery and Management Act Essential Fish Habitat Consultation for Programmatic Consultation on funding and permitting restoration projects within watersheds of San Luis Obispo, Santa Barbara, Ventura, Orange, and San Diego counties, California*. Prepared by, NMFS, Southwest Region.

———. 2016. *Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery and Management Act Essential Fish Habitat Consultation for Program to fund, permit (or both), restoration projects within the NOAA Restoration Center's Central Coastal California Office jurisdictional area*. Prepared by, NMFS, Southwest Region.

———. 2018. *Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response and Fish and Wildlife Coordination Act Recommendations for the NOAA Restoration Center's Program to Facilitate Implementation of Restoration Projects in the Central Valley of California*. Prepared by, NMFS, Southwest Region.

Pacific Fishery Management Council (PFMC). 1998. *Coastal Pelagic Species Fishery Management Plan*. Portland, OR.

———. 2003. *Pacific Coast Salmon Plan. Fishery Management Plan for Commercial and Recreational Salmon Fisheries Off the Coasts of Washington, Oregon, and California. Adopted March 1999; as revised through Amendment 14.* Portland, OR. September 2003.

———. 2008. *Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery.* Portland, OR.

———. 2011. *Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery.* Portland, OR.

Rogers, F. R. 2000. *Assessing the Effects of Moderately Elevated Fine Sediment Levels on Stream Fish Assemblages.* Master's thesis, Humboldt State University. Arcata, CA.

Thomas, V. G. 1985. Experimentally Determined Impacts of a Small, Suction Gold Dredge on a Montana Stream. *North American Journal of Fisheries Management* 5:480–488.

Velagic, E. 1995. *Turbidity Study: A Literature Review*. Prepared for Delta planning branch, California Department of Water Resources by Centers for Water and Wildland Resources, University of California, Davis.

Waters, T. F. (ed.). 1995. *Sediment in Streams: Sources, Biological Effects, and Control. American Fisheries Society,* Monograph 7*.*

Wilber, D.H. and Clarke, D.G. 2001. Biological Effects of Suspended Sediments: A Review of Suspended Sediment Impacts on Fish and Shellfish with Relation to Dredging Activities in Estuaries. *North American Journal of Fisheries Management, 21: 855-875.*

Section 3.7, Cultural Resources

California Department of Transportation (Caltrans). 2008. *A Historical Context and Archaeological Research Design for Mining Properties in California*. Division of Environmental Analysis, Sacramento.

California State Lands Commission. 2019. California State Lands Commission Shipwreck Information. Available: https://www.slc.ca.gov/wp-content/uploads/2018/12/ShipwreckInfo.pdf. Accessed December 19, 2019.

Clark, W. B. 1957. Gold. In *Mineral Commodities of California: Geologic Occurrence, Economic Development and Utilization of the State's Mineral Resources*, ed. L. A. Wright, 215–228. California Division of Mines Bulletin 176 (Revision of Bulletin 156).

Golla, V. 2007. Linguistic Prehistory. In *California Prehistory: Colonization, Culture, and Complexity*, ed. T. L. Jones and K. A. Klar, 71–82. Lanham, MD: AltaMira Press.

Gould, R. A. 1975. Ecology and Adaptive Response among the Tolowa Indians of Northwestern California. *The Journal of California Anthropology* 2(2):149–170.

Heizer, R. F. (ed.). 1978. *Handbook of North American Indians*, Volume 8, *California*. Gen ed. W. C. Sturtevant. Washington, DC: Smithsonian Institution.

Kroeber, A. L., and S. A. Barrett. 1960. Fishing among the Indians of Northwestern California. *University of California Anthropological Records* 21(1):1–210. Berkeley: University of California Press.

Wilson, N. L., and A. H. Towne. 1978. Nisenan. In *California*, ed. R. F. Heizer. *Handbook of North American Indians*, Vol. 8, gen. ed. W. C. Sturtevant. Washington, DC: Smithsonian Institution.

Section 3.8, Energy Resources

California Energy Commission (CEC). 2019. Building Energy Efficiency Standards.

———. 2019. *Draft 2019 Integrated Energy Policy Report.* Publication Number CEC-100-2019-001-CMD. Sacramento, CA.

———. 2020a. Core Responsibility Fact Sheets. Available: https://www.energy.ca.gov/about/core-responsibility-fact-sheets. Accessed January 10, 2020.

———. 2020b. Integrated Energy Policy Report—IEPR. Available: https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report. Accessed January 13, 2020.

California Independent System Operator (CAISO). 2017. A Reliable and Accessible Power Grid. Available: http://www.caiso.com/about/Pages/default.aspx. Accessed April 13, 2017.

California Public Utilities Commission (CPUC). 2017. Renewables Portfolio Standard (RPS) Program. Available: http://www.cpuc.ca.gov/renewables/. Accessed April 7, 2017.

———. 2020. Integrated Energy Policy Report—IEPR. Available: https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report. Accessed January 13, 2020.

Congressional Budget Office (CBO). 1998. *Electric Utilities: Deregulation and Stranded Costs.* Washington, DC. October 1998.

Federal Energy Regulatory Commission (FERC). 2020a. What FERC Does. Available: https://www.ferc.gov/about/ferc-does.asp. Accessed April 7, 2020.

———. 2020b. Order No.888 “Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities” and 889 “Open Access Same-Time Information System (formerly Real-Time Information Networks) and Standards of Conduct.” August 2020.

———. 2020c. California pending relicense by FERC. Available: https://www.ferc.gov/sites/default/files/2020-07/pending-licensed.pdf. Accessed January 14, 2020.

North American Electric Reliability Corporation (NERC). 2020. About NERC. Available: http://www.nerc.com/AboutNERC/Pages/default.aspx. Accessed April 7, 2020.

Senate Bill 350 (SB 350). 2015. Senate Bill 350 (De León, Chapter 547, Statutes of 2015). Available: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350. Accessed September 13, 2017.

U.S. Energy Information Administration (EIA). 2018. California State Profile and Energy Estimates. https://www.eia.gov/state/?sid=CA. Accessed November 11, 2020.

U.S. Environmental Protection Agency (EPA). 2017. Summary of the Energy Independence and Security Act. https://www.epa.gov/laws-regulations/summary-energy-independence-and-security-act. Accessed August 4, 2017.

Western Electricity Coordinating Council (WECC). 2020. About WECC. Available: https://www.wecc.org/Pages/AboutWECC.aspx. Accessed January 10, 2020.

Section 3.9, Geology and Soils

Birkeland, Peter. 1984. Soils and Geomorphology

California Department of Conservation (DOC). 2018. *California 2018 Oil and Gas Production.* Sacramento, CA. October.

———. 2019. *Frequently Asked Earthquake Questions.* Available: https://www.conservation.ca.gov/cgs/Pages/Earthquakes/earthquake-faq.aspx. Accessed December 4, 2019.

California Department of Water Resources (DWR). 2016. December. *Bulletin 118 Interim Update 2016*.

California Energy Commission (CEC). 2019. *California Geothermal Energy Statistics and Data.* Available: https://ww2.energy.ca.gov/almanac/renewables_data/geothermal/index_cms.php. Accessed December 6, 2019.

California State Parks. 2015. Geological Gems of California State Parks: Special Report 230. Available: https://www.parks.ca.gov/pages/734/files/GeoGem%20Note%2036%20Basin%20and%20Range%20Geomorphic%20Province.pdf. Accessed December 4, 2019.

Campagna, Jennifer, Leon Brathwaite, Anthony Dixon, Jason Orta, and Peter Puglia. 2019. 2019 Natural Gas Market Trends and Outlook Report. California Energy Commission. Publication Number: CEC-200-2019-018.

Donahue, R.L., R.W. Miller, and J.C. Shickluna. 1983. *Soil: An introduction to Soils and Plant Growth. 5th ed.* Engelwood Cliffs, NJ.

Griffith, G.E., J.M. Omermik, D.W. Smith, T.D. Cook, K. Moseley, and C.B. Johnsons. 2016. Ecoregions of California (poster): U.S. Geological Survey Open-File Report 2016-2021. Available: https://pubs.usgs.gov/of/2016/1021/ofr20161021_sheet2.pdf.

Harden, D. 1997. *California Geology,* Prentice Hall Inc.: New Jersey, 477p.

Irwin, W.P. 1966. Geology of the Klamath Mountains Province. California Division of Mines and Geology. 190: 19-38.

Page, Ben. 1966. Geology of the Coast Ranges of California. In Geology of Northern California Edited by Edgar H. Bailey, United States Geological Survey, San Francisco Bulletin 19.

Sharp, R.P. 1994. A Field Guide to Southern California, Kendall Hunt Publishing Company: Iowa, 301 p.

Soil Survey Geographic (SSURGO2) digital databases. https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_053627.

Sorenson, Daniel G. 2012. *Chapter 11: Cascades Ecoregions. In Status and trends of land change in the Western United States--1973 to 2000*. U.S. Geological Survey.

Soulard, Christopher E. 2012. Central Basin and Range Ecoregion. U.S. Geological Survey. Available: https://pubs.usgs.gov/pp/1794/a/chapters/pp1794a_chapter20.pdf.

Toy, Terrence. J. 1982. Accelerated erosion: Process, Problems, and prognosis. Geology 10: 524-529.

U.S. Energy Information Administration (EIA). 2019. *Rankings: Crude Oil Production August 2019.* Available: https://www.eia.gov/state/rankings/#/series/46. Accessed December 6, 2019.

U.S. General Soil Map (STATSGO2). https://data.nal.usda.gov/dataset/united-states-general-soil-map-statsgo2.

U.S. Geological Survey (USGS). 2004 July. *Landslide Types and Processes.*

———. (USGS). 2009. Seismic-hazard maps for the conterminous United States.

———. 2019a. U.S. Quaternary Faults. Available: https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=5a6038b3a1684561a9b0aadf88412fcf. Accessed December 6, 2019.

———. 2019b. *What is a fault and what are the different types.* Available: https://www.usgs.gov/faqs/what-a-fault-and-what-are-different-types?qt-news_science_products=0#qt-news_science_products. Accessed December 4, 2019.

United States Department of Agriculture (USDA) 2017. 2017 USDA Soil Survey Manual. Available: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054261. Accessed November 10, 2020.

Walker, J.D., M.W. Martin, and A. Glazner. 2002. Late Paleozoic to Mesozoic development of the Mojave Desert and Environs, California. Memoir of the Geological Society of America. 195:1-18. Available: https://www.researchgate.net/publication/285656367_Late_Paleozoic_to_Mesozoic_development_of_the_Mojave_Desert_and_environs_California.

Western Regional Climate Center (WRCC). 2020. Climate of California. https://wrcc.dri.edu/narratives/CALIFORNIA.htm.

Section 3.10, Hazards and Hazardous Materials

California Environmental Protection Agency (CalEPA). 2020. Unified Program. Available: https://calepa.ca.gov/cupa/. Accessed January 2, 2020.

State Water Resources Control Board (State Water Board). 2019. About the California Water Boards. Available: https://www.waterboards.ca.gov/publications_forms/publications/factsheets/docs/boardoverview.pdf. Accessed November 20, 2019.

Section 3.11, Hydrology and Water Quality

CALFED Bay-Delta Program (CALFED). 2000. Record of Decision. Sacramento, CA. August 28, 2000.

California Department of Water Resources (DWR). 2003. *California's Groundwater*. Bulletin 118, Update 2003. Sacramento, California.

———. 2013. *California Water Plan Update 2013*. Volume 1: The Strategic Plan.

Central Coast Regional Water Quality Control Board (Central Coast Regional Water Board). 2019. Water Quality Control Plan for the Central Coastal Basin. June 2019.

Central Valley Regional Water Quality Control Board (Central Valley Regional Water Board). 2018. The Water Quality Control Plan (Basin Plan) for The California Regional Water Quality Control Board, Central Valley Region, Fifth Edition. May 2018.

Colorado River Regional Water Quality Control Board (Colorado River Regional Water Board). 2019. Water Quality Control Plan for the Lahontan Region. January 2019.

Federal Emergency Management Agency (FEMA). 2020. Flood Zones. Available: https://www.fema.gov/flood-zones. Accessed January 5, 2021.

Hanak, E., J. Lund, A. Dinar, B. Gray, R. Howitt, J. Mount, P. Moyle, and B. Thompson. 2011. Managing California's Water: From Conflict to Reconciliation. San Francisco, CA: Public Policy Institute of California.

Harter, T. 2003. *Groundwater Quality and Groundwater Pollution.* ANR Publication 8084, FWQP Reference Sheet 11.2. University of California Division of Agriculture and Natural Resources, Farm Water Quality Planning. Oakland, CA.

Lahontan Regional Water Quality Control Board (Lahontan Regional Water Board). 2016. Water Quality Control Plan for The Colorado River Basin Region January 2016.

Los Angeles Regional Water Quality Control Board (Los Angeles Regional Water Board). 2014. Water Quality Control Plan, Los Angeles Region. September 2014.

North Coast Regional Water Quality Control Board (North Coast Regional Water Board). 2018. Water Quality Control Plan for the North Coast Region. June 2018.

_____. 2017. Sediment TMDL Implementation. Available: https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/sediment_tmdl_implementation/. Accessed March 2020.

National Marine Fisheries Service (NMFS). 2009. Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project. Southwest Region. Long Beach, California. June 4, 2009.

San Diego Regional Water Quality Control Board (San Diego Regional Water Board). 2016. Water Quality Control Plan for the San Diego Basin (Basin Plan). May 2016.

San Francisco Bay Regional Water Quality Control Board (San Francisco Bay Regional Water Board). 2017. San Francisco Bay Basin (Region 2) Water Quality Control Plan. May 2017.

Santa Ana Regional Water Quality Control Board (Santa Ana Regional Water Board). 2019. Water Quality Control Plan for the Santa Ana River Basin. June 2019.

U.S. Environmental Protection Agency (EPA). 2017. Introduction to the Clean Water Act. Available: https://cfpub.epa.gov/watertrain/pdf/modules/IntrotoCWA.pdf. Accessed August 4, 2017.

———. 2021. Polluted Runoff: Nonpoint Source Pollution. Available: https://19january2017snapshot.epa.gov/nps/what-nonpoint-source_.html#:~:text=What%20is%20nonpoint%20source%20pollution,comes%20from%20many%20diffuse%20sources. Accessed January 5, 2021.

U.S. Fish and Wildlife Service (USFWS). 2008. Formal Endangered Species Act Consultation on the Proposed Operations of the Central Valley Project and State Water Project. Final. Sacramento, California. December 15, 2008.

U.S. Geological Survey (USGS). 2019. 2012-2016 California Drought: Historical Perspective. Available: https://ca.water.usgs.gov/california-drought/california-drought-comparisons.html. Accessed December 19, 2019.

Section 3.12, Land Use and Planning

Governor's Office of Planning and Research (OPR). 2017. *State of California General Plan Guidelines 2017.* Sacramento, CA.

Section 3.13, Mineral Resources

California Department of Conservation (DOC) Division of Oil, Gas, and Geothermal Resources (DOGGR). 2019. *2018 Report of California Oil and Gas Production Statistics*. October 2019.

———. 2021. Construction Site Well Review Program. Available: https://www.conservation.ca.gov/calgem/for_operators/Pages/construction_site_review.aspx. Accessed January 5, 2021.

California Energy Commission (CEC). 2019. California Geothermal Energy Statistics and Data. Available: https://ww2.energy.ca.gov/almanac/renewables_data/geothermal/index_cms.php. Accessed December 12, 2019.

———. 2021. Supply and Demand of Natural Gas in California. Available: https://www.energy.ca.gov/data-reports/energy-almanac/californias-natural-gas-market/supply-and-demand-natural-gas-california. Accessed January 12, 2021.

California Geological Survey (CGS). No date. *California Non-Fuel Mineral Production 2017.* Prepared by T. Key, PG #9504, Engineering Geologist. Available: https://www.conservation.ca.gov/cgs/Documents/california-non-fuel-mineral-production-2017.pdf. Accessed January 10, 2020.

U.S. Energy Information Administration (EIA). 2019. *Natural Gas Consumption by End Use.* Available: https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SCA_a.htm. Accessed January 13, 2020.

U.S. Geological Survey (USGS). 2021. *Mineral commodity summaries 2021: U.S. Geological Survey*. January 2021.

Section 3.14, Noise

California Department of Transportation (Caltrans). 2013a. *Technical Noise Supplement to the Traffic Noise Analysis Protocol.*

———. 2013b. *Transportation and Construction-Induced Vibration Guidance Manual*. Sacramento, CA.

Federal Highway Administration (FHWA). 2006. *FHWA Roadway Construction Noise Model User's Guide.* Final Report. FHWA-HEP-05-054, DOT-VNTSC-FHWA-05-01. January 2006. Available: https://www.fhwa.dot.gov/Environment/noise/construction_noise/rcnm/index.cfm. Accessed November 27, 2019.

Federal Transit Administration (FTA). 2006. *Transit Noise and Vibration Impact Assessment.* Washington, DC.

———. 2018. *Transit Noise and Vibration Impact Assessment Manual.* Washington, DC.

Section 3.15, Population and Housing

California Department of Housing and Community Development (HCD). 2019. Building Code Development and Adoption (Title 24). Available: https://www.hcd.ca.gov/building-standards/buiding-code/index.shtml. Accessed January 23, 2020.

Department of Finance (DOF). 2019a. State's Population Increases by 141,300, While Rate of Growth Continues to Decline. Available: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-2/documents/PressRelease July2019.pdf. Accessed January 13, 2020.

———. 2019b. California Tops 39.9 Million Residents at New Year Per New State Demographic Report. Available: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-1/documents/E-1_2019PressRelease.pdf. Accessed January 13, 2020.

———. 2020. Total Estimated and Projected Population for California and Counties: July 1, 2010 to July 1, 2060 in 1-year Increments. Available: http://www.dof.ca.gov/Forecasting/Demographics/Projections/. Accessed January 13, 2020.

Public Policy Institute of California (PPIC). 2020. Population California's Future. January. Available: https://www.ppic.org/wp-content/uploads/californias-future-population-january-2020.pdf. Accessed January 13, 2020.

Section 3.16, Recreation

California Department of Fish and Wildlife (CDFW). 2020. MPA Overview. Available: https://wildlife.ca.gov/Conservation/Marine/MPAs. Accessed November 10, 2020.

California Department of Parks and Recreation (State Parks). 2018. Boating and Waterways Begins Control Activities in the Delta for Aquatic Invasive Plants. Press release, March 2, 2018. Available: https://www.parks.ca.gov/NewsRelease/791. Accessed January 27, 2020.

California State Lands Commission (SLC). 2020. About the California State Lands Commission. Available: https://www.slc.ca.gov/about/. Accessed January 27, 2020.

National Oceanic and Atmospheric Administration (NOAA). 1975. The Coastline of the United States. Available: https://shoreline.noaa.gov/_pdf/Coastline_of_the_US_1975.pdf. Accessed November 10, 2020.

United States Geological Survey (USGS). 1996. California Wetland Resources. Available: https://www.fws.gov/wetlands/data/Water-Summary-Reports/National-Water-Summary-Wetland-Resources-California.pdf. Accessed November 10, 2020.

Section 3.17, Transportation, Traffic, and Circulation

American Society of Civil Engineers (ASCE). 2018. *California's Surface Transportation Report Card: An Analysis of Roads, Bridges, and Transit.* ASCE Region 9.

California Department of Transportation (Caltrans). 2014. *California Manual on Uniform Traffic Control Devices.* Available: https://dot.ca.gov/-/media/dot-media/programs/traffic-operations/documents/camutcd2014-rev4-a11y.pdf.

———. 2017. *Highway Design Manual.* Sacramento, CA. November 27, 2017.

———. 2019. *California 2018 Public Road Data: Statistical Information Derived from the Highway Performance Monitoring System.* November 2019.

California High-Speed Rail Authority. 2020. Draft 2020 Business Plan. https://hsr.ca.gov/docs/about/business_plans/2020_Business_Plan.pdf.

Federal Highway Administration (FHWA). 2017. *Planning Processes: Statewide Transportation Planning.* Section 3.1, Definitions and Characteristics. Table 3-1: Characteristics of Urban and Rural Roads. Available: https://www.fhwa.dot.gov/planning%20/processes/statewide/related/highway_functional_classifications/

section03.cfm#Toc336872982. Last updated September 27, 2017. Accessed December 26, 2019.

U.S. Fish and Wildlife Service (USFWS). 2020. Digest of Federal Resource Laws of Interest to the U.S. Fish and Wildlife Service. Rivers and Harbors Appropriation Act of 1899. Available: https://www.fws.gov/laws/lawsdigest/RIV1899.HTML. Accessed January 3, 2020.

Section 3.18, Tribal Cultural Resources

Golla, V. 2007. Linguistic Prehistory. In *California Prehistory: Colonization, Culture, and Complexity*, ed. T. L. Jones and K. A. Klar, 71–82. Lanham, MD: AltaMira Press.

Gould, R. A. 1975. Ecology and Adaptive Response among the Tolowa Indians of Northwestern California. *The Journal of California Anthropology* 2(2):149–170.

Heizer, R. F. (ed.). 1978. *Handbook of North American Indians*, Volume 8, *California*. Gen ed. W. C. Sturtevant. Washington, DC: Smithsonian Institution.

Kroeber, A. L., and S. A. Barrett. 1960. Fishing among the Indians of Northwestern California. *University of California Anthropological Records* 21(1):1–210. Berkeley: University of California Press.

Wilson, N. L., and A. H. Towne. 1978. Nisenan. In *California*, ed. R. F. Heizer. *Handbook of North American Indians*, Vol. 8, gen. ed. W. C. Sturtevant. Washington, DC: Smithsonian Institution.

Section 3.19, Utilities and Service Systems and Public Services

California Department of Resources Recycling and Recovery (CalRecycle). 2019. Mandatory Commercial Recycling: Key Elements of the Law. Available: http://www.calrecycle.ca.gov/recycle/commercial/#Elements. Last updated August 12, 2019. Accessed January 6, 2020.

California Energy Commission (CEC). 2019. Total System Electric Generation (2018). Available: https://ww2.energy.ca.gov/almanac/electricity_data/total_system_power.html. Last updated June 24, 2019. Accessed December 30, 2019.

State Water Resources Control Board (State Water Board). 2019. Financial Assistance Funding—Grants and Loans. Available: https://www.waterboards.ca.gov/water_issues/programs/grants_loans/. Last updated December 30, 2019. Accessed January 3, 2020.

U.S. Energy Information Administration (EIA). 2019. Natural Gas Explained: Use of Natural Gas. Accessed November 11, 2020.

Section 3.20, Wildfire

Abatzoglou, John A., and Park Williams. 2016. Impact of Anthropogenic Climate Change on Wildfire Across Western US Forests. May 2016.

California Department of Forestry and Fire Protection (CAL FIRE) 2015. 2015 Wildland Hazard and Building Codes – Frequently Asked Questions. Accessed January 30, 2015.

———. 2019. 2019 Strategic Plan. January 2019. Available: https://www.fire.ca.gov/media/5504/strategicplan2019-final.pdf. Accessed November 11, 2020.

State Board of Forestry and Fire Protection and California Department of Forestry and Fire Prevention (SBFFP and CAL FIRE). 2018. 2018 Strategic Fire Plan for California. August 2018.

University of California Division of Agriculture and Natural Resources (UC DANR). 2009. Invasive Plants and Wildfires in Southern California. August 2009.

U.S. Geological Survey (USGS). 2012. Fire-Driven Alien Plant Invasion in a Fire-Prone Community. July 2012.

Chapter 4, *Cumulative Impacts*

No references cited in this chapter.

Chapter 5, *Other CEQA Considerations*

No references cited in this chapter.

Chapter 6, *Alternatives*

No references cited in this chapter.

Chapter 7, *List of Preparers*

No references cited in this chapter.