

**STATE WATER RESOURCES CONTROL BOARD**  
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

**FINAL STAFF REPORT**

**2020-2022 INTEGRATED REPORT**  
FOR CLEAN WATER ACT SECTIONS 303(d) AND 305(b)



**February 16, 2022**

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CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY



The 2020-2022 Integrated Report Draft Staff Report was posted on June 4, 2021.

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A clean version of the Final Staff Report was finalized on February 16, 2022, which includes all previous revisions plus revisions made per the direction of the State Water Resources Control Board at the January 19, 2022 Adoption Meeting for the 2020-2022 Integrated Report and 303(d) list.

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## List of Regulatory Acronyms and Abbreviations

Basin Plan:	Regional Water Quality Control Plan
BIGHT:	Southern California Bight Regional Monitoring Program
BPTCP:	Bay Protection and Toxic Cleanup Program
CalWQA:	California Water Quality Assessment (Database)
CCAMP:	Central Coast Ambient Monitoring Program
CCC:	Criteria Continuous Concentration
CCR:	California Code of Regulations
CDPH:	California Department of Public Health
CDPR:	California Department of Pesticide Regulation
CFR:	Code of Federal Regulations
CMC:	Criteria Maximum Concentration
CSCI:	California Stream Condition Index
CTR:	California Toxics Rule
CWA:	Clean Water Act
DFW:	California Department of Fish and Wildlife, formerly Department of Fish and Game (“DFG”)
ILRP:	Irrigated Lands Regulatory Program
IR:	Integrated Report
ISWEBE Plan:	Water Quality Control Plan amendments previously adopted by the State Water Board for future incorporation into the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California
Listing Policy:	Water Quality Control Policy for Developing California’s Section 303(d) List
LOE:	Line of Evidence
MTRL:	Maximum Tissue Residue Level
MWMT:	Maximum Weekly Maximum Temperature
NAS:	National Academy of Sciences
NHD:	National Hydrography Dataset
NOAA:	National Oceanic and Atmospheric Administration
NPDES:	National Pollutant Discharge Elimination System
OEHHA:	California Office of Environmental Health Hazard Assessment
OWTS:	Onsite Wastewater Treatment System

PSA:	Perennial Streams Assessment
QA:	Quality Assurance
QAPP:	Quality Assurance Project Plan
QC:	Quality Control
RCMP:	Reference Condition Monitoring Program
Regional Water Board:	Regional Water Quality Control Board
SFEI:	San Francisco Estuary Institute
SMCL:	Secondary Maximum Contaminant Level
SMWP:	State Mussel Watch Program
SQG:	Sediment quality guideline
SSO:	Site-specific Objective
State Water Board:	State Water Resources Control Board
SPoT:	Stream Pollution Trends Program
SWAMP:	Surface Water Ambient Monitoring Program
TIE:	Toxicity Identification Evaluation
TMDL:	Total Maximum Daily Load
TSMP:	Toxic Substance Monitoring Program
U.S. EPA:	United States Environmental Protection Agency
USGS:	United States Geological Survey
WDR:	Waste Discharge Requirement
WQO:	Water Quality Objective
WQS:	Water Quality Standard

## List of Scientific Acronyms and Abbreviations

7DADM:	7-day Average of Daily Maximum Temperature
7DAVG:	Rolling 7-day Average Temperature
BMI:	Benthic Macro Invertebrates
CFU:	Colony Forming Units
°C:	Degrees Celsius
°F:	Degrees Fahrenheit
DDE:	Dichlorodiphenyldichloroethylene
DDT:	Dichlorodiphenyltrichloroethane
DO:	Dissolved Oxygen
dw:	Dry Weight
ERM:	Effects Range Median
FHAB:	Freshwater Harmful Algal Bloom
Geomean:	30-day geometric mean
HCH:	Hexachlorocyclohexane
HSA:	Hydrologic Sub Area
HU:	Hydrologic Unit
HUC-12:	Hydrologic Unit Code "12" subwatershed
IBI:	Index of Biological Integrity
Kg:	Kilogram(s)
MCL:	Maximum Contaminant Level

MDL:	Method Detection Limit
mg/kg:	Milligrams per Kilogram (parts per million)
mg/L:	Milligrams per Liter (parts per million)
µg/g:	Micrograms per Gram (parts per million)
µg/L:	Micrograms per Liter (parts per billion)
µS/cm:	MicroSiemens per Centimeter (parts per million)
MTBE:	Methyl Tertiary-butyl Ether
ng/g:	Nanograms per Gram (parts per billion)
ng/L:	Nanograms per Liter (parts per trillion)
NTU:	Nephelometric Turbidity Unit
oc:	Organic Carbon
PPT:	Parts per Thousand
PAH:	Polynuclear Aromatic Hydrocarbon
PBDE:	Polybrominated Diphenyl Ethers
PCB:	Polychlorinated Biphenyl
PEL:	Probable Effects Level
pg/L:	Picograms per Liter
RBI:	Relative Benthic Index
RL:	Reporting Level
SSM:	Single Sample Maximum
STV:	Statistical Threshold Value
TDS:	Total Dissolved Solids
TEF:	Toxicity Equivalency Factor
TL:	Trophic Level
TSS:	Total Suspended Solids
TST:	Test of Significant Toxicity
ww:	Wet Weight

## Executive Summary

The goal of the Clean Water Act (“CWA”) is “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” (33 U.S.C § 1251(a).) Pursuant to Clean Water Act Sections 303(d) and 305(b) (33 U.S.C. §§ 1313(d), 1315(b)), each state is required to report to the U.S. Environmental Protection Agency (“U.S. EPA”) on the overall quality of the waters within its boundaries. The U.S. EPA then compiles these reports into their biennial “National Water Quality Inventory Report” to Congress.

Under CWA Section 303(d), states are required to review, make changes as necessary, and submit to U.S. EPA a list identifying waterbodies not meeting water quality standards and the water quality parameter (i.e., pollutant) not being met (referred to as the “303(d) list”). States are required to include a priority ranking of such waters, taking into account the severity of the pollution and the uses to be made of such waters, including waters targeted for the development of total maximum daily loads (“TMDLs”). Under CWA Section 305(b), each state is required to report biennially to the U.S. EPA on the water quality conditions of its surface waters (referred to as the “305(b) report”). States are required to submit their 303(d) lists and 305(b) reports every two years (the “listing cycle”). (40 C.F.R. § 130.7(d).) The State Water Resources Control Board (“State Water Board”) administers this portion of the CWA for the State of California.

The U.S. EPA developed guidance to states recommending that the 305(b) report and the 303(d) list be integrated into a single report. For California, this combined report is called the “California Integrated Report” and it satisfies both the CWA Section 305(b) and Section 303(d) requirements.

The State Water Board is administering the listing process for all waters assessed during the 2020-2022 listing cycle, in accordance with Section 6.2 of the Water Quality Control Policy for Developing California’s Clean Water Act Section 303(d) list. In accordance with the final resolution of *Earth Law Center v. State Water Resources Control Board* (Sacramento Superior Court Case No. 34-2017-80002726), this list will satisfy the State Water Board’s obligation to submit the list for both the 2020 cycle and the 2022 cycle. Upon approval of the 303(d) list portion of the 2020-2022 Integrated Report by the State Water Board, the California Integrated Report is submitted to U.S. EPA, which may make changes to the 303(d) list before it approves the final 303(d) list for California.

For the 2020-2022 California Integrated Report, the Central Coast, Central Valley, and San Diego Regional Water Board regions are “on cycle” for assessment. All readily available data and information from waterbodies in these regions were considered. In addition, all readily available data and information from several waterbodies in the Colorado River Basin region were considered as “off cycle” assessments.

The 2020-2022 Integrated Report revises the 2018 Integrated Report. The revisions are based on data and information collected from surface waterbodies (rivers, streams, lakes, bays, estuaries, enclosed lagoons, and coastal waters) located in the

aforementioned regions. The revisions include changes to the 303(d) list and, pursuant to CWA Section 305(b), describe the extent to which surface waters in California are supporting beneficial uses.

This staff report provides background on the methods used to compile and assess the data. Surface water data were downloaded from the California Environmental Data Exchange Network (“CEDEN”) and National Water Quality Monitoring Portal for assessment. Data sources include the Water Boards’ Surface Water Ambient Monitoring Program (“SWAMP”) and other monitoring programs; other state agencies such as the Department of Fish and Wildlife and the Department of Pesticide Regulation; federal agencies such as the U.S. Geological Service and U.S. EPA; Tribes; and local watershed groups.

Based on assessments of these data, 1,011 new listings and 224 new delistings of impaired waterbody-pollutant combinations are recommended for the 303(d) list. A summary of new listings and delistings by Regional Board is outlined in the table, below. The complete recommended 2020-2022 303(d) list of impaired waters is found in Appendix A. The assessments are described in Waterbody Fact Sheets (see Appendix B).

<b>Region</b>	<b>2018 303(d) Listings</b>	<b>New Listings</b>	<b>New Delisting s</b>	<b>2020-2022 303(d) Listings</b>
North Coast	217	0	0	217
San Francisco Bay	348	0	0	348
Central Coast	922	401	146	1,177
Los Angeles	875	0	0	877
Central Valley	906	337	45	1,202
Lahontan	256	0	0	256
Colorado River Basin	93	16	0	110
Santa Ana	144	0	0	142
San Diego	609	257	33	844
<b>TOTALS</b>	<b>4,370</b>	<b>1,011</b>	<b>224</b>	<b>5,173</b>

## 1. About the Integrated Report

The State Water Board, along with the nine Regional Water Boards (collectively, “Water Boards”), protect and enhance the quality of California’s water resources through implementing the CWA as amended (33 U.S.C. § 1251 et seq.; CWA, § 101 et seq.), and California’s Porter-Cologne Water Quality Control Act (Wat. Code, § 13000 et seq.).

States that administer the CWA must submit the CWA Section 303(d) list of impaired waters to the U.S. EPA. CWA Section 305(b) requires each state to report biennially to U.S. EPA on the condition of its surface water quality. U.S. EPA guidance to the states recommends the two reports be integrated (U.S. EPA, 2005). For California, this integrated report is called the “California Integrated Report” and combines the State Water Board’s Section 303(d) and 305(b) reporting requirements.

### 1.1. The 303(d) List of Impaired Waters

Federal regulation defines a “water quality-limited segment” as “any segment where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards, even after application of technology-based effluent limitations required by CWA Sections 301(b) or 306.” (40 C.F.R. § 130.2(j).) Water segments are also known as waterbodies or waters, and water quality-limited segments are also known as “impaired waterbodies” or “impaired waters.” Standards include beneficial uses of water, water quality criteria or objectives set at levels to ensure the reasonable protection of beneficial uses, and antidegradation policies.

Under CWA Section 303(d), states are required to review, make changes as necessary, and submit to U.S. EPA a list of water quality-limited segments that are not meeting, or are not expected to meet, water quality standards. This is referred to as the 303(d) list of impaired waters, or the “303(d) list.” The 303(d) list must identify the pollutants causing lack of attainment of water quality standards and include a priority ranking of the water quality-limited segments considering the severity of the pollution and the uses to be made of the waters. (40 C.F.R. § 130.7(b)(iii)(4).) To restore water quality, a total maximum daily load (“TMDL”), or other regulatory action, must be developed to address the impaired waterbodies on the 303(d) list.

Since there may be more than one pollutant causing lack of attainment of water quality standards, each listing is specific to a pollutant, and there may be multiple listings for one waterbody.

### 1.2. The Listing Policy

Recommendations to place a waterbody on the 303(d) list are made in conformance with the [Water Quality Control Policy for Developing California’s Clean Water Act Section 303\(d\) list](#), commonly referred to as the “Listing Policy.” ([https://www.waterboards.ca.gov/board\\_decisions/adopted\\_orders/resolutions/2015/020](https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2015/020))

[315 8 amendment clean version.pdf](#).) The Listing Policy identifies the process by which the Water Boards comply with the listing requirements of CWA Section 303(d).

The Listing Policy provides direction related to the:

1. Definition of readily available data and information. Readily available data and information is defined as data and information that can be submitted to the CEDEN, unless the data type cannot be accepted by CEDEN. Data types that CEDEN cannot accept can be submitted directly to the State Water Board following a procedure established during the data solicitation process.
2. Administration of the listing process including data solicitation and fact sheet preparation.
3. Application and interpretation of chemical-specific water quality standards; bacterial water quality standards; health advisories; bioaccumulation of chemicals in aquatic life tissues; nuisance such as trash, odor, and foam; nutrients; water and sediment toxicity; adverse biological response; and degradation of aquatic life populations and communities.
4. Interpretation of narrative water quality objectives using numeric evaluation guidelines.
5. Data quality assessments including following an approved Quality Assurance Project Plan (“QAPP”).
6. Data quantity assessments including water segment specific information, data spatial and temporal representation, aggregation of data by reach/area, quantitation of chemical concentrations, evaluation of data consistent with the expression of water quality objectives or criteria, binomial model statistical evaluation, evaluation of bioassessment data, and evaluation of temperature data.
7. Conditions, or listing factors, that determine if waterbody segments shall be placed on the 303(d) list based on exceedances of water quality standards for specific pollutants.
8. The use of a situation-specific weight of evidence approach when all other listing factors do not result in a listing or delisting where information suggests standards nonattainment or attainment, respectively.

### **1.3. The 305(b) Report - Integrated Report Condition Categories**

To meet CWA Section 305(b) requirements of reporting on water quality conditions, the Integrated Report places waterbodies into one of five “Integrated Report Condition Categories.” This categorization is based on the assessment of all available data collected in that waterbody and that waterbody’s ability to support beneficial use(s). The 303(d) list portion of the California Integrated Report consists of waterbodies in

Categories 4a, 4b, and 5. This is because in California a waterbody, or segment of a waterbody, may be considered impaired if standards are not met regardless of whether a TMDL or another program of implementation is in place. The U.S. EPA considers only waterbodies in Category 5 to be responsive to the reporting requirements of CWA Section 303(d) and the U.S. EPA does not place Category 4a, 4b, or 4c waters on the 303 List. See figure 1-1 for descriptions of Integrated Report Condition Categories.

**Figure 1-1: 305(b) Integrated Report Condition Categories**

<b>1</b>	At least one core beneficial use is supported and none are known to be impaired.
<b>2</b>	Insufficient information to determine beneficial use support.
<b>3</b>	There is insufficient data and/or information to make a beneficial use support determination but information and/or data indicates beneficial uses may be potentially threatened.
<b>4</b>	<p>At least one beneficial use is not supported but a TMDL is not needed.</p> <p><b>4a:</b> A TMDL has been developed and approved by U.S. EPA for any waterbody-pollutant combination, and the approved implementation plan is expected to result in full attainment of the water quality standard within a reasonable, specified time frame.</p> <p><b>4b:</b> Another regulatory program is reasonably expected to result in attainment of the water quality standard within a reasonable, specified time frame.</p> <p><b>4c:</b> The non-attainment of any applicable water quality standard for the waterbody segment is the result of pollution and is not caused by a pollutant.</p>
<b>5</b>	At least one beneficial use is not supported and TMDL is needed.

#### 1.4. Integrated Report Cycles

The California Integrated Report is developed in “listing cycles.” Each listing cycle consists primarily of assessments from the three Regional Water Boards that are “on-cycle.” The other six Regional Water Boards that are “off-cycle” may also assess high-priority data and make new listing or delisting recommendations or changes to the



Section 305(b) categories. Regional Water Boards rotate cycles and every region is fully assessed once every six years.

Each listing cycle builds on assessments from the previous listing cycle. The listing decisions and 305(b) waterbody category assignments from the prior cycle for all waterbodies in the state are first carried over into the current cycle. All readily available data and information received during the data solicitation period for the current listing cycle are assessed and the listings and categories are revised, as appropriate. Thus the 2020-2022 California Integrated Report is an revised version of the 2018 California Integrated Report and contains all prior assessments as well as any new or revised assessments based on the data received prior to the end of the data solicitation period for the 2020-2022 listing cycle.

For the 2020-2022 listing cycle, assessments are focused on surface waters in the Central Coast, Central Valley, and San Diego Regional Water Quality Control Boards (“Regional Water Boards”), as these Regional Water Boards are “on cycle.” All readily available data and information from waterbodies in these regions were considered. Additionally, the Colorado River Regional Water Board conducted “off-cycle” assessments for waterbodies within their region.

## **2. Assessment Process**

This Section describes the rationale, methods, and procedures employed by Water Board staff to assess data for the 2020-2022 Integrated Report.

### **2.1. Data and Information Used**

All readily available data and information (as defined by Section 6.1.1 of the Listing Policy) received before and during the 2020-2022 Integrated Report data solicitation period were considered in the development of the California Integrated Report. The State Water Board solicited data and information from the public from December 14, 2018, to June 14, 2019. All readily available data and information submitted for the Central Coast, Central Valley, and San Diego Regional Water Boards, and high priority data from the Colorado River Regional Water Board, were considered. Specifically, data and information reviewed included:

- The 2018 Integrated Report and its supporting data and information
- California Environmental Data Exchange Network (“CEDEN”) data
- Surface Water Ambient Monitoring Program (“SWAMP”) data
- Irrigated Lands Regulatory Program monitoring data
- Southern California Coastal Water Research Project data
- San Francisco Estuary Institute’s Regional Monitoring Program data
- Fish and shellfish advisories; beach postings, advisories, and closures; or other water quality-based restrictions
- Reports of fish kills, cancers, lesions, or tumors

- Reports of dog deaths associated with water contact
- Existing and readily available water quality data and information reported by local, state, and federal agencies (including receiving water monitoring data from discharger monitoring reports), citizen monitoring groups, academic institutions, and the public
- National Water Quality Portal (“WQP”) for federal USGS, U.S. EPA, and tribal data
- Existing internal Water Board data and reports
- Other sources of data and information that became readily available to Water Board staff

## **2.2. Data Processing**

All readily available data and information must be considered in the development of the 303(d) list. Some data were processed to facilitate analysis of the data and make listing and delisting recommendations. The following subsections describe how data were processed.

### **2.2.1. Mapping**

Staff reviewed readily available data and information to determine representative waterbody segments for further assessment. New monitoring stations were either associated with existing mapped waterbody segments or new waterbody segments were mapped to represent the new stations. Waterbody segments were mapped to account for hydrologic features or as described in the Basin Plans.

If staff were unable to associate a station with a waterbody segment, or the station did not include required metadata, or the station did not represent water quality conditions of the larger waterbody, then the data or information sourced from the station were not further considered. This is in accordance with Section 6.1.2.1 of the Listing Policy. Data collection locations deemed not representative of ambient conditions in the waterbody segment (e.g., storm drain outfalls, effluent discharge, etc.) were not further considered. This is in accordance with Section 1 and Section 6.1.5.2 of the Listing Policy.

The beneficial uses were identified for each waterbody segment. Some waterbodies were re-segmented, split into additional segments, or renamed since the 2018 Integrated Report was approved. These and other non-substantive mapping modifications are summarized in Appendix F: Miscellaneous Mapping Changes Report.

### **2.2.2. Quality Review**

Data and information were assembled and evaluated for quality per Section 6.1.4 of the Listing Policy. Each record was screened to interpret quality control metadata. Data and information that met Listing Policy quality standards were used as primary lines of evidence (“LOEs”) to make determinations of water quality standards attainment. Data and information that did not meet Listing Policy quality standards were considered

ancillary LOEs. Erroneous or inaccurate data and information were not further considered.

Quality review of data involved the application of filters to screen out data from stations with missing or inaccurate location information (latitude, longitude, and datum); data results that are less than the quantitation limit when the quantitation limit is greater than the water quality standard, objective, criterion or evaluation guideline; data flagged by a laboratory as rejected during quality control (“QC”) review; data from a quality control sample (laboratory duplicate, blank); and sample types that were not water quality-related data.

Data records that passed the screening filters were further evaluated based on available QC metadata and assigned estimated data quality tiers, as follows:

- Tier 0 - Metadata, QC record: Not a measurement of environmental conditions.
- Tier 1- Passed QC: Data passed all QC checks.
- Tier 2- Some review needed: Data did not pass minor QC checks; some effort needed to review and defend data if used.
- Tier 3- Spatial Accuracy Unknown: Data missing spatial datum information, data should not be used for fine scale spatial analysis.
- Tier 4- Extensive review needed: Data did not pass some critical QC checks, high level of effort needed to review and defend data if used.
- Tier 5- Unknown Data Quality: Data were not reviewed by the monitoring program. Data will need review before use.
- Tier 6- Reject Data: Data were rejected by the monitoring program or data did not pass all critical QC checks. Data deemed unusable.
- Tier 7- Error in Data.

Data classified in Tier 1 were considered to meet Listing Policy quality requirements for use as a primary LOE for listing decisions. Data classified in Tiers 0, 6, and 7 were considered inapplicable, erroneous, or inaccurate and were not further considered. Data classified in Tiers 2 through 5 were evaluated on a case-by-case basis to determine compliance with Listing Policy quality requirements and suitability for use as primary or ancillary lines of evidence to make listings or delisting recommendations based on determinations of water quality standards attainment.

Additionally, all datasets were associated with an approved QAPP, unless the dataset came from a monitoring program (such as SWAMP) specifically exempted from this requirement by the Listing Policy. Only data supported by an approved QAPP, or exempt from the QAPP requirement, were used as primary LOEs to make determinations of water quality standards attainment. In the absence of quality assurance documentation, data were used as ancillary evidence and not the basis of a listing or delisting recommendation. A list of the datasets and associated QAPPs from the 2020-2022 data solicitation is available in the References Report (Appendix G).

### 2.2.3. Data Averaging & Adjustments

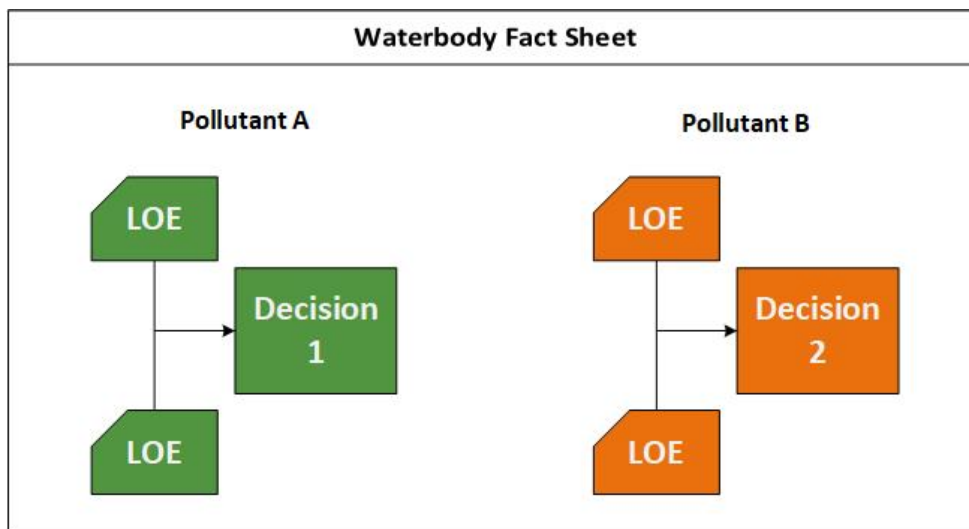
Some data were grouped to allow comparison of the data to water quality thresholds that are expressed with a specific averaging period (annual, 30-day, weekly, four-day, etc.) in accordance with Section 6.1.5.6 of the Listing Policy. For example, if the threshold is expressed as a 30-day geometric mean, data from samples collected within a 30-day timeframe were grouped and a geometric mean was calculated for comparison to the threshold. If only one datum point was available during an averaging period, it was used to represent the average concentration for that period. If the averaging period is not stated for the threshold, then data from samples collected less than 7 days apart were averaged.

Some data, such as metal concentrations, were adjusted based on the concentration of another constituent measured at the same time and location to allow for comparison to a threshold. For example, some metal data reported in the total fraction were converted to the dissolved fraction using hardness conversion factors before comparison to the threshold. See Section 2.5 for additional detail regarding pollutant-specific data manipulation steps.

### 2.2.4. Waterbody Fact Sheets

The LOEs and Decisions for each waterbody are included in Waterbody Fact Sheets. **Error! Not a valid bookmark self-reference.** shows the relationship between the three document types. In each waterbody, data from multiple pollutants may be assessed, resulting in more than one waterbody-pollutant Decision. Detailed Waterbody Fact Sheets for all waterbodies assessed for the 2020-2022 Integrated Report are available in Appendix B.

**Figure 2-3: Waterbody Fact Sheets – Information Summary**



## **2.3. Data Analysis to Determine Standards Attainment & Make Listing Recommendations**

Data that met mapping and quality assurance requirements of the Listing Policy (as described above) were analyzed using the listing factors identified in the Listing Policy to determine if water quality standards are attained in a waterbody. Standards include beneficial uses of water, water quality objectives or criteria set at levels to ensure the reasonable protection of beneficial uses, and antidegradation policies. Data and information were compared to thresholds protective of beneficial uses, including water quality objectives, water quality criteria, and evaluation guidelines. Whether or not these thresholds were exceeded describes a waterbody's ability to support its beneficial uses and determines whether to recommend listing, not listing, delisting, or not delisting the waterbody-pollutant combination as impaired on the 303(d) list.

### **2.3.1. Lines of Evidence**

Data and information were organized into individual LOEs and compared to the applicable thresholds to determine the beneficial use support rating. An LOE was prepared for each unique combination of a waterbody, pollutant, matrix, fraction, beneficial use, and threshold. The term "matrix" refers to the sample medium used in an LOE, such as water, sediment, or tissue. The "fraction" is the analyzed portion of the sample medium. For example, if the matrix of a sample is water, then the fraction can be either the total constituent or the dissolved portion of the constituent. The procedure to identify beneficial uses and the corresponding thresholds for each LOE is described in Section 2.4, below. An LOE is compared to applicable threshold(s) to determine the beneficial use support rating.

Three possible beneficial use support ratings were used for an individual LOE: Fully Supporting, Not Supporting, and Insufficient Information.

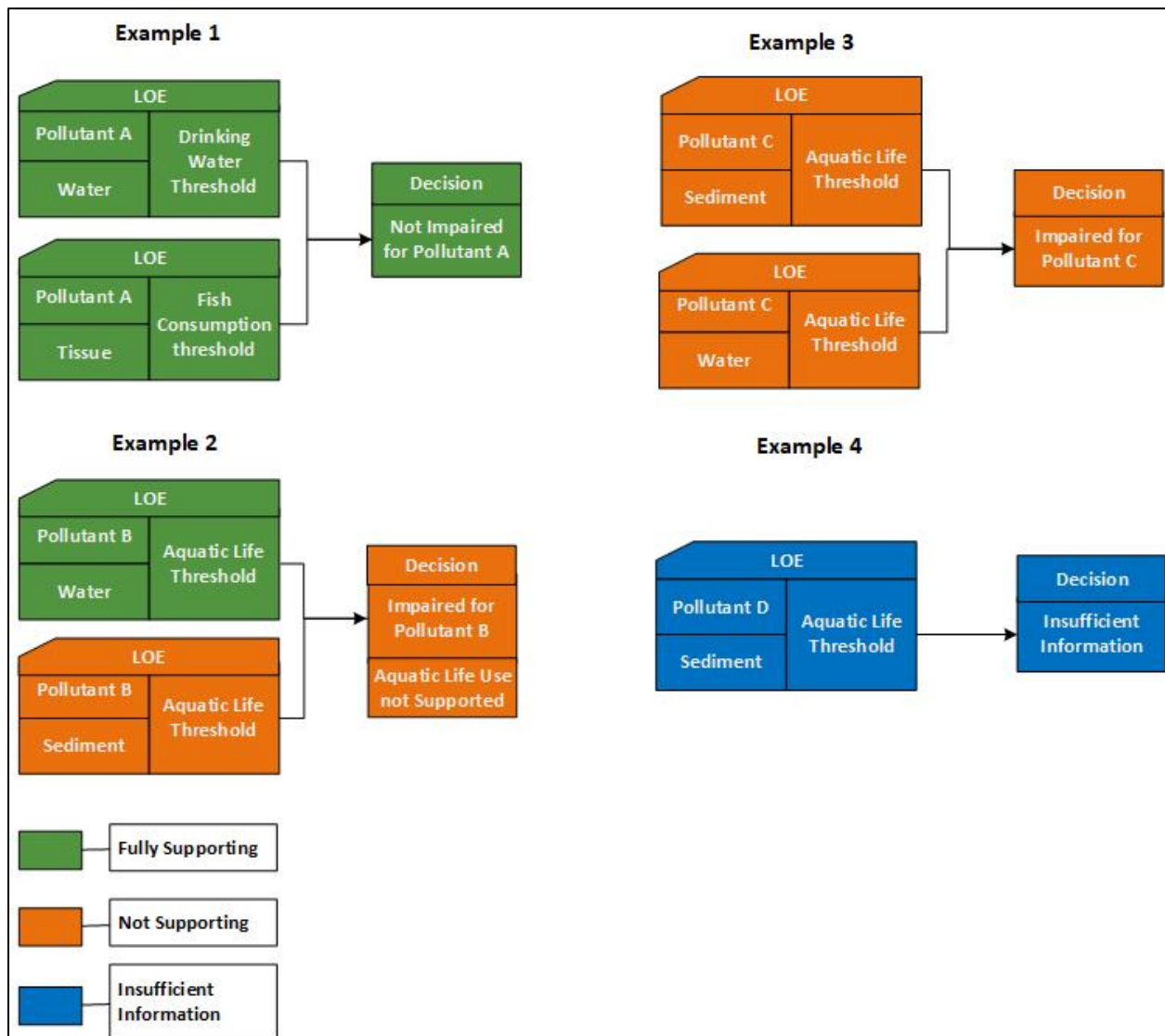
- Fully Supporting: Pollutants do not exceed thresholds with a frequency that cause a listing and the dataset consists of at least 26 samples for conventional pollutants or at least 16 samples for toxic pollutants.
- Not Supporting: Pollutants exceed thresholds with a frequency that cause a listing.
- Insufficient Information: It cannot be determined if a use is supported or not supported. This usually occurs when the data have poor quality assurance, there are not enough samples in a dataset, there is not an existing threshold, or the information alone cannot support a listing or delisting recommendation.

All individual LOEs for a particular pollutant in a particular waterbody were then aggregated into waterbody-pollutant combinations and a "Decision" was developed that describes the overall use support rating and recommendation to list, not list, delist, or not delist for that waterbody-pollutant combination. Decisions not supporting beneficial uses were added to the 303(d) list, as described in Section 2.3.2, below.

Retirement of an LOE occurs when it is no longer included in the decision for a waterbody-pollutant combination. Generally, retired LOEs from previous cycles are replaced with current LOEs when data are reassessed using a different threshold. LOEs retired during the 2020-2022 cycle are available in Appendix M: List of Retired Lines of Evidence.

See Figure 2-1 for examples of how LOEs are aggregated into Decisions based on beneficial use support ratings.

**Figure 2-1: Example of Aggregation of Lines Of Evidence into Decisions and Use Support Ratings**



### 2.3.2. Decisions

Each Decision is an evaluation, as required by the Listing Policy, to determine whether a waterbody-pollutant combination is impaired and suitable for placement on the 303(d)

list. Section 3 of the Listing Policy describes the factors used to add waters to the 303(d) list (“listing factors”). Section 4 of the Listing Policy describes the factors used to remove waters from the 303(d) list (“delisting factors”). The listing and delisting factors are summarized below.

Listing a waterbody-pollutant combination is recommended if adequate data exist to show that any of the following statements were true:

1. Evaluation of beneficial use support results in a rating of Not Supporting. Numeric data exceed the threshold more than the prescribed number of times. The number of times varies by the number of samples and is based on a binomial distribution as described in the Listing Policy. See Sections 3.1, 3.2, 3.3, 3.5, and 3.6 the Listing Policy for more information.
2. A health advisory against the consumption of edible resident organisms or a shellfish harvest ban has been issued. See Section 3.4 of the Listing Policy for more information.
3. Nuisance conditions exist for odor, taste, excessive algae growth, foam, turbidity, oil, trash, litter, and color when compared to reference conditions. See Section 3.7 of the Listing Policy for more information.
4. Adverse biological response is measured in resident individuals as compared to reference conditions and the impacts are associated with water or sediment concentrations of pollutants. See Section 3.8 of the Listing Policy for more information.
5. Significant degradation of biological populations and/or communities is exhibited as compared to reference sites and is associated with water or sediment concentrations of pollutants. See Section 3.9 of the Listing Policy for more information.
6. A trend of declining water quality standards attainment is exhibited. See Section 3.10 of the Listing Policy for more information.
7. The weight of evidence demonstrates that a water quality standard is not attained. See Section 3.11 of the Listing Policy for more information.

Delisting a waterbody-pollutant combination from the existing 303(d) list is recommended if adequate data exist to show that any of the following statements were true:

1. Evaluation of beneficial use support results in a rating of Fully Supporting. Numeric data do not exceed the threshold more than the prescribed number of times. The number of times varies by the number of samples and is based on a binomial distribution as described in the Listing Policy. See Sections 4.1, 4.2, 4.3, 4.5 and 4.6 of the Listing Policy for more information.
2. A health advisory has been removed or the evaluation guideline is no longer exceeded. See Section 4.4 of the Listing Policy for more information.
3. The water segment no longer satisfies the conditions for a nuisance listing. See Section 4.7 of the Listing Policy for more information.

4. Adverse biological response is no longer evident or associated water or sediment pollutants are no longer exceeded. See Section 4.8 of the Listing Policy for more information.
5. Degradation of biological populations and/or communities is no longer evident or associated water or sediment pollutants are no longer exceeded. See Section 4.9 of the Listing Policy for more information.
6. Trends in water quality are not substantiated or impacts are no longer observed. See Section 4.10 of the Listing Policy for more information.
7. The weight of evidence demonstrates that a water quality standard is attained. See Section 4.11 of the Listing Policy for more information.

The statewide 2020-2022 303(d) list was developed with the following assumptions:

1. The 2018 303(d) list (Appendix H) formed the basis for the 2020-2022 303(d) list submittal.
2. The provisions of the Listing Policy directed staff recommendations.
3. Invasive species were considered as pollutants and were considered for inclusion on the Section 303(d) list.
4. Flow alterations were not considered as an appropriate basis for listing, in accordance with *Earth Law Center v. State Water Resources Control Board* (Sacramento Superior Court Case No. 34-2017-80002726).
5. Waterbody-pollutant listings were independent of the TMDLs that have been approved and are being implemented for the waterbody. If a waterbody-pollutant combination is removed from the list for any reason, the delisting has no effect on the validity or requirements for implementing an existing TMDL that was adopted and approved by U.S. EPA. Implementation of water quality control plan and policy provisions are not affected by the Section 303(d) list.
6. Provisions of Basin Plans and statewide water quality control plans containing water quality thresholds were used as they are written. Judgments were not made during the list development process regarding the suitability, quality, or applicability of beneficial uses or water quality objectives.
7. Novel approaches for interpreting objectives were not used unless the approach was specifically allowed by the applicable water quality standards (e.g., analyzing wet and dry season data separately).

As stated above, the 2018 303(d) list was the basis for developing the listing recommendations for the 2020-2022 list. If a waterbody-pollutant combination was listed on the 2018 303(d) list, a recommendation was made to either keep it on the list or delist it. If the waterbody-pollutant combination was not listed on the 2018 list, a recommendation was made to either list it or keep it as not listed. The determination for each waterbody-pollutant combination along with a presentation of the data assessment and the recommended changes, when applicable, are documented in Waterbody Fact Sheets (see Appendix B).

Potential pollutant sources were only identified in Decisions when a specific source analysis has been performed as part of a TMDL or other regulatory process. Otherwise,



the potential pollutant source is marked “Source Unknown” or “No Source Analysis Available.”

### **2.3.3. Integrated Report Condition Categories**

The beneficial use support ratings contained in LOEs were the basis for determining the overall Integrated Report Condition Category for each assessed waterbody (as described in Section 2.3.1, above).

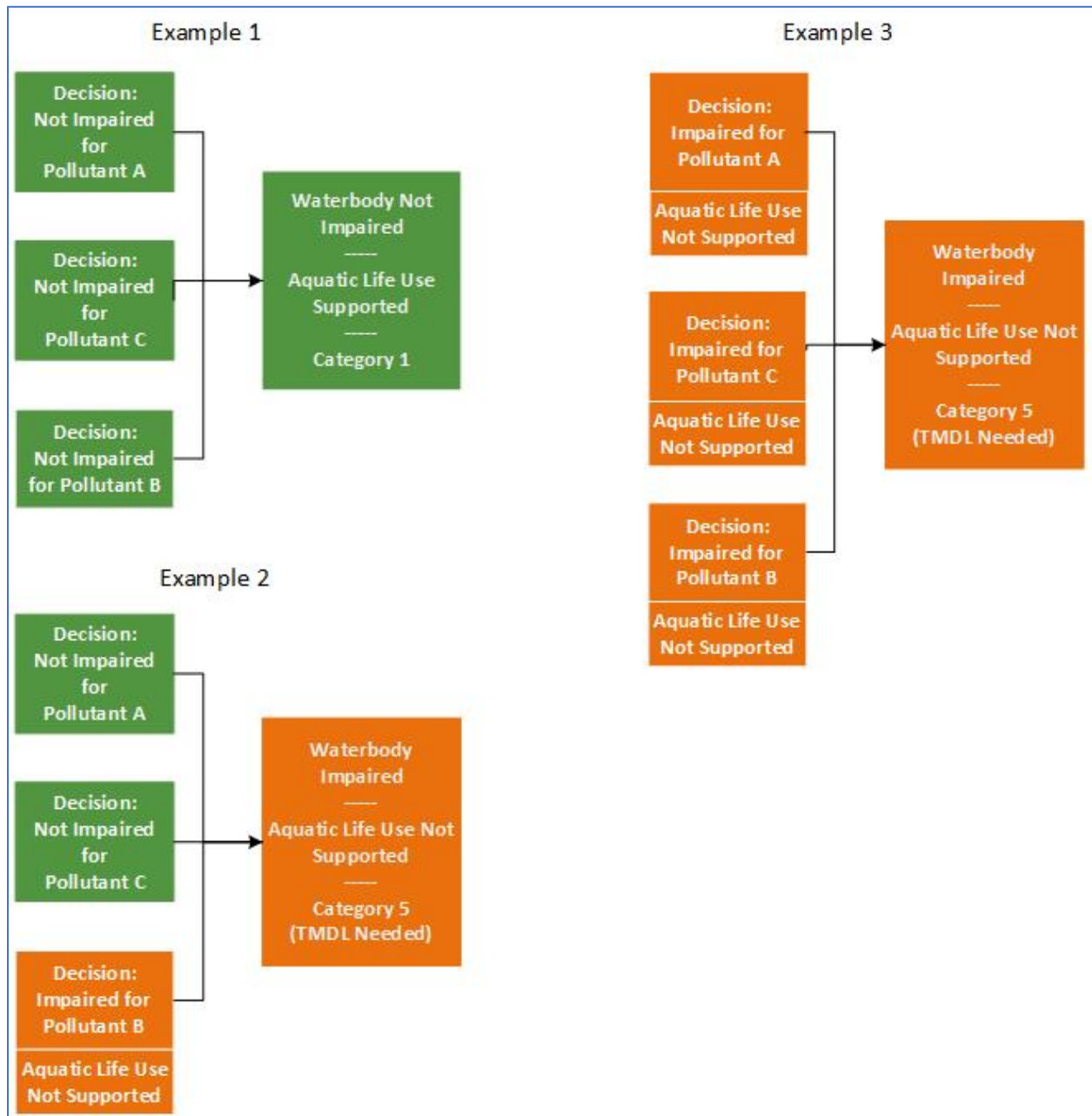
If a waterbody, or waterbody segment, had no existing or proposed impairment and at least one beneficial use was fully supported, it was placed in Category 1. If use support could not be determined for any beneficial uses, the waterbody segment was placed into Category 2. If there was indication of impairment but there were insufficient data to list, the waterbody was placed in Category 3. This approach was taken to prevent waterbodies with insufficient data from being classified as fully attaining standards and to indicate the need for a more thorough assessment in future listing cycles.

If a waterbody segment had one or more impairments in the waterbody needing a TMDL, it was placed into Category 5. The waterbody remains in Category 5 until TMDLs are developed or another regulatory program that is expected to attain standards is developed. Waterbodies where one or more impairments exist, but a TMDL is not needed, are placed in Category 4. There are three reasons why a TMDL would not be needed for a waterbody with one or more impairments. One, a TMDL has already been adopted and approved by the U.S. EPA. Waterbodies where all listings are being addressed and at least one is being addressed by U.S. EPA-approved TMDL were placed in Category 4a. Two, another regulatory program (an alternative to a TMDL) is expected to remove the impairment within a reasonable timeframe. Waterbodies were placed into Category 4b if it was determined that actions from another regulatory program will result in beneficial use attainment. Three, the impairment was not caused by a pollutant but rather caused by pollution, such as flow alteration or habitat alteration. Waterbodies where impairment is caused by pollution were placed in Category 4c. The 303(d) list is comprised of waterbodies in Categories 4a, 4b, and 5.

In some circumstances, TMDLs have been adopted by the Water Boards but approval from U.S. EPA is pending. In these cases, the waterbody remains in Category 5.

See Figure 2-3 below for examples of how Integrated Report Categories are determined based on the results of beneficial use support ratings. See also Appendix D: List of Adopted TMDLs.

**Figure 2-2: Examples of Integrated Report Condition Category Determination**



#### 2.4. Selecting Beneficial Uses and Thresholds

The beneficial uses for waters of California are identified in the Regional Water Boards' Water Quality Control Plans ("Basin Plans") or statewide water quality control plans, including the Water Quality Control Plan for Ocean Waters of California ("Ocean Plan") and the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries ("ISWEBE Plan"). See Table 2-1 for a list of the most frequently used beneficial uses for the Integrated Report with the most commonly used definitions. Some Basin Plans contain variations of the definitions.

If a beneficial use was not designated for a water segment in a Basin Plan or statewide water quality control plan, but it was determined that the beneficial use nonetheless actually exists in the water segment, the water segment was assessed using the existing beneficial use of the water. Beneficial use support was determined by comparing the data to a protective threshold. Thresholds may be water quality objectives, water quality criteria or other applicable evaluation guidelines that were selected in accordance with the Listing Policy.

When available, numeric water quality objectives and criteria were used to evaluate beneficial use attainment. Numeric water quality objectives are established in Basin Plans or in statewide water quality control plans, including the ISWEBE Plan and the Ocean Plan. Objectives may apply statewide, apply across an entire region, or be site-specific to a watershed or waterbody reach. Additionally, numeric water quality objectives and criteria include:

- Maximum Contaminant Levels (numeric objectives by reference in some Basin Plans) to the extent applicable. Examples include:
  - Table 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of the California Code of Regulations, title 22, Section 64431
  - Table 64444-A (Organic Chemicals) of the California Code of Regulations, title 22, Section 64444
  - Tables 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of the California Code of Regulations, title 22, Section 64449
- Numeric criteria for priority toxic pollutants contained in the California Toxics Rule or “CTR” (40 C.F.R. § 131.38)

If numeric water quality objectives or criteria were not available, evaluation guidelines were selected in conformance with Section 6.1.3 of the Listing Policy. Section 6.1.3 of the Listing Policy describes the process for selecting guidelines for sediment quality, fish and shellfish consumption, aquatic life protection from bioaccumulation of toxic substances, as well as other parameters. All objectives, criteria and evaluation guidelines used for 2020-2022 assessments are listed in Appendix B: Statewide Waterbody Fact Sheets.

Thresholds may be revised, resulting in the need to reassess all previously assessed data and information. For these reassessments, all available previously assessed data were identified and processed for comparison with the revised/current threshold. The assessment is documented in a new LOE, and the previous LOE was retired and not used further. If data and information were unable to be reassessed (e.g., data and information used to make listing recommendations prior to 2006 that are not available in CalWQA and therefore not “readily available”), the previous LOE with the previous threshold was retained and considered as part of the weight of the evidence for determining attainment of standards. For the 2020-2022 Integrated Report, data were reassessed statewide for bacteria, multiple pesticides in water, and mercury in tissue.

LOEs retired during the 2020-2022 cycle are available in Appendix M: List of Retired Lines of Evidence.

**Table 2-1: Summary of Beneficial Uses and Common Definitions**

Beneficial Use	Definition
<b>MUN</b>	<b>Municipal and Domestic Supply:</b> Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
<b>AGR</b>	<b>Agricultural supply:</b> Uses of water for farming, horticulture or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
<b>REC-1</b>	<b>Water Contact Recreation:</b> Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.
<b>REC-2</b>	<b>Non-Contact Water Recreation:</b> Uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
<b>COMM</b>	<b>Ocean Commercial and Sport Fishing:</b> Uses of water for commercial or recreational collection of fish and shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.
<b>SHELL</b>	<b>Shellfish Harvesting:</b> Uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g., clams, oysters, abalone, and mussels) for human consumption, commercial or sport purposes.
<b>WARM</b>	<b>Warm Fresh Water Habitat:</b> Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
<b>COLD</b>	<b>Cold Fresh Water Habitat:</b> Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
<b>EST</b>	<b>Estuarine Habitat:</b> Uses of water that support estuarine ecosystems including, but not limited to, preservation or enhancement of estuarine

Beneficial Use	Definition
	habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds).
<b>MAR</b>	<b>Marine Habitat:</b> Uses of water that support marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds).
<b>RARE</b>	<b>Rare, Threatened, or Endangered Species:</b> Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened or endangered.
<b>WILD</b>	<b>Wildlife Habitat:</b> Uses of water that support terrestrial ecosystems including, but not limited to, preservation or enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.
<b>MIGR</b>	<b>Migration of Aquatic Organisms:</b> Uses of water that support habitats necessary for migration or other temporary activities by aquatic organisms, such as anadromous fish.
<b>CUL</b>	<b>Tribal Tradition and Culture:</b> Uses of water that support the cultural, spiritual, ceremonial, or traditional rights or lifeways of California Native American Tribes, including, but not limited to: navigation, ceremonies, or fishing, gathering, or consumption of natural aquatic resources, including fish, shellfish, vegetation, and materials.
<b>T-SUB</b>	<b>Tribal Subsistence Fishing:</b> Uses of water involving the non-commercial catching or gathering of natural aquatic resources, including fish and shellfish, for consumption by individuals, households, or communities of California Native American Tribes to meet needs for sustenance.
<b>SUB</b>	<b>Subsistence Fishing:</b> Uses of water involving the non-commercial catching or gathering of natural aquatic resources, including fish and shellfish, for consumption by individuals, households, or communities, to meet needs for sustenance.

## 2.5. Pollutant Assessment Methods

This section explains how data for some pollutants were assessed using water quality criteria that apply statewide or to more than one Regional Water Board. Region-specific assessments, or assessments using SSOs, are described in Sections 4-7 of the staff report.

### 2.5.1. Bacteria

Bacteria data from waterbodies with the water contact recreation (“REC-1”) beneficial use were assessed in accordance with the statewide bacteria objectives or SSOs, where applicable. The statewide bacteria objectives apply to inland surface waters and marine waters as described in Part 3 of the ISWEBE Plan (SWRCB, 2019a) and the Ocean Plan (SWRCB, 2019c). For inland surface waters, the indicators for assessment depend on the salinity of the water. Saline waters are defined as waters where the salinity is greater than one part per thousand (“ppt”) more than five percent of the time whereas freshwaters include all waters where the salinity is equal to or less than one part per thousand 95 percent or more of the time. *Escherichia coli* (“*E. coli*”) is the bacteria indicator for freshwater and enterococci is the indicator for inland saline, estuarine, and marine waters. Fecal coliform is a second indicator in marine waters.

Statewide bacteria objectives for REC-1 waters include two numeric values for each indicator, one based on a six-week or 30-day geometric mean (“geomean”) and another based on a statistical threshold value (“STV”) or single sample maximum (“SSM”) calculated on a monthly basis. The *E.coli* bacteria objective includes a six-week rolling geomean not to exceed 100 colony forming units (“cfu”) per 100 milliliters (“mL”), calculated weekly, and a STV of 320 cfu per 100 mL not to be exceeded by more than 10 percent of the samples collected in a calendar month, calculated in a static manner. The enterococci bacteria objective includes a six-week, rolling geomean of 30 cfu per 100mL calculated weekly, and a STV of 110 cfu per 100mL not to be exceeded by more than 10 percent of samples in a calendar month. The fecal coliform bacteria objective includes a 30-day geomean not to exceed 200 per 100 mL, calculated based on the five most recent samples from each site, and an SSM not to exceed 400 per 100 mL.

The geomean was applied only if a statistically sufficient number of samples was available (generally not less than five samples collected over the specified averaging period). In waterbodies where a statistically sufficient number of geomean samples were not available, then attainment of the bacteria objective was determined based only on the STV or SSM per the weight of evidence approach outlined in Sections 3.11 and 4.11 of the Listing Policy. Beach notification information, if available, was also used in the weight of evidence evaluations. Table 2-2 below provides a summary of the current water quality thresholds used for bacteria assessments in the 2020-2022 Integrated Report cycle.

**Table 2-2: Summary Water Quality Thresholds used for Bacteria**

<b>Beneficial Use</b>	<b>Waterbody Type</b>	<b>Threshold(s)</b>	<b>Reference</b>
<b>REC-1</b>	Inland saline surface waters, enclosed bays and estuaries (salinity > 1 ppt, > 5% of the time)	Enterococci (Geomean preferred, STV)	ISWEBE Plan
<b>REC-1</b>	Inland fresh surface waters (salinity ≤ 1 ppt, ≥ 95% of the time)	<i>E. coli</i> (Geomean preferred, STV)	ISWEBE Plan
<b>REC-1</b>	Ocean	Fecal coliform (Geomean, SSM) Enterococci (Geomean preferred, STV)	Ocean Plan
<b>SHELL</b>	Ocean	Total coliform (median)	Ocean Plan
<b>SHELL</b>	Bays and estuaries	Total coliform (median)	Basin Plan

#### A. Data Reassessments for REC-1 Waters

For waterbodies covered under the ISWEBE Plan, this is the first Integrated Report cycle for which fecal coliform is no longer considered a valid indicator assessing support of the REC-1 beneficial use, and fecal coliform LOEs from prior cycles were not transferred to the 2020-2022 cycle. Additionally, past assessments did not distinguish between inland freshwater and inland saline water. All inland saline water assessments included all indicator bacteria data available (i.e., total coliform, fecal coliform, *E. coli*, enterococci), gave equal preference to geomean and STV, and used water quality thresholds from various references. The revised bacteria objectives in the ISWEBE Plan, adopted in 2019, supersede most other water quality objectives associated with the REC-1 use.

The REC-1 threshold in the Ocean Plan for total coliform was eliminated as part of the 2019 Amendment. As a result, no new total coliform data were assessed for REC-1 in ocean waters. All past REC-1 LOEs based solely on total coliform were retired. Listing decisions were based on the revised objective for enterococci and the objective for fecal coliform.

Additionally, historical LOEs may have used *E. coli* as a measurement for fecal coliform. All past *E. coli* LOEs were retired and not used in the 2020-2022 Integrated Report for marine waters if enterococci or fecal coliform data collected since 2010 were available in the waterbody to determine standard attainment. Indicator bacteria (total coliform, fecal coliform, *E. coli*, enterococci) populations may fluctuate substantially on a daily, seasonal, or yearly basis. Lacking constant inputs, they do not persist in the environment for a long period and effects are of relatively short duration. As a result,

the historical levels of indicator bacteria in the waterbody may be a poor indicator of current risks to human health, particularly when more recent data are available to sufficiently assess the water quality standard. Additionally, water quality conditions in waterbodies have changed as a result of management actions that have been implemented to address bacteria sources. Unrepresentative data may result in incorrectly placing or not placing a water body segment on the CWA section 303(d) List. This could result in the unnecessary expenditure of public resources or missing a problem completely. Therefore, historic indicator bacteria data collected prior to 2010, were evaluated pursuant to these considerations and were not used to assess water quality standards attainment when more recent data were sufficient to make a listing recommendation.

### **2.5.2. SHELL Beneficial Uses**

Bacteria data from waterbodies with the Shellfish Harvesting (“SHELL”) beneficial use were assessed in accordance with the statewide bacteria objectives or SSOs, where applicable. The statewide bacteria objectives apply to ocean waters. As described in the Ocean Plan, ocean waters are the territorial marine waters of the state as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons (SWRCB, 2019c). Total coliform is the main indicator used to assess the SHELL objectives.

The statewide bacteria objectives for SHELL waters are in two parts, a 30-day median total coliform density (“median”), not to exceed 70 per 100mL, and an objective that states that not more than 10 percent of the samples shall exceed 230 per 100 mL. The 10 percent exceedance rate is calculated for a 30-day period. Both the median and 10 percent exceedance rate objectives are used to assess water quality standards attainment. Additionally, historical total coliform data collected prior to 2010 were not used to assess water quality standards attainment when more recent data were sufficient to make a listing decision.

The State Water Board identified the need to consider revising the total coliform objectives for the protection of the SHELL use in the 2019 triennial review of the Ocean Plan, citing comments that the objectives are unattainable. As part of the review, the State Water Board prioritized as a high priority a future project to consider revising the SHELL use to distinguish between recreational, commercial, or tribal types of harvesting, and to consider revising the bacterial objectives applied to areas where shellfish are harvested. Should the total coliform objectives be revised in the future, previously assessed data will be reassessed and compared to the new objectives.

### **2.5.3. Cyanotoxins**

For the 2020-2022 cycle, the cyanotoxins microcystins, anatoxin, cylindrospermopsin, and saxitoxin were assessed. Cyanotoxin data were compared to Office of Environmental Health Hazard Assessment (“OEHHA”) Cyanotoxin Action Levels



(OEHHA, 2012), California Cyanobacteria and Harmful Algal Bloom Network (“CCHAB”) Trigger Levels (California Water Quality Monitoring Council, 2016), U.S. EPA Drinking Water Health Advisories for Microcystins (U.S. EPA, 2015a) and Cylindrospermopsin (U.S. EPA, 2015b), and the Oregon Health Authority’s public health advisory guidelines (Oregon Health Authority, 2019). These thresholds were utilized per Section 6.1.3 of the Listing Policy as evaluation guidelines to assess attainment of REC-1 and Municipal and Domestic Supply (“MUN”) beneficial uses.

To evaluate attainment of the REC-1 beneficial use, multiple evaluation guidelines were considered for microcystins, anatoxin, and cylindrospermopsin. The CCHAB Network Trigger Levels are divided into three risk-based tiers: Caution (Tier 1), Warning (Tier 2), and Danger (Tier 3). Swimming is prohibited at the Tier 2 level. For anatoxin and cylindrospermopsin, the CCHAB Tier 2 levels were used as evaluation guidelines to determine impairment. For microcystins, the CCHAB Tier 2 level is not protective of dogs. Since dog deaths are one of the most commonly observed impacts resulting from cyanotoxins in water, the OEHHA subchronic water intake action level for dogs was used as the evaluation guideline for microcystins data. As an additional level of review, cyanotoxin data were also compared to the CCHAB Tier 1 levels. Waterbodies where the cyanotoxin levels exceeded the Tier 1 levels but were below the Tier 2 levels were further evaluated to determine if additional data or information for the waterbody were available that would warrant an impairment decision, per Section 3.11 of the Listing Policy. Waterbodies where cyanotoxin levels were below the CCHAB Tier 1 levels were not determined to be impaired. Saxitoxin data were not evaluated for REC-1 beneficial use attainment due to the lack of an evaluation guideline.

To evaluate attainment of the MUN beneficial use, the U.S. EPA 10-day Drinking Water Health Advisory for Infants and Young Children thresholds were utilized as evaluation guidelines for microcystins and cylindrospermopsin data. The Oregon Health Authority Drinking Water Guidance Value for children 5 and under were used as evaluation guidelines for anatoxin and saxitoxin.

#### **2.5.4. Pesticides, Other Organic Chemicals, and Metals**

Pollutant concentrations in water, sediment, and tissue were assessed based on applicable thresholds. Most assessments were a direct comparison of the data result with the threshold, while some assessments included data manipulation before comparison with the threshold. More detailed explanations of assessment methods by matrix are included in the subtopics below.

##### **A. Water Matrix**

Pesticides, organic chemicals, and metals data from water column samples were assessed using thresholds from the CTR, U.S. EPA national recommended water quality criteria (U.S. EPA, 2019b), maximum contaminant levels, U.S. EPA aquatic life benchmarks (“benchmarks”) (U.S. EPA, 2019a), U.S. EPA Office of Pesticide Programs’ Pesticide Ecotoxicity Database (“Ecotoxicity Database”) (U.S. EPA 2012a), or other sources that meet requirements of the Listing Policy. An explanation is provided below

on thresholds specific to a type of pollutant or a pollutant that required data manipulation.

i. Pesticides

Many legacy pollutants, such as dichloro-diphenyl-trichloroethane (“DDT”) and other organochlorine pesticides, were assessed using criteria from the CTR or the national recommended water quality criteria.

While most sources provided one threshold, the aquatic life benchmarks and the Ecotoxicity Database provided many studies for selection of a threshold. The lowest aquatic life benchmark reported for a pesticide was selected as the threshold to use for assessments. A threshold from the Ecotoxicity Database may be based on a single study or include multiple studies combined as a geomean or maximum acceptable toxicant concentration. Studies from the Ecotoxicity Database were required to meet certain parameters for use as a threshold. The parameters focused on quality and applicability of the study and included:

- Whether the study was classified as a core study
- Whether the study was conducted on freshwater
- Whether the chemical used in the study was greater than 80% pure
- Whether the endpoint in the study was linked to survival, growth, or reproduction
- Whether the species studied was in a family that resides in North America
- The acceptable standard or equivalent method used
- The toxicity values that were calculated or were calculable (i.e., LC50)

Multiple methods were available for the assessment of pyrethroids in water. The total or freely dissolved pyrethroid concentration may be used for either of the following: 1) comparison with the individual chronic pyrethroid threshold, or 2) comparison of multiple pyrethroids in an additive manner with one concentration goal unit (“CGU”). The additive effects were assessed by calculating the sum of individually measured pyrethroid concentration-to-chronic-concentration-goal ratios and using one CGU according to the following equation:

$$CGU_{chronic} = \frac{C_1}{CCG_1} + \frac{C_2}{CCG_2} + \frac{C_n}{CCG_n}$$

Where,

$C_1$  = Concentration of pyrethroid 1

$CCG_1$  = Chronic Concentration Goal of pyrethroid 1

$C_2$  = Concentration of pyrethroid 2

$CCG_2$  = Chronic Concentration Goal of pyrethroid 2

The CGU was developed as part of the Amendment to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Pyrethroid

Pesticide Discharges (R5-2017-0057) by the Central Valley Regional Water Board (Region 5 pyrethroid amendment). Pyrethroid assessment methods selected for use in a region are identified in Regional Water Board 303(d) Recommendations (Sections 4, 5 and 6).

Many pesticide assessments in prior Integrated Reports were based on thresholds selected from the Ecotoxicity Database. Most of these thresholds were replaced by thresholds selected from the benchmarks. The benchmarks are based on toxicity values from scientific studies reviewed by the U.S. EPA and included the risk assessment process for pesticides. The benchmarks are an estimate of a pesticide concentration below which there is not expected to be a risk of concern to aquatic life. Chronic and acute benchmarks were available for nonvascular and vascular plants, invertebrates, and fish. The lowest of available thresholds for a pesticide was selected as the threshold for assessment of pesticide data. For the 2020-2022 Integrated Report, all available data for on-cycle regions were assessed according to the selected pesticide benchmark.

When appropriate, certain pollutants are added together and assessed using an evaluation guideline for the sum of the pollutants. For example, the following pollutants are summed and compared to the evaluation guideline for chlordane: Nonachlor, cis-; Nonachlor, trans-; Chlordane, cis-; Chlordane, trans-; and Oxychlordane. Another example includes polychlorinated biphenyls (“PCBs”), which were evaluated based on CTR guidance to sum the PCB aroclors for aquatic life and either congeners or aroclors for human health for comparison to criteria protective of human health and aquatic life. A list of the pollutants referred to as “summing pollutants” can be found in Appendix N: List of Summing Pollutants.

#### ii. Other Organic Chemicals

Polychlorinated biphenyls (“PCBs”) were evaluated based on CTR guidance to sum the PCB aroclors for aquatic life and either congeners, or aroclors for human health for comparison to the corresponding aquatic life and human health criteria. CTR guidance was followed to derive aquatic life criteria dependent on pH for the organochlorine pentachlorophenol.

#### iii. Metals

The CTR includes hardness-adjusted aquatic life criteria for cadmium, copper, chromium III, lead, nickel, silver, and zinc. The criteria were calculated based on the equations provided in the CTR, using hardness data collected at the same sample location, day, and time. If no hardness data were available, a default value of 100 mg/L was used in the equation, as specified in the CTR. The calculated criteria were then compared with the data result.

The CTR aquatic life criteria for arsenic, cadmium, chromium III, chromium VI (freshwater only), copper, lead, nickel, selenium (saltwater only), silver, and zinc are for the dissolved fraction. Data results from these constituents that were reported as “total”

were converted to dissolved using the CTR conversion factor before comparison with the corresponding criteria. Conversion factors for cadmium and lead were also hardness-adjusted using a CTR formula.

## B. Sediment Matrix

Evaluation guidelines for assessment of pollutant concentration data in sediment were selected in accordance with Section 6.1.3 of Listing Policy. See below for an explanation of pesticide assessments that required data manipulation.

### i. Pesticides

The toxicity of some pesticides is dependent on the amount of organic carbon within sediment. If the threshold selected for assessment was based on organic carbon normalization, the pesticide data were also organic carbon-normalized (using the organic carbon content from the same sample) for comparison of the data with the threshold. Data for the following pesticides (when measured in sediment samples) were organic carbon-normalized: pyrethroids, fipronil, fipronil metabolites, and the organophosphates chlorpyrifos, diazinon, and methyl parathion.

Organic carbon-normalized pyrethroids are compared to organic carbon-normalized thresholds. These thresholds are based on the geometric mean of multiple values of the lethal concentrations of 50 percent of the population ("LC50"), normalized for the organic carbon content of the soil. The geometric mean is the preferred statistic to calculate a singular threshold since the distribution of toxicity test results are generally not normally distributed and are more likely to follow a lognormal distribution (U.S. EPA, 1985). Assessments conducted for Central Valley Region waterbodies use one-tenth the LC50 value in accordance with the Central Valley Water Quality Control Plan (2018).

Calculations of additive toxicity, or toxic units, were used to assess impairment based on the cumulative impact of individual organophosphate and pyrethroids pesticides. For these pesticides, the evaluation guideline for the protection of aquatic life is one toxic unit equivalent (Amweg et al., 2006 for pyrethroid pesticides, and Bailey et al., 1997 for organophosphate pesticides). A toxic unit equivalent is equal to the sum of all individual pyrethroids concentrations from a single sample, each having their reported concentration divided by their respective evaluation guideline prior to being summed. If this calculation results in a value greater than one, the sample is counted as an exceedance of the water quality objective.

## C. Tissue Matrix - Fish and Shellfish

Pesticides, other organic chemicals, and metals (except mercury) in fish and shellfish tissue were assessed based on a modified version of the Fish Contaminant Goals (FCG) developed by OEHHA (OEHHA, 2008). The FCG were modified by replacing the 0.7 cooking reduction factor with a value of 1.0. A cooking reduction factor is a numeric value that approximates the amount of contaminant removed from tissue by cooking. A cooking reduction factor of 1.0 implies there is no reduction in contaminant concentration from cooking. U.S. EPA guidance allows for the assumption of no contaminant loss during preparation and cooking (U.S. EPA, 2000). Tissue sample fractions were reported as either "whole organism" or "fish fillet." The modified OEHHA

FCGs were used for assessment (with the exception of mercury) of both whole organism and fish fillet data. Information related to assessment of specific pollutants is provided in the below subtopics.

i. Mercury

Mercury concentrations in fish tissue were reported in terms of individual fish or multiple fish per composite sample. Annual composite averages were weighted when composites have an unequal number of fish or samples were a mix of composites and individuals. Fork lengths were used in place of total lengths when the total length was unknown. The total length of a fish was assumed to be at least as long as the fork length. In addition, data from fish with lengths smaller or larger than the California Department of Fish and Wildlife's fishing regulation legal size limits were not used to determine attainment with the Commercial and Sport Fishing beneficial use.

For comparison with the mercury objectives, mercury data were assessed as datasets. Each dataset grouped all fish tissue data collected in a waterbody or at a station in a calendar year by trophic level ("TL") and an annual average value was calculated. Each annual average was considered one sample.

The mercury annual average value was then compared to the appropriate objective applied to each beneficial use for a waterbody. Three mercury objectives were primarily used: the sport fish objective, the prey fish objective, and the California least tern objective. The objectives were established to protect one or more beneficial uses depending on the consumption pattern (which includes consumption rate, fish size, and species) by individuals and wildlife. The sport fish objective applies to waters with the beneficial uses of Commercial and Sport Fishing ("COMM"), Wildlife Habitat ("WILD"), Marine Habitat ("MAR"), or Tribal Tradition and Culture ("CUL"). The prey fish objective applies to waters with the beneficial uses of WILD or MAR. The California least tern objective applies to waters with the beneficial uses of WILD, MAR, or Rare, Threatened, or Endangered Species ("RARE"). Table 2-3 summarizes the mercury objectives. Additional information on trophic levels and fish lengths is located in Tables C-1 and C-2 of Part 2 of the ISWEBE Plan (SWRCB, 2017).

**Table 2-3: Mercury Water Quality Objectives By Category, Beneficial Uses, and Fish Size**

<b>Mercury Objective Category</b>	<b>Beneficial Use</b>	<b>Fish Length (total length in mm)</b>	<b>Mercury Objective (mg/kg)</b>
Sport Fish TL4	COMM, WILD, MAR, CUL	200-500	0.2
Sport Fish TL3	COMM, WILD, MAR, CUL	150-500	0.2
Prey Fish (any species)	WILD, MAR	50-150	0.05
California Least Tern	RARE, WILD, MAR where least tern habitat exists	<50	0.03

The objectives are interpreted as an absolute value and are not assigned a designated number of significant figures.

For the sport fish objective, data from TL3 and TL4 fish species were used for assessment of COMM.

Assessment of data from TL4 fish were used to evaluate whether all species are supported with respect to the WILD and MAR beneficial uses. If data from just TL3 fish were used, protection of all species within the WILD and MAR beneficial uses is not ensured. Therefore, if data from TL3 fish were used, then the prey fish objective was used instead of the sport fish objective. If the waterbody is habitat for the California least tern, then the least tern objective was used. However, if the data from TL3 fish indicate non-attainment of the sport fish objective, there is sufficient evidence to indicate that the prey fish objective (or the least tern objective, if applicable) is not attained. Exceedance of the prey fish objective indicates impairment of the WILD and MAR beneficial uses. Non-exceeding TL3 fish provide insufficient information for the assessment of the WILD and MAR beneficial uses.

For the prey fish objective, data from any fish species and trophic level were used for assessment of WILD or MAR. The prey fish objective applies during the breeding season, which is February 1 through July 31 unless site-specific information indicates another appropriate breeding period. For the purpose of the 2020-2022 Integrated Report, data from all prey fish sample results collected throughout the year were compared to the prey fish objective due to the lack of a better threshold in the non-breeding period.

Determination of waterbody placement on the 303(d) list based on tissue is described in Sections 3.4 and 3.5 of the Listing Policy. Listing Policy Section 3.11 (the situation specific weight of evidence approach) may be utilized to determine placement on the

303(d) list if information indicates non-attainment of standards. For a flow chart illustrating fish tissue mercury assessments for the 2020-2022 Integrated Report, see Appendix E.

Statewide mercury objectives for fish tissue were established in Part 2 of the ISWEBE Plan in 2017 (SWRCB, 2017). For waterbodies in the Central Coast, Central Valley, and San Diego regions, this is the first Integrated Report cycle for which data are compared to the new objectives. Assessments of mercury in tissue in prior integrated reports were based on various mercury evaluation guidelines. For the 2020-2022 Integrated Report, all available data for on-cycle regions were reassessed in accordance with the mercury objectives adopted in 2017.

#### ii. Polycyclic Aromatic Hydrocarbons (PAHs)

Polycyclic aromatic hydrocarbons (PAHs) were assessed by comparing a potency-weighted total concentration of PAHs with the threshold for benzo(a)pyrene. The potency-weighted concentration was calculated for each PAH by multiplying the concentration of the PAH by a toxicity equivalency factor (TEF). The TEF is the toxicity of each PAH relative to benzo(a)pyrene. The potency-weighted concentrations for all PAHs were summed to create the potency-weighted total concentration for total PAH. The potency-weighted total concentration was then compared with the threshold for benzo(a)pyrene.

### 2.5.5. Aluminum

The December 17, 2021 Proposed Final Staff Report included recommendations to list 34 waterbodies in the Central Valley Region and list 31 waterbodies in the Central Coast Region as impaired for aluminum for toxic impacts to aquatic life beneficial uses. The listing recommendations were based on assessments of readily available aluminum data using the U.S. EPA's 1988 Ambient Water Quality Criteria for Aluminum, which includes a chronic criterion expressed as a single aluminum concentration of 87 ug/L.

Commenters expressed concerns that the 87 ug/L criterion is overly protective and has not been used within recently adopted permits or water effect ratio studies.

Commenters suggested that data be compared to U.S. EPA's more recent 2018 Final Aquatic Life Ambient Water Quality Criteria for Aluminum, which includes a chronic criterion expressed as variable aluminum concentration based on pH, dissolved organic carbon, and total hardness values. Commenters also suggested use of a threshold consistent with results from water effect ratio analyses or other similar analyses.

Aluminum data submitted for the 2020-2022 Integrated Report did not include total hardness or dissolved organic carbon data. Some pH data were submitted. Because it was not possible to apply the 2018 criterion, data were initially evaluated using the 1988 U.S. EPA Ambient Water Quality Criteria.

Staff conducted a cursory review of pH, dissolved organic carbon, and hardness data collected from other sources to compare aluminum data to the 2018 criterion. The Water Board's Office of Information Management and Analysis compiled data that had

not been submitted during the data submittal period for the 2020-2022 Integrated Report. Data were obtained and compiled for the following three waterbodies: Sacramento River (Sacramento City Marina to Suisun Marsh Wetlands); Middle River (in Delta Waterways, central portion); and San Joaquin River (in Delta Waterways, southern portion). Staff selected all nearby stations less than 200 feet from the station with aluminum data, as well as two upstream and two downstream stations when applicable.

Total hardness values were calculated using calcium concentrations per the following formula:

$$\text{Total Hardness as CaCO}_3 \frac{\text{mg}}{\text{L}} = 2.497 * \left( \text{CA} \frac{\text{mg}}{\text{L}} \right) + 4.118 * \left( \text{MG} \frac{\text{mg}}{\text{L}} \right)$$

Additionally, total hardness data from CEDEN dating from the 1950s to 1980s was used to provide context, characterize seasonal trends, and as a check of the calculated hardness data. The CEDEN data were not used further because they are likely not representative of the waterbody's current condition.

After analyzing the pH, dissolved organic carbon, and total hardness data, staff utilized the U.S. EPA Aluminum Criteria Calculator (<https://www.epa.gov/wqc/aquatic-life-criteria-aluminum>) to determine the appropriate chronic aluminum threshold. Based on this cursory review, aluminum concentrations appear to be well below the threshold when accounting for pH, dissolved organic carbon, and total hardness data. None of the aluminum samples exceeded the threshold.

Based on the cursory review, aluminum listing recommendations for 65 waterbodies were revised for the 2020-2022 Integrated Report. Aluminum data were evaluated but not used to make listing or delisting recommendations for the 2020-2022 303(d) list. The aluminum listing decisions associated with aluminum data first submitted for the 2020-2022 Integrated Report and evaluated for attainment of aquatic life beneficial uses will remain as identified in the 2018 Integrated Report to afford adequate time to gather data and for staff and stakeholders to review any proposed changes. Data will be assessed during the 2024 Integrated Report using the 2018 criterion following additional efforts to gather and apply pH, dissolved organic carbon, and hardness data. This review will include researching existing water effect ratio studies or similar analyses.

### **2.5.6. Aquatic Toxicity**

Aquatic toxicity tests are conducted in a laboratory by exposing test organisms, consisting of vertebrate, invertebrate, and plant species, to water or sediment samples collected in the field. Test and control organism responses (e.g., mortality, growth, reproduction) are measured and results are evaluated to determine if there is a statistically significant difference in responses between the test and the control organisms. In addition, the percent effect to the test organisms in the sample is calculated. The percent effect is a measure of the similarity between the organisms in the sample matrix and the control organisms.



A sample is defined as a water or sediment sample collected from the same location on the same day. Although the sample may be tested in the laboratory with multiple test species, it is still one sample. One LOE may summarize the results for multiple test species and may include the test species that exhibited toxicity.

For purposes of the 2020-2022 Integrated Report, acute and chronic aquatic toxicity data results were grouped into one of four categories based on the occurrence of a significant effect between the test and the control organisms, and the percent of the effect. The four significant effect categories are shown in Table 2-4, below.

**Table 2-4: Aquatic Toxicity Significant Effect Categories**

Code	Definition	Explanation
“Not Significant, Greater Similarity” (NSG)	The test result is not statistically significant and shows a greater similarity to the control (i.e., the percent effect is below a 20% threshold).	The result indicates that the sample is not toxic. This data can be used with confidence.
“Not Significant, Less Similarity” (NSL)	The test result is not statistically significant but shows less similarity to the control (i.e., the percent effect is equal to or greater than a 20% threshold).	The result indicates that the sample may or may not be toxic, and that further investigation is necessary.
“Significant, Greater Similarity” (SG)	The test result is statistically significant but shows greater similarity to the control (i.e., the percent effect is below a 20% threshold).	The result indicates that the sample may or may not be toxic, and that further investigation is necessary.
“Significant, Less Similarity” (SL)	The test result is statistically significant and shows less similarity to the control (i.e., the percent effect is equal to or greater than a 20% threshold).	The result indicates that the sample is toxic. This data can be used with confidence.

For the purposes of 2020-2022 Integrated Report, only samples with a Significant Effect Code of “SL” were considered an exceedance. The SL code is applied when:

- There is a statistically significant difference between the response of the organism in the sample matrix and the control organism.
- There is less similarity between the organism in the sample matrix and the control organism, as determined by the percent effect of the sample. The percent effect evaluation threshold is set at 20 percent for both chronic and acute toxicity for data associated with the Water Board SWAMP program. Some non-SWAMP data were evaluated using other percent effect evaluation thresholds.

Toxicity of any one or more test species of a sample, as noted by application of the SL to the data, is an exceedance.

The State Water Board adopted numeric aquatic toxicity water quality objectives on December 1, 2020, but these objectives are not yet in effect. Analysis of aquatic toxicity data from the 2020 – 2022 Integrated Report occurred prior to the adoption date and effective date of the objectives and, therefore, the 2020-2022 Integrated Report did not assess data using the numeric objectives and the test of significant toxicity (“TST”) data

assessment method. Previously assessed TST data will be reassessed and compared to the new objectives after they take effect in a future Integrated Report cycle.

### 2.5.7. Benthic Community Effects

The California Stream Condition Index (“CSCI”) is a biological scoring tool which translates species taxa data about benthic macroinvertebrates found living in a stream into an overall measure of stream health (Mazor et al., 2016). The CSCI score is calculated by comparing the expected condition with actual (observed) results. CSCI scores range from 0 (highly degraded) to greater than 1 (equivalent to reference). CSCI scoring of biological conditions are shown in Table 2-5.

**Table 2-5: CSCI Score Ranges and Biological Conditions**

CSCI Score Range	Condition
≥ 0.92	Likely intact
0.91 – 0.80	Possibly altered
0.79 – 0.63	Likely altered
≤ 0.62	Very likely altered

*Adapted from Rehn et al., 2015*

In accordance with Section 3.9 of the Listing Policy, where CSCI scores show degradation at one or more sites or at one site over multiple years in a receiving water when at least two site measurements are available, the waterbody is considered to exhibit significant degradation. The waterbody’s chemistry and toxicity data was then evaluated to determine if one or more associated pollutants were exceeding water quality standards. Where this was the case, the waterbody segment was listed as impaired under Category 5 for Benthic Community Effects.

The threshold of 0.79 was used as an evaluation guideline for beneficial use attainment and was selected in conformance with Sections 3.9 and 6.1.5.8 of the Listing Policy. Section 3.9 allows the use of reference site or sites to compare degradation in biological populations and/or communities. Section 6.1.5.8 requires a method of selecting reference sites and applying them to develop an Index of Biological Integrity, which has been done and validated by the CSCI threshold study authored by Mazor et al. (2015).

Additionally, any waterbody listed for benthic community effects must also have at least one other 303(d) pollutant listing identified for that waterbody for aquatic life water quality impairments, such as a chemical concentration, temperature, dissolved oxygen, or trash. This additional line of evidence indicating impairment is in accordance with the Listing Policy’s requirement in Section 6.1.5.8 to evaluate physical habitat data and other water quality data, when available, to support conclusions about the status of the water segment when evaluating bioassessment data. Association of benthic community

effects with water or sediment concentrations of pollutants is necessary to show that the population or community changes observed are potentially caused by pollutants.

#### A. Use of CSCI Scores

The CSCI is a biological scoring tool that helps translate multiple taxa and species indices about benthic macroinvertebrates identified in a stream into an overall measure of stream health (Mazor et al., 2015). Living organisms integrate the effects of multiple stressors, such as chemicals, sedimentation, nutrient enrichment and riparian disturbance, over both space and time. The CSCI score indicates whether, and to what degree, the ecology of a stream is altered from a healthy state as indicated by the aquatic insect larvae and other macroinvertebrates living in, on, or near the bottom, or benthic zone, of a wadeable stream or river.

More specifically, the CSCI score is a measure of how well a site's observed condition matches its predicted, or expected, healthy condition. Expected values for a set of ecological measures are predicted using statistical models developed from reference sites, which are healthy stream reaches that set a benchmark of ecological conditions when human disturbance in the upstream watershed is absent or minimal. Predictions are based on natural environmental variables (i.e., site elevation, catchment or watershed size, climate and geology) resulting in a site-specific prediction for each site; greater deviations from this expectation indicate a greater likelihood of degradation relative to reference conditions. The CSCI is made up of two types of indices: (1) observed to expected ("O/E"), which measures taxonomic completeness which is the proportion of expected native macroinvertebrate species that are observed at a site, and (2) multi-metric index ("MMI") that measures macroinvertebrate ecological structure (e.g., diversity) and function (e.g., nutrient cycling).

The O/E index is created through predictive modeling where taxa that are expected at a monitoring and assessment site are predicted by modeling relationships between macroinvertebrate taxonomic composition and natural environmental variables at reference sites. Benthic community condition at a site is then measured as the number of expected benthic macroinvertebrate taxa ("E") compared to the number that are actually observed ("O"), and degradation is measured as the loss of expected native taxa.

The MMI combines six measures of the benthic macroinvertebrates assemblage, or "metrics", into a single measure of biological condition. Each of the metrics represent different aspects of assemblage composition, or the various species living within the benthic aquatic ecosystem. They were chosen based on their ability to differentiate between reference and high-activity/disturbance sites and by their lack of bias among Perennial Streams Assessment regions (i.e., the metrics performed consistently across different ecoregions in California). Finally, all of the six metrics are "decreasers" as their values all decrease as human disturbance increases. That is, higher values indicate better conditions for all six metrics. A brief description of the six MMI metrics and their relevance to biological conditions are listed below:

1. **Percent Clinger Taxa** - percent of species present that are clingers. Clingers are a category of benthic macroinvertebrates based on their 'clinging' behavior and broadly include several different types of aquatic species such as stoneflies, dragonflies, and others. They typically require fast-flowing water and coarse streambed material to cling to, so they are very sensitive to hydromodification and altered sediment regimes.
2. **Percent Coleoptera Taxa** - percent of species present that are Coleoptera (i.e., beetles). Beetles are a diverse group of insects that includes both sensitive and pollution-tolerant species. More species (especially sensitive species, like riffle beetles) tend to be found in streams with better water quality.
3. **Taxonomic Richness** - or species richness, is the total count of different species present and represents aquatic biodiversity. Biodiversity is critical to maintaining stability in aquatic ecosystems, including the various ecosystem services provided (e.g., clean water, food, recreation, climate change resilience).
4. **Percent EPT Taxa** - percent of species present that are mayflies (Ephemeroptera), stoneflies (Plecoptera), or caddisflies (Trichoptera). EPT are sensitive to environmental stress/disturbance and are used as bioindicators of condition. Most EPT species breathe through sensitive gills that can absorb contaminants. High percentage of EPT indicates low environmental stress/disturbance and vice versa.
5. **Shredder Taxa Richness** - count, or number, of different shredder species present. 'Shredders' are a category of aquatic macroinvertebrate functional feeding groups (e.g., shredders, collectors, grazers, and predators). Shredders are responsible for processing leaf litter and help to make dissolved organic matter available, which is a primary food source for aquatic food webs. They require intact riparian corridors to provide their food.
6. **Percent Intolerant Individuals** - percent of individuals with high pollution-sensitivity ratings. Many benthic macroinvertebrate species have been assigned pollution-sensitivity ratings based on studies of their life-histories, observations at polluted and clean sites, and lab-based experiments.

#### B. Selection of the 0.79 Threshold

The CSCI threshold is described in Mazor et al. (2015), which was independently peer reviewed. CSCI scores range from 0 (highly degraded) to greater than 1 (equivalent to reference). The 0.79 threshold is based on the selection of the 10th percentile of the distribution of benthic macroinvertebrate community composition scores from 473 reference sites across California.

Reference sites were located in healthy stream reaches that set a benchmark of ecological conditions as human disturbance in the stream watershed was absent or minimal. These reference sites were calibrated to have a mean value of 1. Based on a calibration of reference sites, 0.79 represents the 10<sup>th</sup> percentile of reference waterbody

scores. Waterbodies with CSCI scores below 0.79 indicate the waterbody's condition is likely altered and, therefore, the benthic macroinvertebrate community that is part of several aquatic life beneficial uses is not being supported. In addition, analysis of statewide CSCI results identified sites below the 10th percentile threshold of 0.79 as being in poor condition (Rehn, 2016).

The CSCI relies on quantile regressions to evaluate biological responses to stress gradients. Most biological response measures, including the CSCI, show wedge-shaped relationships with stress gradients. At high levels of a stressor (e.g., high chloride concentration), CSCI scores are low. At low levels of a stressor, CSCI scores may be high, but can be low due to unidentified factors (e.g., presence of an unmeasured contaminant, or habitat degradation). In these situations, traditional linear regression underestimates the strength of the relationship between biological responses and stressors because it only attempts to predict the average response value. In contrast, quantile regression can focus on the "top" of the wedge by predicting a high-value quantile (e.g., the 90th percentile) which better estimates biological responses in most of the population to stressors.

Section 6.1.3 of the Listing Policy states that "narrative water quality objectives shall be evaluated using evaluation guidelines" and provides guidance for selection of numeric evaluation guidelines. The requirements specify that the evaluation guidelines must be applicable and protective of the beneficial use, linked to the pollutant under consideration, scientifically-based and peer reviewed, well described, and identify a range above which impacts occur and below which no or few impacts are predicted. The CSCI threshold of 0.79 as described by Mazon et al. (2015) meets the Listing Policy requirements and so is appropriate to use as evaluation guidelines to interpret the narrative objective, typically the Toxicity Water Quality Objective, for determination of impairment.

In developing the Listing Policy, the Water Board prepared the Functional Equivalent Document to serve as an environmental review equivalent to a California Environmental Quality Act document with alternatives, options, recommendations, and an analysis of environmental impacts of the Listing Policy (SWRCB, 2004). The Functional Equivalent Document supports the use of the CSCI threshold, as stated in the recommended approach for determining degradation of biological populations or communities. The CSCI score and threshold are based on a modeled extrapolation of expected biology at a site based on reference conditions that are minimally impacted by anthropogenic activities. The recommended approach in Issue 5G Degradation of Biological Populations or Communities, Bioassessment Guidelines of the Functional Equivalent Document states:

*A reference condition, an empirical model of expectations that may include knowledge of historical conditions, or a model extrapolated from ecological principles can be derived from reference sites. A reference site may be natural, minimally impaired (somewhat natural), or best available (altered system). Actual sites that represent best attainable conditions of a water body should be used.*

## 2.6. TMDL Prioritization and Scheduling

The Regional Water Boards undertake a prioritization process to develop TMDLs or alternative programs of implementation for their impaired waterbody-pollutant combinations. Each Regional Water Board reviews their listings and prioritizes TMDLs for completion based on the following factors from Section 5 of the Listing Policy:

- Waterbody significance (such as importance and extent of beneficial uses, threatened and endangered species concerns, and size of waterbody)
- Degree that water quality objectives are not met or beneficial uses are not attained or threatened (such as the severity of the pollution or number of pollutants/stressors of concern) [40 CFR 130.7(b)(4)]
- Degree of impairment
- Potential threat to human health and the environment
- Water quality benefits of activities ongoing in the watershed
- Potential for beneficial use protection and recovery
- Degree of public concern
- Availability of funding
- Availability of data and information to address the water quality problem

Since 2009, Regional Water Boards have adopted a total of 114 TMDL Projects to address various water quality impairments. A summary table of TMDL Projects adopted by each of the nine Regions since 2009 can be found in Appendix D.

## 2.7. Pyrethroids in Sediment Error

A number of pyrethroids in sediment data were incorrectly labeled as sediment toxicity data. In addition, the Integrated Report's automated system miscalculated the organic carbon normalization equation for two pyrethroids, permethrin and cypermethrin. The carbon normalization error may result in undercounting exceedances and missing potentially impaired waterbodies. Staff fixed these errors for 25 decisions identified by commenters. For a list of the remaining decisions, which will be corrected in the 2024 Integrated Report cycle, please reference Appendix P: List of Decisions to Correct Pyrethroids in Sediment Labelling Error.

## 3. Summary of 303(d) Listing Recommendations

This section summarizes the recommended listings, delistings, and 305(b) category revises for the 2020-2022 Integrated Report. Sections 4, 5, 6, and 7 outline specific information for individual regions.

For the 2020-2022 California Integrated Report, the Central Coast, Central Valley, and San Diego Regional Water Board regions are "on cycle" for assessment. All readily available data and information received prior to the data solicitations cut-off date of June 14, 2019 in these regions were considered. In addition, all readily available data and

information from several waterbodies in the Colorado River Basin region were considered as “off cycle” assessments.

The State Water Board is administering the listing process for all “on-cycle” and “off-cycle” regions, consistent with Section 6.2 of the Listing Policy. The State Water Board will receive oral comments on waterbodies proposed for addition or deletion from the 303(d) list at a hearing. The State Water Board will respond to timely written and oral comments and, if needed, will release a revised staff report prior to the meeting during which the State Water Board will consider adopting the proposed 303(d) list.

Table 3-1 below summarizes new waterbody-pollutant combination listings and delistings for the 2020-2022 California Integrated Report. Sections 4, 5, 6 & 7 describe assessments specific for that region. A summary of the recommended new listings and delistings, in comparison to the 2018 California Integrated Report is presented in Table 8-1.

**Table 3-1: Number of New Waterbody-Pollutant Combination 303(d) Listings and Delistings**

<b>Regional Water Board</b>	<b>Proposed New Listings</b>	<b>Proposed New Delistings</b>
Central Coast	401	146
Central Valley	337	45
Colorado River Basin	16	0
San Diego	257	33
<b>TOTALS</b>	1,011	224

#### **4. Central Coast Region 303(d) List**

The Central Coast Regional Water Quality Control Board (“Central Coast Regional Water Board”) was “on-cycle” for the 2020-2022 listing cycle. Staff assessed data from a total of 356 waterbodies, containing 8,493 waterbody-pollutant combinations. Based on these assessments, 401 waterbody-pollutant combinations are recommended to be added to and 146 waterbody-pollutant combinations are recommended to be removed from the 303(d) list.



There are several reasons for the large number of changes to the 303(d) list. The new listing recommendations included in this cycle are largely a result of new criteria available, expansion of California Department of Pesticide Regulation (“CDPR”) monitoring in the region, and the large amount of data available for assessment (eight years of data). The recommendations for delisting in this cycle are primarily due to a change in the water quality standards for fecal indicator bacteria, discussed in detail below. The delisting recommendations due to attaining water quality standards are also discussed in detail below.

#### **4.1. Central Coast Region-Specific Assessments**

Assessments specific to the Central Coast Regional Water Board are described in the following subsections.

##### **4.1.1. Fecal Coliform in Inland Waters**

There are 94 inland waterbody segments recommended for delisting (see Table 4-2) due to reassessment of data using new bacteria water quality objectives (see Table 4-3). The State Water Board’s ISWEBE Plan contains two bacteria water quality objectives applicable to the REC-1 beneficial use. These objectives supersede the Central Coast Region’s Basin Plan water quality objective for fecal coliform and the REC-1 beneficial use. The non-contact recreation (“REC-2”) water quality objective from the Central Coast Region’s Basin Plan remains applicable and many of the decisions are based on the comparison of fecal coliform data to the REC-2 objective.

##### **4.1.2. *Escherichia coli* in Inland Waters**

The State Water Board’s ISWEBE Plan established a water quality objective for *E. coli* for waters where the salinity level is less than 1 part per thousand (“ppt”) 95 percent or more of the time, and a water quality objective for enterococci bacteria where the salinity level is more than 1 ppt 95 percent or more of the time. Using these new objectives for data from the current solicitation cycle resulted in 22 recommendations to remove (delist) waterbody segments for *E. coli* because the salinity in the waterbody segment exceeded 1 ppt more than 95 percent of the time and therefore the *E. coli* objective is not applicable (see Table 4-2). In addition, the spatial extent of the *E. coli* impairment for seven waterbodies was revised where the salinity exceeded the 1 ppt threshold in specific areas but not throughout the entire waterbody segment (see Table 4.1). See Section 2.5.1 for more information.

**Table 4.1. Waterbody Segments with Revised Spatial Impairments for *E. coli* Due to Elevated Salinity in the Lower Reaches.**

<b>Waterbodies</b>
Main Street Canal
Pajaro River
Salinas River (Lower, estuary to near Gonzales Road Crossing)
San Antonio Creek (San Antonio Watershed, Rancho del las Flores Bridge at Hwy 135 to downstream at Railroad Bridge)
San Benito River
San Lorenzo River
Santa Ynez River (below City of Lompoc to Ocean)

#### **4.1.3. Imidacloprid**

Imidacloprid (a neonicotinoid insecticide) data were evaluated to determine aquatic life beneficial use attainment using criteria developed by the University of California, Davis (TenBrook et al., 2009a). This is the first listing cycle this evaluation guideline has been used for the Integrated Report. The University of California, Davis imidacloprid criteria meet all the requirements of an evaluation guideline as defined in Section 6.1.3 of the Listing Policy, as do other University of California, Davis pesticide criteria used in this and previous Integrated Report assessment cycles. See Section 2.5.2(A) for more information. The Central Coast Regional Water Board staff recommend adding (listing) 22 waterbody segments to the 303(d) list for imidacloprid. (See Appendix I: Central Coast Regional Water Board – New Waterbody-Pollutant Combination Listing and Delistings.) Two imidacloprid degradates, imidacloprid guanidine and imidacloprid urea, as well as other neonicotinoid insecticides were evaluated using U.S. EPA Aquatic Life Benchmarks.

#### **4.1.4. Use of Toxic Units**

Calculations of additive aquatic toxicity, or toxic units, were used to determine beneficial use attainment in addition to evaluating impairment based on concentrations of individual pesticides. Evaluation guidelines expressed in toxic units were used to interpret the following Central Coast Region’s Basin Plan narrative water quality objective:

*No individual pesticide or combination of pesticides shall reach concentrations that adversely affect beneficial uses (CCRWQCB, 2019).*

For the organophosphate insecticides chlorpyrifos and diazinon, the evaluation guideline for the protection of aquatic life is one toxic unit equivalent. A toxic unit equivalent is equal to the sum of chlorpyrifos and diazinon from a single sample, each having their reported concentration divided by their respective evaluation guideline prior to being summed. If this calculation results in a value greater than one, the sample is counted as an exceedance of the water quality objective. The Central Coast Regional Water Board staff recommends adding (listing) seven waterbody segments to the 303(d) list for additive toxicity from organophosphate pesticides (see new listings for “Organophosphate Pesticides” in Appendix I: Central Coast Regional Water Board – New Waterbody-Pollutant Combination Listing and Delistings).

For pyrethroid insecticides, the evaluation guideline for the protection of aquatic life from pyrethroids is one toxic unit equivalent. A toxic unit equivalent is equal to the sum of bifenthrin, cyfluthrin, cypermethrin, lambda-cyhalothrin, and permethrin, each having their reported concentration divided by their respective evaluation guideline prior to being summed. If this calculation results in a value greater than one, the sample is counted as an exceedance of the water quality objective. Central Coast Regional Water Board staff recommends adding (listing) 12 waterbody segments to the 303(d) list for additive toxicity from pyrethroid pesticides (see new listings for “Pyrethroids” in Appendix I: Central Coast Regional Water Board – New Waterbody-Pollutant Combination Listing and Delistings).

#### **4.1.5. Chlorpyrifos and Diazinon Porewater**

In the 2006 Integrated Report, porewater or “interstitial water” samples were inadvertently compared to the evaluation guidelines for the water matrix. Porewater is the water in a sediment sample and there are no evaluation guidelines for the porewater matrix. Some of these porewater samples led to 303(d) listings. These listings were corrected in the 2016 Integrated Report. In the 2020-2022 Integrated Report, porewater LOEs were removed and retired so they cannot be included in future listing cycle decisions.

#### **4.1.6. Dissolved Oxygen, Percent Saturation**

In the previous listing cycles, assessments of dissolved oxygen saturation data (measured as “percent saturation” and calculated as a function of water temperature and barometric pressure) were included in “ancillary” LOEs. Ancillary LOEs were included as information; however, they were not used as the basis of a listing recommendation. Dissolved oxygen decisions for the 2020-2022 Integrated Report continue to rely solely on the dissolved oxygen concentration data measured in mg/L.

#### **4.1.7. Nutrients & Biostimulatory Substances**

Five new waterbodies are recommended for placement on the 303(d) list for nitrate as there is evidence of nitrate causing or contributing to a biostimulatory condition: Arroyo Burro, Castroville Slough, Cieneguitas Creek, El Encanto Creek (Phelps Ditch), and Tequisquita Slough.

Data were assessed using the weight of evidence approach, as defined by Section 3.11 of the Listing Policy, to evaluate attainment of aquatic life uses and the Central Coast Region's Basin Plan narrative water quality objective for biostimulatory substances which states:

*“Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.”*

To interpret attainment of the narrative objective, a numeric evaluation guideline for nitrate (1.0 mg/L nitrate as nitrogen) was used to identify potentially impaired waterbodies. Where nitrate levels exceeded this evaluation guideline, additional data and evidence were evaluated, in accordance with Sections 3.11 and 4.11 of the Listing Policy, to determine the risk for or presence of biostimulatory response conditions.

This evaluation guideline was developed by Central Coast Regional Water Board staff using the extensive central coast regional dataset and the approach detailed in a peer reviewed technical report (Worcester et al., 2010).

#### **4.1.8. Water Temperature and Turbidity**

Data assessments for water temperature and turbidity used evaluation guidelines specific to resident fish species and were only applicable to waterbodies with certain characteristics.

There are seven waterbody segments recommended to be added to the 303(d) list for elevated water temperature. For waterbody segments designated with the COLD beneficial use, assessments included:

- Grab sample data;
- A 21 degree Celsius evaluation guideline, the upper end of the optimum range for growth and completion of most life stages of rainbow trout (Moyle, 1976); and
- Applied only to waters where there is historic or current documentation of steelhead trout in the waterbody segment (as documented in Becker and Reining, 2008).

There are 11 waterbody segments recommended to be added to the 303(d) list for elevated turbidity. Different evaluation guidelines were applied to waterbodies based on whether the waterbody is designated for the COLD or WARM beneficial use.

For COLD waterbody segments, assessments included:

- Grab sample data;
- A 25 NTU evaluation guideline, a level shown to cause reduction in juvenile salmonid growth due to interference with their ability to find food (Sigler et al., 1984); and

- Applied only to waters where there is historic or current documentation of steelhead trout in the waterbody segment (as documented in Becker and Reining, 2008).

For WARM waterbody segments, assessments included:

- Grab sample data; and
- A 40 NTU evaluation guideline, a level shown to cause a reduction in piscivorous fish (largemouth bass) growth due to interference with their ability to find food (Shoup, D.E. and Wahl D.H., 2009).

#### **4.1.9. Data Not Used to Determine Standards Attainment**

##### **A. Chlorophyll a**

Chlorophyll a data from waterbodies in the Central Coast Region were not used to determine standards attainment in the 2020-2022 Integrated Report because of errors in the way data were reported to CEDEN. In many cases, field measurements that are outside the accuracy range of the field instrument should have been flagged. In those cases, field staff submitted a grab sample to the laboratory and therefore there are two chlorophyll a results in the database. Consequently, the automated LOE tools would have averaged the field and laboratory sample results when the field result should have been flagged and excluded. Staff will work with State Water Board SWAMP Information Management and Quality Assurance Center staff and Central Coast Ambient Monitoring Program (“CCAMP”) staff to address the errors in reporting to the CEDEN database and staff will assess these data in a future Integrated Report listing cycle.

##### **B. Total Coliform in Ocean Waters for Shellfish Harvesting**

For the 2020-2022 listing cycle, total coliform data collected from ocean water samples since 2010 and derived using the IDEXX Colilert methods were not used to determine attainment of shellfish harvesting standards because the IDEXX Colilert method can lead to a high number of false positives in this matrix. Further, the California Department of Public Health recommended that the IDEXX Colilert method not be used for the enumeration of total coliforms in marine waters (CDPH, 2000).

In previous listing cycles, many ocean beach segments (shoreline segments) were placed on the 303(d) list for total coliform based on data derived from the IDEXX Colilert method. The basis of the existing beach segment total coliform listings was not evaluated in the 2020-2022 Integrated Report. They will be re-evaluated in a future Integrated Report cycle, likely off-cycle as part of the 2024 Integrated Report.

##### **C. CCLEAN Program Data**

The Central Coast Long-term Environmental Assessment Network (“CCLEAN”) conducts required monitoring and reporting for several of the Monterey Bay area municipal and industrial dischargers. Routine monitoring occurs at both inland surface waters and nearshore areas each year. However, several years of CCLEAN’s data that are available in CEDEN were not included in the data set assessed for the 2020-2022 Integrated Report. The cause of this omission has been remediated where possible.

An assessment of CCLEAN data that meet the requirements of the Listing Policy will be included off-cycle, likely in the 2024 Integrated Report.

#### D. Water Quality Exchange Data

Data from the Water Quality Portal (“WQP”) database for waterbodies in the Central Coast Region had significant errors that precluded the use of these data to determine standards attainment. The most substantial WQP data issues staff identified are as follows:

- Results were different from those housed in the USGS database (the data providers), confirmed in communication with USGS. This applied to hundreds of data records.
- Non-detect results were screened out (made unavailable for use) by the State Water Board’s automated LOE tool because of the way the data were reported in the WQP database (e.g., missing units, reporting limits, or other required fields). When compared to data from the USGS database, which contained the necessary information, this resulted in an omission of hundreds of non-detect results.
- Some results were reported as a “0” but zero is not a number appropriate for the analyte and method. The zero may have been a non-detect but did not include appropriate documentation to make that determination. Consequently, data would be used as a true zero, which ignores the Listing Policy rules applied to using non-detects.
- Duplicate records were reported with different analyte names. For example, “Nitrate as NO<sub>3</sub>” = 3.8 mg/L and “Nitrate + Nitrite as N” = 3.8 mg/L was reported for the same sample. One of these results is an error: nitrate reported as NO<sub>3</sub> is 4.43 times higher than nitrate reported as N.
- Duplicate records were not documented correctly. For example, station code includes “dup,” but the replicate field does not identify the sample as a duplicate (field duplicate or lab duplicate). If these incorrectly documented records were lab duplicates (lab quality control data), they would be erroneously included in the assessment.
- Depth profile data (e.g., samples taken at different depths) and continuous monitoring data (e.g., samples taken by a stationary data logger every 30 minutes) were not documented in a way that the automated LOE tools could recognize. Consequently, the results would have been averaged in accordance with Section 6.1.5.6 of the Listing Policy, which is not appropriate for these data types.
- Incorrect units were associated with analytes.

#### E. Data Quality Screening and Efforts to Include Data

As described in Section 2.2.2 above, each data record was screened for quality assurance and assigned to one of eight tiers depending on the quality assurance metadata included in the dataset. Data of uncertain or unknown quality were reviewed on a case-by-case basis to determine compliance with Listing Policy quality assurance requirements.

Over 23,000 data records were evaluated that required QA review and staff provided the justifications for using 694 of these data records that would otherwise be removed from the assessment. In many cases, the use of data was justified where the relevant QC Code was informative but did not indicate a problem with the data that would negatively affect the assessment.

#### 4.2. Central Coast Region 303(d) List Recommendations

There are 401 new waterbody-pollutant combinations recommended for listing in the Central Coast Region and 145 waterbody-pollutant combinations recommended for delisting. If approved by the U.S. EPA as recommended, the Central Coast Region’s 303(d) list would be revised to have a total of 1,177 waterbody-pollutant combinations on the 303(d) list. Table 4-2 and Table 4-3 below summarize new delisting recommendations and recommended listings by pollutant category for the Central Coast Region for the 2020-2022 Integrated Report. A list of individual recommendations can be found in Appendix I: Central Coast Regional Water Board – New Waterbody-Pollutant Combination Listings and Delistings.

**Table 4-2: Summary of Central Coast Waterbody-Pollutant Combination Delisting Recommendations by Pollutant Category**

Pollutant Category	Delisting Due to Water Quality Attainment	Delisting Due to Change in Assessment	Total
Nutrients (including dissolved oxygen)	5	0	5
pH	4	0	4
Temperature	6	0	6
Pathogens/Bacteria	1	117	118
Pesticides and toxicity	8	1	9
Turbidity	4	0	4

**Table 4-3: Summary of Central Coast Waterbody-Pollutant Combination New Listing Recommendations by Pollutant Category**

<b>Pollutant Category</b>	<b>Number of New Listing Recommendations<sup>1</sup></b>	<b>Number of New Listing Recommendations Changed from Previous Cycle <sup>2</sup></b>	<b>Total</b>
Metals	71	35	106
Nutrients (including dissolved oxygen)	7	18	25
pH	2	11	13
Temperature	2	5	7
Benthic Community Effects	14	4	18
Pathogens/Bacteria	8	18	26
Pesticides	107	54	161
Salinity, Total Dissolved Solids, Chlorides	5	5	10
Turbidity	0	11	11
Aquatic Toxicity	2	21	23
Toxic Organics (PCBs)	0	1	1

The Central Coast Regional Water Board staff recommends new listings for 57 different pollutants and 126 different waterbody segments. Metals, pesticides, and toxicity make up the majority of the new listing recommendations (see Table 4-3). The increase in the

<sup>1</sup> Listing recommendations based on new assessments.

<sup>2</sup> Revised listing recommendations include decisions that were previously assessed as “do not list” or “delist” and revised to “list.”



number of these pollutant impairments is due to several factors including recent data availability for metals and pesticides (specifically neonicotinoid and pyrethroid pesticides), as well as availability of new evaluation guidelines.

Several delisting recommendations are particularly noteworthy. As previously discussed, several delisting recommendations for waterbody segments for fecal coliform and *E. coli* are due to the adoption of new water quality objectives which no longer include fecal coliform or *E. coli* as appropriate indicator bacteria types for assessment of REC-1 use support for the particular waterbody.

Other noteworthy recommendations to remove a waterbody-pollutant combination from the CWA section 303(d) list include the following:

- Organophosphate pesticide delisting recommendations where pesticide TMDLs have been adopted, Department of Pesticide Regulation data confirm that the specific pesticide is not used heavily in these watersheds anymore, and water quality data show water quality standards are attained.
  - o Blanco Drain – chlorpyrifos
  - o Lower Salinas River – chlorpyrifos and diazinon
  - o Pajaro River – diazinon
  - o Orcutt Creek – diazinon
  - o Salinas Reclamation Canal - diazinon
- Dissolved oxygen delisting recommendations where nutrient TMDLs have been adopted and water quality data indicate standards are attained.
  - o Greene Valley Creek (Santa Barbara County)
  - o Main Street Channel
  - o Merritt Ditch
  - o Salinas Reclamation Canal
- Ammonia delisting recommendation for Tequisquita Slough, where no exceedances of the water quality objective occurred since 2013, coincident with the development of Pajaro River Nutrient TMDL.

The following are several noteworthy trends of improving water quality. However, there are insufficient data available to confirm water quality standards attainment to remove the waterbody segment and pollution combination from the 303(d) list at this time:

- Moro Cojo Slough – nitrate: Data show an improving trend in nitrate conditions in the middle and upper reaches of the Slough, following implementation of several nutrient treatment projects in the watershed. However, additional biostimulatory response data are needed to confirm that nitrate does not cause or contribute to an unacceptable biostimulatory response in this waterbody segment.
- San Simeon Creek – nitrate: The spatial extent of this impairment is limited to the lagoon. Data from the lagoon show a significant trend of improvement in nitrate concentrations (now less than 1.0 mg/L nitrate as N) following an upgrade to the nitrate treatment process at a nearby wastewater treatment plant. However, additional biostimulatory response data are needed to confirm that nitrate does

not cause or contribute to an unacceptable biostimulatory response in this waterbody segment.

- Pinto Lake – microcystins: most of the data evaluated for the 2020-2022 Integrated Report exceed the evaluation guideline. However, following implementation of grant funded projects to sequester nutrients in Pinto Lake (2017 alum application) and to reduce nutrient loading from the watershed, Lake managers documented a significant reduction in the severity and duration of toxic algal blooms in this waterbody segment. Consequently, the local community now has increased access to the lake for recreational activities.
- Salinas Reclamation Canal and Tembladero Slough – chlorpyrifos and diazinon: data show very few exceedances of the evaluation guidelines in recent years and CDPR data show that these pesticides are used infrequently in the watersheds. However, additional data are needed to justify a recommendation to remove these waterbody segments from the CWA Section 303(d) list.

#### **4.2.1. Central Coast Scheduling of TMDLs and Efforts to Address Impaired Waters**

Efforts to address impaired waterbodies identified on the 303(d) list can include revising standards, developing and implementing TMDLs, individual permits, or other programs of implementation, which are sometimes known as TMDL alternative projects. TMDL projects, and other efforts to address impaired waters, are identified, assessed, and prioritized each year during the development of the Central Coast Regional Water Board's TMDL workplan. To prioritize and schedule TMDL project development, factors in Section 5 of the Listing Policy were considered (also described in Section 2.6 of this report, above) and the following Central Coast Regional Water Board TMDL project prioritization factors:

- TMDL projects aligned with Central Coast Regional Water Board's highest priorities and vision for healthy watersheds specifically, preventing and correcting threats to human health (with consideration of the Human Right to Water and Disadvantaged Communities), and aquatic habitat;
- TMDL projects addressing the most ecologically important areas, such as critical habitat for steelhead trout or other threatened and endangered species, ecologically unique habitats, and habitats that sequester greenhouse gases (e.g., estuaries and lagoons);
- TMDL project importance to the implementation of other Regional Water Board programs;
- TMDL projects aligned with the stated priorities of the State Water Board or the U.S. EPA;
- Requests of stakeholders or ability to leverage ongoing implementation, including tribal governments, cities and counties, other state or federal agencies, non-governmental organizations, and individuals; and
- Availability of necessary expertise, funding, and other resources.

Estimated TMDL completion dates for waterbody-pollutant combinations on the 303(d) list are based on the projects in current workplans or projects aligned with the Central Coast Regional Water Board’s U.S. EPA vision priorities list. Projects with a 2021 or 2025 estimated TMDL completion date are currently under development (Table 4-4) and a 2035 estimated TMDL completion date is assigned to other waterbody-pollutant combinations on the 303(d) list.

**Table 4-4: Central Coast TMDL Schedule**

TMDL Project	Projected Completion Date
Pinto Lake watershed TMDL for total phosphorus to address cyanobacteria blooms	2021
Gabilan watershed TMDL for turbidity	2025
Lower Salinas watershed TMDL for organophosphate pesticides	2025
Elkhorn Slough TMDL for biostimulatory substances	2025
Santa Ynez River TMDL nutrient and biostimulatory substances	2025
Other waterbody segment and pollution combinations	2035

## 5. Central Valley Region 303(d) List

The Central Valley Regional Water Board was “on-cycle” for the 2020-2022 listing cycle. Data from a total of 905 waterbodies, containing 12,442 waterbody-pollutant combinations were assessed. Based on these assessments, 337 waterbody-pollutant combinations are recommended to be added to and 45 waterbody-pollutant combinations are recommended to be removed from the 303(d) list.

### 5.1. Central Valley Region-Specific Assessments

Assessments specific to the Central Valley Regional Water Board are described in the following subsections.

#### 5.1.1. Bacteria

The State Water Board’s bacteria objectives contain thresholds for *E. coli* in freshwaters and enterococci in saline waters. See Section 2.5.2 for more information about statewide bacteria thresholds.

Although surface waters within the Central Valley Region generally have salinity levels less than 1 part per thousand less than 95 percent of the time, some portions of the

Sacramento-San Joaquin Delta may exceed that threshold. For the 2020-2022 Integrated Report, no enterococci data were assessed for surface waters within the Central Valley Region. In the absence of enterococci data, all waters within the Central Valley Region according to the E. Coli thresholds were assessed. During future Integrated Report cycles, if enterococci data become available, salinity conditions in surface waters throughout the Central Valley Region will be considered to determine the appropriate indicator species for assessments.

### 5.1.2. Pyrethroids

The Central Valley Pyrethroid Pesticides TMDL and Basin Plan Amendment (“Amendment”) was adopted by the Central Valley Regional Water Board on June 8, 2017 (R5-2017-0057) and approved by U.S. EPA on July 10, 2018. The Amendment includes a TMDL and a program to control the following pyrethroid pesticides:

- Bifenthrin
- Cyfluthrin
- Cypermethrin
- Esfenvalerate
- Lambda-cyhalothrin
- Permethrin

Consistent with the Amendment, these pyrethroid pesticides were assessed against an evaluation guideline of their chronic concentration goals represented as a 4-day average. Additionally, the Amendment provides for the assessment of the additive effects of pyrethroid pesticides. The additive effects were assessed by calculating the summed ratios of pyrethroid pesticides and their respective chronic concentration goals. The additive chronic concentration goal is not to exceed one. The additive chronic concentration goal unit was calculated according to the following equation:

$$CGU_{chronic} = \frac{C_1}{CCG_1} + \frac{C_2}{CCG_2} + \frac{C_n}{CCG_n}$$

Where,

$C_1$  = Concentration of pyrethroid 1

$CCG_1$  = Chronic Concentration Goal of pyrethroid 1

$C_2$  = Concentration of pyrethroid 2

$CCG_2$  = Chronic Concentration Goal of pyrethroid 2

For these assessments, if the freely dissolved concentrations of pyrethroid constituents were reported or could be calculated then dissolved concentration values were used. In the absence of freely dissolved concentrations, total concentrations were used. See Section 2.5.5(A)(i), above, for more information.

### **5.1.3. Delta Waterways Subareas**

Previous integrated report cycles have included geographically broad assessments of portions of the Sacramento – San Joaquin River Delta (“Delta”), known as subareas. Some waterbodies within these large subareas were remapped and separated in order to ensure data from sampling locations are grouped within a similar waterbody segment and that data are not used to assess water quality in a separate, dissimilar waterbody in the large Delta subarea. The remapping exercise is ongoing and will continue in future Integrated Report cycles. For the 2020-22 Integrated Report, data from sampling locations that remain grouped in the Delta subareas were not used to make new listing or delisting recommendations because those data may not be representative of the Delta subarea, and for which staff has not confirmed that the grouping is accurate. Data within the remapped waterbody segments were assessed.

### **5.1.4. Data Not Used to Determine Standards Attainment**

Data received during the 2020-2022 Integrated Report data solicitation period from sixty waterbodies in Central Valley Region were not used to determine standards attainment. These data are from waterbodies for which no decision has been made regarding their status as waters of the United States under the Clean Water Act and the Navigable Waters Protection Rule. Examples of such waterbodies include constructed drains or canals or other waterbodies that were modified or constructed with the primary purpose of conveying agricultural flows. As the Integrated Report is authorized under the Clean Water Act and is therefore limited to waters of the United States, and as the status of these waterbodies is uncertain, data were not used and no changes to the current listing category are recommended. If it is determined that a waterbody is classified as a water of the United States in the future, the data from that waterbody will be used to make listing recommendations in a future Integrated Report cycle.

## **5.2. Central Valley Region 303(d) List Recommendations**

There are 337 new waterbody-pollutant combinations recommended for listing in the Central Valley Region and 45 waterbody-pollutant combinations are recommended for delisting.

Table 5-1 and Table 5-2 below summarize delisting recommendations and recommended listings by pollutant category for the Central Valley Region for the 2020-2022 Integrated Report. A list of individual recommendations can be found in Appendix J: Central Valley Regional Water Board – New Waterbody-Pollutant Combination Listings and Delistings.

**Table 5-1: Summary of Central Valley Waterbody-Pollutant Combination Delisting Recommendations by Pollutant Category**

<b>Pollutant Category</b>	<b>Delisting Due to Water Quality Attainment</b>	<b>Delisting Due to change in Assessment</b>	<b>Total</b>
Metals	4	2	6
Nutrients (including dissolved oxygen)	1	0	4
pH	2	2	4
Pathogens/Bacteria	2	4	6
Pesticides	21	1	23
Total Dissolved Solids	1	0	1
Aquatic Toxicity	1	0	1
Temperature	0	1	1

**Table 5-2: Summary of Central Valley Waterbody-Pollutant Combination New Listing Recommendations by Pollutant Category**

<b>Pollutant Category</b>	<b>Number of New Listing Recommendations<sup>3</sup></b>	<b>Number of New Listing Recommendations Changed from Previous Cycle<sup>4</sup></b>	<b>Total</b>
Metals	42	24	66
Nutrients (including dissolved oxygen)	34	25	59
pH and Alkalinity as CaCO <sub>3</sub>	26	11	37
Temperature	7	4	11
Benthic Community Effects	9	1	10
Microcystins	1	0	1
Pathogens	10	4	14
Pesticides	59	41	100
Salinity/Total Dissolved Solids/Chlorides	27	2	29
Aquatic Toxicity	7	1	8
Toxic Inorganics (Sulfates)	0	1	1
Trash	1	0	1

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<sup>3</sup> Listing recommendations based on new assessments.

<sup>4</sup> Revised listing recommendations include decisions that were previously assessed as “do not list” or “delist” and revised to “list.”

An assessment of new listings and delistings during the 2020-2022 Cycle points to several potential reasons for the number of changes to the 303(d) list. A main reason for the increase this cycle is the large amount of data available for assessment. Data were included from August 2010 to June 2019, resulting in approximately nine years of data being assessed. In addition, much of the Central Valley Region’s data were submitted under the Irrigated Lands Regulatory Program (“ILRP”), which likely influences nutrient and pesticide decisions. As for pesticide delistings, some of the delistings may be due to management practices being implemented by growers covered under the ILRP. Metals represent the greatest number of recommendations for new listings. A breakdown of the most common metals are as follows:

- Aluminum (6 new listings)
- Boron (13 new listings)
- Mercury (15 new listings)
- Copper (7 new listings)

### 5.3. Central Valley Scheduling of TMDLs and Efforts to Address Impaired Waters

Efforts to address impaired waterbodies identified on the 303(d) list can include revising standards, developing and implementing TMDLs, individual permits, or other programs of implementation, which are sometimes known as TMDL alternative projects. TMDL prioritization is influenced by a number of factors within the Central Valley Region. The Triennial Review of the two Regional Basin Plans consists of solicitation for comments on water quality issues in the Central Valley that may need to be addressed through basin plan amendments and preparing a work plan for each Basin Plan which describes the actions the Regional Water Board may take over the next three years to investigate and respond to the issues. Additionally, input from the Central Valley Regional Water Board and the regional executive management team are incorporated into work planning through the portfolio management process. Priorities are established through the content of the Triennial Review, annual consultations with program managers, and direction from the Board during yearly presentations by the Executive Officer. Finally, the TMDL prioritization is influenced by other work going on within the Region. Regulatory programs such as the Irrigated Lands Regulatory Program (“ILRP”) address water quality impairments throughout the Region. Programs that can ensure that water quality standards will be met in a reasonable amount of time obviate the need for the development of a TMDL.

Projects with a 2021 estimated TMDL completion date are currently under development (Table 5-3). A 2035 estimated TMDL completion date is assigned to other waterbody-pollutant combinations on the 303(d) list.

**Table 5-3: Central Valley TMDL Schedule**

TMDL Project	Projected Completion Date
Sacramento-San Joaquin Delta Methylmercury TMDL	2021



### 5.3.1. Impairments Being Addressed by Existing Pollutant Control Requirements Other than a TMDL (Category 4b)

During the 2020-2022 Integrated Report cycle, assessments were completed to reflect impairments being addressed by regulatory requirements specified within waste discharge requirements (“WDRs”) under the Central Valley Regional Water Board’s ILRP. The weight of evidence indicates these waterbodies are not meeting standards; but the impairments are being addressed by an enforceable regulatory program, other than a TMDL, that is expected to result in attainment of the water quality standards within a reasonable, specified time frame. The fact sheets in Appendix B contain documentation of how existing regulatory requirements address U.S. EPA’s requirements for Category 4b designations for each waterbody-pollutant combination. The following six impairments are being addressed by regulatory requirements implemented under the ILRP and are placed in Category 4b on the 303(d) list:

**Table 5-4: Impairments Being Addressed Under ILRP**

Waterbody Segment	Pollutant
Dry Creek	Pyrethroids
Duck Slough	Bifenthrin
Mud Slough	Malathion
Orestimba Creek (above Kilburn Road)	Dimethoate
Orestimba Creek (below Kilburn Road)	Dimethoate
Salt Slough	Diuron

### 5.4. Central Valley Region Revisions Following Public Comments

The following describes revisions to the June 4, 2021 Draft Integrated Report made in response to comments received. For additional documentation of revisions, please reference the Summary of Comments and Responses.

#### 5.4.1. Dissolved Oxygen Site-Specific Objective Revisions

Staff revised 19 dissolved oxygen decisions that were assessed using SSOs. These decisions were corrected because they were either written with the incorrect objective or exceedances were calculated incorrectly. Where appropriate, incorrectly written LOEs and ancillary LOEs were deleted and replaced with correctly written LOEs. Appendix T: List of Central Valley Regional Water Board Corrected Dissolved Oxygen SSO LOEs provides specific information about revisions, including decision IDs, 2020-2022 draft listing recommendations, and revised listing recommendations.

#### 5.4.2. Trihalomethane Revisions

Staff revised 84 decisions that included data expressed as trihalomethane formation potential. Results from trihalomethane formation potential tests should not be considered as part of the assessment of disinfection byproducts using primary maximum contaminant levels. Of the 84 affected decisions, 77 were deleted as the only data associated with those decisions were trihalomethane formation potential test results. The remaining seven decisions are based on data from specific trihalomethane analysis, which include chloroform, bromoform, dibromochloromethane, bromodichloromethane, and total trihalomethane. These recommendations are “Do not List” based because there are not enough exceedances using the binomial distribution in Table 3.1 of the Listing Policy. Appendix S: List of Central Valley Regional Water Board Revised Trihalomethane Decisions provides specific information about revisions, including decision IDs, 2020-2022 draft listing recommendations, and revised listing recommendations.

#### 5.4.3. Stormwater Outfall Site Revisions

Staff re-evaluated data from monitoring sites to determine if the data were collected at stormwater outfalls and categorized as effluent data. Effluent data are not subject to 303(d) assessments; therefore, staff removed stormwater outfall monitoring sites from specific data sets. When appropriate, LOEs were deleted. Staff re-assessed non-stormwater outfall data for 116 decisions. Appendix U: List of Central Valley Regional Water Board Revised Decisions Associated with Stormwater Outfall Sites provides specific information about revisions, including decision IDs, 2020-2022 draft listing recommendations, and revised listing recommendations.

### 5.5. Assessment Errors and Remedies

In responding to comments received on the draft 2020-2022 integrated Report, several errors, as described below, were discovered that could not be corrected due to time constraints. The State Water Board is committed to submitting the 2020-2022 Integrated Report to the U.S. EPA by April 1, 2022 in accordance with the Settlement Agreement in *Earth Law Center v. State Water Resources Control Board* (Sacramento Superior Court Case No. 34-2017-80002726). These errors are related to 1) mapping; 2) re-assessments for Westside San Joaquin Coalition data in waterbodies in the Central Valley Region, and 3) application of chloride objectives in Delta waterbodies. Errors were corrected for waterbodies identified in comments received on the draft 2020-2022 Integrated Report. Mapping errors were corrected for waterbodies which are recommended to be listed or delisted from the 2020-2022 303(d) list. All other errors will be corrected during the 2024 Integrated Report cycle. Any waterbody listed as impaired associated with one of these errors is not expected to be scheduled for TMDL development until after the errors are corrected.

The Water Board is committed to improving procedures and modernizing data analysis tools to correct these errors, prevent future errors, and increase transparency.

### **5.5.1. Mapping**

Data from 147 monitoring stations were assigned to the wrong waterbody. This mapping error impacted 953 decisions and 2,772 LOEs. Staff corrected mapping errors for waterbodies which are recommended to be listed or delisting from the 2020-2022 303(d) list. As a result, staff reassigned data from 93 monitoring stations to the correct waterbody, made 240 modifications to the existing lines of evidence, and, when appropriate, revised 66 decisions. For a list of decisions that were corrected please reference Appendix R: List of Central Valley Regional Water Board Station Location Revisions to Correct Mapping Error and Listing Recommendation Updates.

Any mapping errors left unresolved in the 2020-2022 Integrated Report cycle are those that did not result in a new listing or delisting recommendation and will be corrected during the 2024 Integrated Report cycle. For a list of decisions that will be corrected in the 2024 Integrated Report cycle, please reference Appendix O: List of additional Mis-Mapped Stations in the Central Valley Region.

The error in station mapping is solely associated with data submitted through the Water Quality Exchange database and does not implicate data submitted to the California Environmental Data Exchange Network (“CEDEN”), and therefore affects a relatively small number of the Water Boards’ assessment of data for the Integrated Report.

### **5.5.2. Westside San Joaquin Coalition Pesticide Data Re-Assessments**

Data for the Westside San Joaquin Water Quality Coalition from years 2004-2009 were submitted for the 2012 Integrated Report. These data were reassessed using aquatic life benchmarks for the 2020-2022 Integrated Report. The reporting limit was mistakenly omitted from the data, which resulted in incorrect samples and/or exceedances reported for 143 decisions. Staff identified the error while evaluating a decision mentioned in a comment received. Staff fixed these errors for one waterbody-pollutant combination that was mentioned in a comment received. For a list of the remaining decisions that will be corrected in the 2024 Integrated Report Cycle, please reference Appendix Q: List of Decisions to Correct for Westside San Joaquin Coalition Data Re-Assessments.

### **5.5.3. Chloride Objective Re-Assessments**

Chloride data from several waterbodies in the Delta were incorrectly assessed using the Chemical Constituents Water Quality Objective from the Central Valley Basin Plan. The appropriate objective to apply for chloride in these waterbodies is the objective from the Bay-Delta Plan. Staff revised the assessment for the one waterbody which was identified by a commenter. Staff will revise the assessments for the remaining waterbodies in the 2024 Integrated Report.

## 6. San Diego Region 303(d) List

The San Diego Regional Water Board was “on-cycle” for the 2020-2022 listing cycle. Data from a total of 358 waterbodies, containing 3,998 waterbody-pollutant combinations were assessed. Based on these assessments, 257 waterbody-pollutant combinations are recommended to be added to and 33 waterbody-pollutant combinations are recommended to be removed from the 303(d) list. Of the recommended additions to the 303(d) list, eleven are the result of waterbody splits, which are described in Section 6.3.

### 6.1. San Diego Region- Specific Assessments

Assessments specific to the San Diego Regional Water Board are described in the following subsections.

#### 6.1.1. Bacteria Assessments for REC-1 and SHELL

For the 2020-2022 Integrated Report cycle, the San Diego Regional Water Board made changes to the assessment process for indicator bacteria (total coliform, fecal coliform, *E. coli*, enterococci). These changes include using revised water quality objectives for determining REC-1 beneficial use attainment, as well as changes to the data collection period used for REC-1 and SHELL beneficial use assessments.

The revised REC-1 indicator bacteria water quality thresholds are provided in State Water Board’s ISWEBE Plan and Ocean Plan. See Section 2.5.1 for more information about statewide bacteria thresholds.

Part 3 of the ISWEBE Plan contains two bacteria water quality objectives applicable to the REC-1 beneficial use, which were adopted on August 7, 2018. The *E. coli* bacteria objective applies where salinity is equal to or less than 1 part per thousand 95 percent or more of the time. The enterococci bacteria objective applies where salinity is greater than 1 part per thousand more than 5 percent of the time.

In addition, preference is given to using the geometric mean (geomean) over the statistical threshold value (STV) when both statistics are available for a given waterbody. In past assessments, there was not a distinction between inland freshwater and inland saline water. All inland water assessments included all indicator bacteria data available (i.e., total coliform, fecal coliform, *E. coli*, enterococci), gave equal preference to geomean and STV, and used water quality thresholds from various references. These references included U.S. EPA’s Ambient Water Quality Criteria for Bacteria (1986) for *E. coli* and Draft Guidance for Fresh Water Beaches (2006) for total coliform. The ISWEBE Plan supersedes all older references, and therefore, only *E. coli* and enterococci data are used to assess the waters included in the ISWEBE Plan.

The 2019 Ocean Plan contains two bacteria water quality objectives applicable to the REC-1 beneficial use, for fecal coliform and enterococci. The fecal coliform objective includes values for the geomean and single sample maximum (“SSM”), and the

enterococci objective includes values for the geometric mean and STV. The geometric mean is given preference over the other statistics when enough data are available to calculate the geometric mean for a given waterbody. The 2009 Ocean Plan contained water quality objectives for fecal coliform, enterococci, and total coliform for the REC-1 beneficial use. These are superseded by the 2019 Ocean Plan, and therefore, total coliform is no longer used to assess REC-1 beneficial use attainment in ocean waters.

The water quality objectives to determine SHELL beneficial use attainment (in the Ocean Plan and the San Diego Basin Plan) have not changed. Historically, the San Diego Regional Water Board has not prioritized addressing SHELL total coliform impairments. Stakeholders and staff share concerns that the current objectives are likely unattainable, and research shows a high incidence of exceedances of the objectives in coastal waters throughout California that are considered reference with little to any anthropogenic bacteria sources, including at State Water Quality Protected Areas (Figure 6-1, SCCWRP, 2012). Therefore, the use of total coliform as an indicator of impairment likely does not accurately characterize risk of illness from consumption of shellfish. Beginning in 2005, the State Water Board identified the updating of the SHELL indicator bacteria objective as a high priority project as part of the Ocean Plan's triennial review (SWRCB, 2011). The project was included as a very high priority project in the subsequent triennial reviews (SWRCB 2011 and 2019) but has not been implemented due to staff resource limitations (SWRCB, 2011 and 2019).

As part of the most-recent 2019 Ocean Plan Review, the State Water Board prioritized as a high priority a future project to consider revising the SHELL use to distinguish between recreational, commercial, or tribal types of harvesting, and to consider revising the bacterial objectives applied to areas where shellfish are harvested. Should the total coliform objective be revised in the future, previously assessed data will be reassessed and compared to the new objective. Therefore, due to the inaccuracy of the current threshold, this waterbody-pollutant combination is the lowest priority in the San Diego Region for developing TMDLs.

**Figure 6-1. Exceedances of Ocean Plan Total Coliform Objective at Reference, Non-Reference, and Areas of Special Biological Significance).**

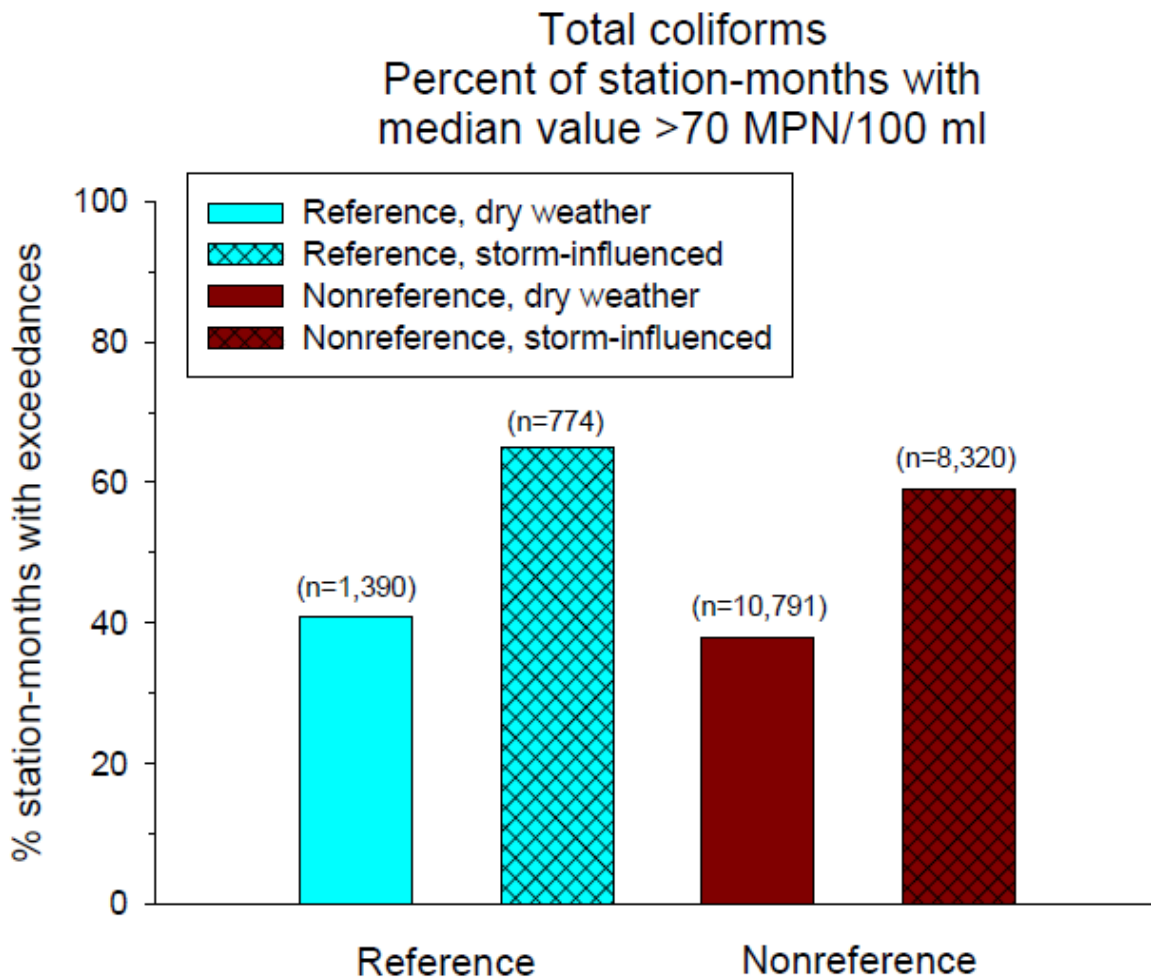


Figure 6-1 Note: The y-axis depicts the percent of total months that exceeded the total coliform objective of 70 MPN/100 mL for all stations (SCCWRP, 2012).

Table 2-2 summarizes water quality thresholds used for bacteria (See Section 2.5.1). Historical indicator bacteria data collected prior to 2010 were not used to assess water quality standards attainment when more recent data were sufficient to make a listing decision. Historical levels of indicator bacteria in the waterbody may be a poor indicator of current risks to human health, particularly when more recent data are available to sufficiently assess the water quality standard. Additionally, water quality conditions in waterbodies have changed as a result of management actions that have been implemented to address bacteria sources. If no, or insufficient, new bacteria data were available for a given waterbody, a change in conditions could not be determined, and the decision status remained as it was in the last cycle. These waterbodies will be reassessed in future cycles as data become available. Decision changes were only made where sufficient data, collected from 2010 through 2019, were available.

### **6.1.2. Pyrethroid Pesticide Assessments and Reassessments for WARM and COLD**

Some pyrethroid pesticide water quality thresholds for determining aquatic life beneficial use (WARM and/or COLD) attainment were revised since the last San Diego Regional Water Board on-cycle Integrated Report (2014 - 2016). The revised thresholds were used to reassess all old data from previous Integrated Report cycles and to assess newer data submitted for the 2020-2022 Integrated Report cycle. The pyrethroid pesticides that were included in the reassessments are the following:

- Bifenthrin
- Cyfluthrin
- Cyhalothrin, Lambda
- Cypermethrin, Total
- Deltamethrin
- Esfenvalerate/Fenvalerate
- Fenpropathrin
- Fenvalerate
- Permethrin/Permethrin, Total

Water quality thresholds for a portion of the pyrethroid pesticides listed above were revised during the development of the Amendment to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Pyrethroid Pesticide Discharges (R5-2017-0057) by the Central Valley Regional Water Board (“Pyrethroid Amendment”). The pyrethroid amendment employs the freshwater water quality criteria for the protection of aquatic life derived by a methodology developed by the University of California, Davis (TenBrook et al., 2009a). The method determines chronic concentration goals, expressed as a 4-day average, which were used as water quality thresholds. For the integrated report assessments, the water quality thresholds were compared with the freely dissolved concentrations of the pesticides, if data were reported in that manner or could be calculated. In the absence of freely dissolved concentrations, total concentrations were used. Table 6-1 provides the water quality thresholds used for the 2020-2022 Integrated Report.

**Table 6-1: Pyrethroid Pesticide Water Quality Thresholds Developed by the University of California, Davis Methodology**

<b>Pyrethroid Pesticide</b>	<b>Water Quality Threshold (expressed as a 4-day average)</b>
Bifenthrin	0.1 ng/L
Cyfluthrin	0.2 ng/L
Cyhalothrin, Lambda	0.3 ng/L
Cypermethrin, Total	0.3 ng/L
Esfenvalerate	0.3 ng/L
Permethrin	1 ng/L

The pyrethroid amendment also addresses the additive effects of pyrethroids and provides additive concentration goal units, which were used as the water quality threshold for total pyrethroids. Total pyrethroids were assessed using summed ratios. The summed ratios of bifenthrin, cyfluthrin, cypermethrin, esfenvalerate, lambda-cyhalothrin, permethrin and their respective chronic concentration goals (i.e., thresholds) are not to exceed one (1). If available data were reported as freely dissolved concentrations or could be calculated, these values were used for the assessments. In the absence of freely dissolved concentrations, total concentrations were used.

Deltamethrin, Fenpropathrin and Fenvalerate were assessed using Aquatic Life Benchmarks that are developed by the U.S. EPA Office of Pesticide Programs (“OPP”) (<https://www.epa.gov/pesticide-science-and-assessing-pesticide-risks/aquatic-life-benchmarks-and-ecological-risk>). Aquatic Life Benchmarks are based on toxicity values from scientific studies reviewed by the U.S. EPA and used to estimate risk for pesticides and their degradates in their most recently publicly available risk assessments and preliminary Problem Formulations developed for pesticide registration. They are estimates of the concentrations below which pesticides are not expected to represent a risk of concern for aquatic life. The revised benchmarks (revised as of September 28, 2020) were used as water quality thresholds during the 2020-2022 Integrated Report cycle. All older data from previous integrated report cycles were reassessed using the new benchmarks for deltamethrin and fenpropathrin. No older data were available for Fenvalerate. All newer submitted data for the 2020-2022 Integrated Report were assessed with the revised Aquatic Life Benchmarks provided in the table below (Table 6-2).



**Table 6-2: Aquatic Life Benchmarks Developed by U.S. EPA OPP**

<b>Pyrethroid Pesticide</b>	<b>Water Quality Threshold</b>
Deltamethrin	0.0041 ug/L
Fenpropathrin	0.06 ug/L
Fenvalerate	1.13 ug/L

### **6.1.3. Specific Conductivity Assessments for MUN**

Starting with the 2020-2022 Integrated Report for the San Diego Region, LOEs were created for assessing specific conductivity and MUN beneficial use attainment. These LOEs use an evaluation guideline that is a secondary Maximum Contaminant Level (“MCL”) from Table 64449-B in Title 22 of the CCR. Secondary MCLs are not explicitly included in the San Diego Regional Basin Plan as part of a water quality objective, as the Basin Plan specifically refers to primary MCLs from Table 64431-A. The Secondary MCLs are derived from human welfare considerations (e.g., taste and odor), and those in Table 64449-B are established consumer acceptance contaminant levels. The three secondary MCL values provided in the table for specific conductivity are:

- Recommended = 900 microSiemens per centimeter (“ $\mu\text{S}/\text{cm}$ ”)
- Upper = 1,600  $\mu\text{S}/\text{cm}$
- Short Term = 2,200  $\mu\text{S}/\text{cm}$

The water quality threshold used in the LOEs is the recommended value. However, the recommended value of the secondary MCL is not appropriate for southern California streams because many of these streams, including reference-quality streams, have a natural specific conductivity greater than 900  $\mu\text{S}/\text{cm}$  (e.g., Ode et al. 2016). Because the 900  $\mu\text{S}/\text{cm}$  contaminant level is recommended (not required), no 303(d) listings were created based on this water quality threshold. A more appropriate threshold for San Diego Region waterbodies may be established for future Integrated Report assessments.

### **6.1.4. Sediment Quality Objectives Assessments**

For the 2020-2022 Integrated Report, sediment quality data from enclosed bays and estuaries in the San Diego Region were not compared to the recently established sediment quality objectives (“SQOs”) adopted by the State Water Board under Resolutions No. 2018-0028 and 2011-0017, due to unavailable or inadequate data.

To be comparable to the SQOs, data must include concurrent measurements of sediment chemistry, toxicity, and benthic community taxonomy at specific stations in a waterbody. Data collected by the San Diego Regional Water Board Harbor Monitoring Program, the Southern California Bight Regional Monitoring Program (“BIGHT”), historic site investigations, and past cleanup orders were not available via CEDEN. Entities

who collected the data did not express an interest in voluntarily uploading data to CEDEN. Additionally, data sets available via CEDEN were missing toxicity or taxonomy data, were missing calculated station assessment scores, or were missing station locations.

Necessary data sources were identified to conduct SQO assessments during the 2020-2022 Integrated Report cycle. Identified data sources were procured, where possible; however, some data were unavailable or inadequate for this cycle. The San Diego Region Water Board is actively procuring and conglomerating data for use in the upcoming 2024 Integrated Report as part of “off-cycle” efforts. Data yet to be received includes results from past BIGHT surveys, which represent the bulk of data collected for many of the region’s estuaries, and data from recent cleanup efforts, which are critical for a timely and accurate assessment. The assessment efforts will provide an evaluation of the station data submitted, including quality assurance checks on the raw data and station scores generated, and will provide mapping of the results. Impairment determinations will be conducted in future Integrated Report cycles by comparing data to the SQOs.

## **6.2. San Diego Region Identification of Category 1 Waters Using the California Stream Condition Index**

For the 2020-2022 Integrated Report, the San Diego Region revised the list of streams where CSCI scores were similar to reference conditions, which indicates the WARM and/or COLD beneficial use is being supported. For these streams, if no other impairments were present, they were placed into Category 1 of the 305(b) Report Condition Categories. If other impairments were present, the waterbody was placed into Category 5 and identified as “partially supporting” as the CSCI score(s) indicate that biological integrity is supported. Category 1 and “Partially Supported Streams” are identified in Table 6-4, below.

**Table 6-4: Current and Recommended Category 1 and Partially Supporting Streams.**

<b>Category*</b>	<b>HU</b>	<b>Listing Cycle**</b>	<b>Stream/Stream Segment</b>
1	901	2014-2016	Arroyo Trabuco, Upper (USFS)
Partially Supporting	901	2018	Bell Canyon Creek
1	901	2020-2022	Bluewater Canyon
1	901	2018	Cold Spring Canyon
Partially Supporting	901	2020-2022	Cristianitos Creek
1	901	2018	Devils Canyon
1	901	2018	Falls Canyon
1	901	2020-2022	Holy Jim Canyon Creek
1	901	2014-2016	Hot Spring Canyon Creek
1	901	2020-2022	Long Canyon Creek (Riverside County)
Partially Supporting	901	2014-2016	San Mateo
1	901	2020-2022	Tenaja Canyon
Partially Supporting	902	2020-2022	Adobe Creek
1	902	2018	Bear Creek (unnamed tributary to Murrieta Creek near Keith Road)
1	902	2020-2022	Cottonwood Creek (San Diego and Riverside County)
Partially Supporting	902	2018	De Luz Creek, Upper (unnamed tributary at De Luz Murrieta Road)
1	902	2014-2016	Roblar Creek
Partially Supporting	902	2018	Sandia Creek

<b>Category*</b>	<b>HU</b>	<b>Listing Cycle**</b>	<b>Stream/Stream Segment</b>
1	902	2018	Unnamed Tributary to Arroyo Seco Creek
1	902	2020-2022	Unnamed Tributary to Sandia Creek
Partially Supporting	902	2020-2022	Warm Springs Creek (Riverside County)
1	903	2014-2016	Agua Caliente Creek, Upper
1	903	2020-2022	Canada Verde
Partially Supporting	903	2020-2022	Couser Canyon Creek
1	903	2014-2016	Doane Creek
1	903	2020-2022	Double Canyon (San Diego County)
1	903	2018	French Creek
1	903	2014-2016	Fry Creek
Partially Supporting	903	2020-2022	Gomez Creek
1	903	2014-2016	Iron Springs Creek
Partially Supporting	903	2018	Keys Creek
1	903	2014-2016	Pauma Creek, Upper
1	903	2018	Pine Valley Creek (Unnamed Tributary to West Fork San Luis Rey River)
1	903	2020-2022	Prisoner Creek
1	903	2020-2022	San Luis Rey River, above Lake Henshaw
1	903	2018	Weaver Creek
1	903	2020-2022	West Fork San Luis Rey River (San Diego County)

<b>Category*</b>	<b>HU</b>	<b>Listing Cycle**</b>	<b>Stream/Stream Segment</b>
Partially Supporting	904	2020-2022	San Marcos Creek, Lower (below San Marcos Lake)
1	905	2018	Black Canyon Creek
1	905	2014-2016	Boden Canyon Creek
1	905	2014-2016	Carney Canyon Creek
Partially Supporting	905	2018	Kit Carson Creek (San Bernardo Valley)
1	905	2018	Santa Ysabel Creek above Sutherland Reservoir
1	905	2018	Sycamore Creek
1	905	2014-2016	Temescal Creek above Pamo Road
1	907	2014-2016	Boulder Creek above Boulder Creek Road
1	907	2014-2016	Cedar Creek
Partially Supporting	907	2020-2022	Chocolate Creek
1	907	2020-2022	Coleman Creek
1	907	2018	Conejos Creek
1	907	2014-2016	King Creek, Upper
Partially Supporting	907	2018	Los Coches Creek
1	907	2018	San Diego River, Upper
1	909	2014-2016	Cold Spring Creek
1	909	2018	Japacha Creek above 79
1	909	2018	Juaquapin Creek
1	909	2020-2022	Stonewall Creek

<b>Category*</b>	<b>HU</b>	<b>Listing Cycle**</b>	<b>Stream/Stream Segment</b>
Partially Supporting	909	Revised 2020-2022	Sweetwater River, Upper (above Loveland Reservoir)
1	909	2018	Viejas Creek
Partially Supporting	910	2018	Jamul Creek
1	911	2018	Antone Canyon Creek
1	911	2018	Copper Canyon Creek (Unknown tributary to Tijuana River)
Partially Supporting	911	Revised 2020-2022	Cottonwood Creek above Morena Reservoir
Partially Supporting	911	Revised 2020-2022	Cottonwood Creek below Barrett Reservoir
1	911	Revised 2020-2022	Cottonwood Creek between Barrett and Morena Reservoirs
1	911	2020-2022	Horsethief Canyon Creek (San Diego County)
1	911	2018	Indian Creek
1	911	2014-2016	Kitchen Creek
1	911	2020-2022	La Posta Creek
1	911	2018	Long Canyon Creek (San Diego County)
1	911	2014-2016	Noble Canyon
Partially Supporting	911	Revised 2020-2022	Pine Valley Creek (Lower)***
1	911	Revised 2020-2022	Pine Valley Creek (Upper)
1	911	2020-2022	Potrero Creek (San Diego County)
1	911	2018	Troy Canyon Creek

Category*	HU	Listing Cycle**	Stream/Stream Segment
1	911	2014-2016	Wilson Creek above Barrett Reservoir

\* Partially Supporting are stream segments where bioassessment data indicates the WARM and/or COLD beneficial use is being supported though other beneficial uses may not be supported.

\*\*Indicates when first identified as Category 1 or Partially Supporting, or if spatial extent was revised during this listing cycle.

\*\*\*Note: Lower Pine Valley Creek also includes data for two tributaries: Secret Canyon Creek and Espinosa Creek.

HU = Hydrologic Unit. Names in parenthesis indicate clarifications or references to source data names.

### 6.3. Mapping Revisions

Mapping corrections and adjustments were made to various waterbodies during the 2020-2022 Integrated Report cycle. The purpose of these revisions is to:

- 1) Correct historic errors or missing data in waterbody mapping and/or in the National Hydrology Dataset (NHD);
- 2) Provide better representation of distinct hydrologic characteristics of the waterbody segments for more relevant assessments (e.g. above and below a reservoir); and
- 3) Provide better representation of impairments or beneficial use support within a waterbody.

Major revisions required reassigning LOEs to the correct waterbody reaches or segments, then reassessing the data. Minor revisions included only visual corrections to the map, where LOEs had been appropriately assigned to the corresponding waterbody or segment in previous integrated report assessments. Mapping revisions are described in Table 6-3.

**Table 6-3: San Diego Mapping Revisions Completed During the 2020-2022 Integrated Report Cycle**

Previous Mapping	New Mapping
<b><i>Arroyo Trabuco Creek</i></b>	<b><i>Arroyo Trabuco Creek, Lower</i></b> Downstream of National Forest Service property
	<b><i>Arroyo Trabuco Creek, Upper</i></b> Within Cleveland National Forest
<b><i>Sweetwater River, Lower</i></b>	<b><i>Sweetwater River, Lower (below Sweetwater Reservoir)</i></b>  This reach did not change. The upper reach is now split into two.
<b><i>Sweetwater River, Upper</i></b>	<b><i>Sweetwater River, Middle (between Sweetwater and Loveland Reservoirs)</i></b>
	<b><i>Sweetwater River, Upper (above Loveland Reservoir)</i></b>
<b><i>San Marcos Creek</i></b>	<b><i>San Marcos Creek, Lower (below San Marcos Lake)</i></b>
	<b><i>San Marcos Creek, Upper (above San Marcos Lake)</i></b>
<b><i>San Diego River (Lower)</i></b>	<b><i>San Diego River (Lower)</i></b>  The revised upstream limit was moved lower in the watershed to below El Capitan Reservoir.
<b><i>San Diego River (Upper)</i></b>	<b><i>San Diego River (Upper)</i></b>  This portion now includes the reach upstream of El Capitan Reservoir.
<b><i>Pine Valley Creek</i></b>	<b><i>Pine Valley Creek (Lower)</i></b>  Includes the portion from Barrett Lake to Old Highway 80
	<b><i>Pine Valley Creek (Upper)</i></b>  Upstream of Old Highway 80



Previous Mapping	New Mapping
<b><i>Mission Bay</i></b>	<b><i>Mission Bay</i></b>  No longer incorrectly includes the mouth of the San Diego River
	<b><i>San Diego River Mouth</i></b>  This was mapped as distinct from Mission Bay, and the upstream extent was mapped as separate from the freshwater portion of the San Diego River

Some mapping corrections were unable to be completed during this cycle and may be done off-cycle. Lake San Marcos is incorrectly mapped to a waterbody to the east called South Lake. However, all corresponding data are for Lake San Marcos, and all assessments apply to Lake San Marcos. All tributaries to Pine Valley Creek were included in the original mapping of Pine Valley Creek. This cycle, Horsethief Canyon Creek (San Diego County) was successfully split and mapped separately from Pine Valley Creek. Two other tributaries remain grouped with Pine Valley Creek: Secret Canyon Creek and Espinosa Creek.

**6.4. San Diego Region 303(d) List Recommendations**

There are 257 new waterbody-pollutant combinations recommended for listing in the San Diego Region and 33 waterbody-pollutant combinations are recommended for delisting.

Table 6-5 and 6-6 below summarize delisting recommendations and recommended listings by pollutant category for the San Diego Region for the 2020-2022 Integrated Report. A list of individual recommendations can be found in Appendix K: San Diego Regional Water Board – New Waterbody- Pollutant Combination Listings and Delistings.

**Table 6-5: Summary of San Diego Waterbody-Pollutant Combination Delisting Recommendations by Pollutant Category**

<b>Pollutant Category</b>	<b>Delisting Due to Water Quality Attainment</b>	<b>Delisting Due to Change in Assessment</b>	<b>Total</b>
Metals	6	2	8
Nutrients (including dissolved oxygen)	0	1	1
pH	1	0	1
Benthic Community Effects	0	3	3
Pathogens/Bacteria	0	11	11
Pesticides	0	7	7
Aquatic Toxicity	0	1	1
Toxic Inorganics (Sulfates)	0	1	1

**Table 6-6: Summary of San Diego Waterbody-Pollutant Combination New Listing Recommendations by Pollutant Category**

<b>Pollutant Category</b>	<b>Number of New Listing Recommendations<sup>5</sup></b>	<b>Number of New Listing Recommendations Changed from Previous Cycle<sup>6</sup></b>	<b>Total</b>
Metals	12	8	20
Nuisance	2	0	2

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<sup>5</sup> Listing recommendations based on new assessments.

<sup>6</sup> Revised listing recommendations include decisions that were previously assessed as “do not list” or “delist” and revised to “list.”

<b>Pollutant Category</b>	<b>Number of New Listing Recommendations<sup>5</sup></b>	<b>Number of New Listing Recommendations Changed from Previous Cycle<sup>6</sup></b>	<b>Total</b>
Nutrients (including dissolved oxygen)	60	6	66
pH	0	1	1
Benthic Community Effects	4	10	14
Pathogens	7	24	31
Pesticides	50	27	77
Total Dissolved Solids/Chlorides	13	5	18
Turbidity	6	8	14
Aquatic Toxicity	2	4	6
Toxic Inorganics (Sulfates)	6	1	7
Toxic Organics (PCBs)	1	0	1

A preliminary assessment of new listings and delistings points to multiple potential reasons for the number of changes. A main reason for the increases in listings and delistings this cycle is the net increase in the amount of data available for assessment this cycle. The prior cycle (2014/16) data cutoff was August 2010, and included new data over a roughly three-year period from the prior Integrated Report. The 2020-2022 cycle included data from August 2010 to June 2019, which represents a roughly nine-year period.

New listings can be attributed to multiple factors. This cycle included additional sampling efforts across the region, including waterbodies that had not been sampled previously and new pollutants (e.g., pyrethroid pesticides) not previously assessed. In addition, a number of evaluation thresholds were revised for various pollutants. Delistings for numerous waterbody-pollutant combinations occurred for various reasons. These include the implementation of permits, stream restoration efforts, site cleanups, banning of chemicals, and the adoption of new thresholds.

## **6.5. San Diego Scheduling of TMDLs and Efforts to Address Impaired Waters**

Efforts to address impaired waterbodies identified on the 303(d) list can include revising standards, developing and implementing TMDLs, individual permits, or other programs of implementation, which are sometimes known as TMDL alternative projects. For waterbodies that are currently listed or recommended for listing under Category 5 as impaired, the San Diego Regional Water Board will continue to use the process outlined in Resolution 2005-0050, the *Water Quality Control Policy for Addressing Impaired Waters: Regulatory Structure and Options* (“Impaired Waters Policy”) for selecting waterbodies for TMDLs. Thus, not all waterbodies are expected to require TMDLs, as the San Diego Regional Water Board will evaluate the appropriateness of the use of a TMDL on a case-by-case basis.

In accordance with the Impaired Waters Policy, the San Diego Regional Water Board identified the following scenarios and projects (Table 6-7) to best address the Region's impaired waters.

**Table 6-7: San Diego Region Projects to Address the Various Scenarios for Impaired Water Restoration under Resolution No. 2005-0050**

Scenario	Category	Number of Projects*	Number of Waterbodies
Inappropriate WQS: Unclear, Broad, or Natural Levels Exceed	TMDL Not Required: Revise Standards	1	45**
Impaired by Pollution (not Pollutants)	TMDL Not Required: Explore Remedies	0	NA
Cause Addressed by Single Board Vote	TMDL Alternative: Single Vote	16	18
Cause Addressed by Other Entity's Regulatory Action	TMDL Alternative: Other Entity Regulatory Action	1	1
Cause Addressed by Other Non-Regulatory Action	TMDL Alternative: Other Non-regulatory Action	1	1
Cause Addressed by Basin Plan Amendment	TMDL Traditional	7 (+1 in development***)	48

\*Projects include those completed and in progress/development

\*\*Revised bacteria threshold needed for the SHELL beneficial use. This is the current number of waterbodies where REC-1 is supported, but SHELL is exceeding.

\*\*\* Tijuana River and Estuary (see below)

To set priorities, the San Diego Regional Water Board uses its Practical Vision (Resolution R9-2013-0153), the triennial Basin Plan review, and the U.S. EPA's Long Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program (U.S. EPA Vision [https://www.epa.gov/sites/production/files/2015-07/documents/vision\\_303d\\_program\\_dec\\_2013.pdf](https://www.epa.gov/sites/production/files/2015-07/documents/vision_303d_program_dec_2013.pdf)).

In accordance with the U.S. EPA Vision, the San Diego Regional Water Board has prioritized:

- 1) Protection of those waterbodies already meeting beneficial uses, and
- 2) Meaningful restoration of waterbodies using environmental outcomes and TMDL alternative approaches.

This approach is expected to result in meaningful net gains in water quality in a more timely and less costly manner than developing traditional TMDLs. To address Priority 1, the San Diego Regional Water Board has focused on the protection of high quality and minimally-impacted freshwater streams that are supporting the COLD and WARM beneficial uses by including all readily available bioassessment data in integrated report assessments and the resulting placement of waterbodies into Category 1 when at least one core beneficial use is supported and none are known to be impaired. To address Priority 2, various TMDL alternative approaches are currently being used or are in progress, including investigative orders, cleanup and abatement orders, or implementation through existing permits (shown as TMDL Alternative: Single Vote in above Table 6-7). Where alternative approaches do not result in beneficial use attainment, the traditional TMDL approach may still be warranted and used. There is currently one new traditional TMDL being developed in the San Diego Region to address Indicator Bacteria and Trash in the lower Tijuana River (Table 6-8).

**Table 6-8: San Diego TMDL Schedule**

TMDL Project	Projected Completion Date
Lower Tijuana River Indicator Bacteria and Trash TMDL	2022

## 6.6. San Diego Revisions Following Public Comment

The following describes revisions to the June 4, 2021 Draft Integrated Report made in response to comments received. For additional documentation of revisions, please reference the Summary of Comments and Responses.

### 6.6.1. Nutrient Data

Staff assessed nutrient data previously omitted. Newly created nitrogen LOEs were used in the following 15 decisions:

- 132037 Agua Hedionda Creek
- 132038 Buena Vista Creek
- 132039 Forester Creek
- 132040 Green Valley Creek
- 132041 Loma Alta Creek
- 132042 Los Penasquitos Creek

- 132043 San Diego River (Lower)
- 132044 San Luis Rey River, Lower (west of Interstate 15)
- 132045 Sweetwater River, Lower (below Sweetwater Reservoir)
- 132046 Buena Creek
- 132047 Chollas Creek
- 132048 Lusardi Creek
- 132049 Murphy Canyon
- 132050 Murrieta Creek
- 132051 Otay River

One newly created phosphorus LOE was used in the following decision:

- 132052 San Elijo Lagoon

### **6.6.2. Mapping**

Staff corrected mapping errors. Significant mapping revisions are described below.

Staff revised Decision ID 113353 for Cyhalothrin, Lambda in the San Dieguito River. Data associated with LOEs 227866 and 227768 were not collected from the San Dieguito River and the LOEs were marked as “insufficient information” and not used in the decision. The listing recommendation for San Dieguito River was revised from “List” to “Do not List” for Cyhalothrin, Lambda. Data associated with LOEs 227866 and 227768 will be moved to the appropriate waterbody (upstream of Lake Hodges) in a future listing cycle.

Staff revised multiple decisions and LOEs for the Lower Santa Margarita River. Data collected from a station in the lower San Luis Rey River were incorrectly uploaded into CEDEN as being in the Lower Santa Margarita River. Staff corrected the mapping error for decisions and LOEs identified by commenters. Remaining data from the San Luis Rey River were removed from the Lower Santa Margarita River assessments and will be reassessed when data are corrected in CEDEN in a future listing cycle. The mapping corrections resulted in a new Decision ID 132056 and deletion of Decision ID 111260. The following Decision IDs were revised:

- 111264
- 111498
- 111247
- 111250
- 111263
- 111496
- 111494
- 111263
- 128035
- 111505

Additionally, data sets for several waterbodies were not assessed due to missing latitude and longitude coordinates and/or datum. These can be assessed once the data provider makes corrections in CEDEN. Staff will further investigate these during the next assessment cycle.

### **6.6.3. Beachwatch Data**

Staff assessed Beachwatch bacteria data from Orange County ocean beaches that were previously omitted. Data were omitted because they were mapped to the wrong waterbody or for another reason yet to be determined. Staff added the Beachwatch data and assessed those data for waterbodies which are recommended to be listed or delisted from the 2020-2022 303(d) list. All other data will be evaluated and assessed in the 2024 Integrated Report cycle if the data meet data quality requirements. Decision IDs that were created, revised, and deleted as a result of the mapping corrections are listed below.

New Decision IDs:

- 132168 Pacific Ocean Shoreline, Lower San Juan HSA, at North Doheny State Park Campground
- 132163 Pacific Ocean Shoreline, Lower San Juan HSA, at South Doheny State Park Campground
- 132164 Pacific Ocean Shoreline, San Clemente HA, at San Clemente City Beach at Pier
- 132057 Pacific Ocean Shoreline, Aliso HSA, at Aliso Beach – middle

Revised Decision IDs:

- 127931 Pacific Ocean Shoreline, Dana Point HSA, at Dana Point Harbor at Baby Beach
- 127933 Pacific Ocean Shoreline, Dana Point HSA, at Dana Point Harbor at guest dock
- 127963 Pacific Ocean Shoreline, Lower San Juan HSA, at North Beach Creek

Deleted Decision ID:

- 127929 Pacific Ocean Shoreline, Dana Point HSA, at Aliso Beach – south

## **7. Colorado River Basin Region 303(d) List**

Several high-priority data sets in the Colorado River Basin Region were assessed “off-cycle” for the 2020-2022 listing cycle. A total of 11 waterbodies, containing 31 waterbody-pollutant combinations were assessed. Based on these assessments, 16 waterbody-pollutant combinations are recommended to be added to the 303(d) list. No waterbody-pollutant combinations are recommended to be removed from the 303(d) list.



The data from the 11 waterbodies were preliminarily assessed during the development of the 2018 Integrated Report. The Colorado River Basin Regional Water Board did not adopt listing recommendations for these 11 waterbodies for the 2018 Integrated Report. The State Water Board recommended placing the 25 waterbody-pollutant combinations in Category 3 of the Integrated Report if no other pollutant impairment existed in the waterbody. Data assessments were completed for these 25 waterbody-pollutant combinations with the 2020-2022 Integrated Report.

Additionally, the listing category for six waterbody-pollutant combinations for the Palo Verde Outfall and Lagoon and the Coachella Valley Stormwater Channel was changed as the impairments are being addressed by actions other than a TMDL, as described in the section entitled, “Efforts to Address Impaired Waters.”

### 7.1. Colorado River Region 303(d) List Recommendations

There are 16 new waterbody-pollutant combinations recommended for listing in the Colorado River Region. Table 7.1 below summarizes the proposed listing recommendations by pollutant category for the Colorado River Basin Region for the 2020-2022 Integrated Report. A list of individual recommendations can be found in Appendix L: Colorado River Basin Regional Water Board – New Waterbody-Pollutant Combination Listings.

**Table 7-1: Colorado River Basin Listing Recommendations**

Pollutant Category	Number of New Listing Recommendations <sup>7</sup>	Number of Listing Recommendations Changed from Previous Cycle <sup>8</sup>	Total
Nutrients	0	3	3
Pesticides	0	11	11
Sediment	0	1	1
Toxic Organics	0	1	1

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<sup>7</sup> Listing recommendations based on new assessments.

<sup>8</sup> Revised listing recommendations include decisions that were previously assessed as “do not list” or “delist” and revised to “list.”

## 7.2. Colorado River Scheduling and Efforts to Address Impaired Waters

Efforts to address impaired waterbodies identified on the CWA Section 303(d) list can include revising standards, developing and implementing TMDLs, individual permits, or other programs of implementation, which are sometimes known as TMDL alternative projects. TMDL projects, and other efforts to address impaired waters, are identified, assessed, and ranked during the Colorado River Basin Plan triennial review process. The proposed ranking of projects identified during the triennial review is based on the factors required by the Listing Policy (described in Section 2.6, above) and consideration of several other factors, which are:

- Relevance to human health protection
- Relevance to threatened and endangered species protection
- Importance to the implementation of other Regional Water Board programs
- Stated priorities of the Regional Water Board, State Water Board, or the U.S. EPA
- Requests of stakeholders, including tribal governments, cities and counties, other state or federal agencies, non-governmental organizations, and individuals
- Availability of necessary expertise, funding, and other resources

A workplan is developed by assessing the amount of time each highly ranked project is estimated to take and the staff resources available during the next triennial period. The high priority projects in progress are TMDL alternatives for "Palo Verde Outfall Drain and Palo Verde Lagoon DDT and Toxaphene" and "Coachella Valley Stormwater Channel DDT, Dieldrin, PCBs and Toxaphene."

### 7.2.1. Palo Verde Outfall Drain and Palo Verde Lagoon DDT and Toxaphene

Palo Verde Outfall Drain and Palo Verde Lagoon are listed on the 303(d) list as impaired by the pesticides dichlorodiphenyltrichloroethane ("DDT") and toxaphene because concentrations of these pollutants in those waterbodies do not attain water quality standards. In lieu of developing a TMDL, the Colorado River Basin Regional Water Board adopted Order R7-2019-0030, *General Waste Discharge Requirements for Discharges of Waste from Irrigated Agricultural Lands for Dischargers that are Members of a Coalition Group in the Palo Verde Valley and Palo Verde Mesa*, on May 15, 2019. The General WDRs incorporate impairment control requirements for DDT and toxaphene and serves as a TMDL alternative, the rationale for which is explained in Attachment B of the General WDRs. Attachment B is known as the Palo Verde Outfall Drain and Lagoon DDT and Toxaphene Impairment Control Plan. The General WDRs are reasonably expected to result in attainment of DDT and toxaphene water quality standards by 2036. If DDT and toxaphene were the only pollutants impairing Palo Verde Outfall Drain and Palo Verde Lagoon, the waterbodies would be placed into Integrated Report Condition Category 4b. However, because the waterbodies are also impaired by other pollutants and a TMDL or other action to address those impairments is not currently in place, the Palo Verde Outfall Drain and Palo Verde Lagoon waterbodies were placed in Integrated Report Condition Category 5 for the 2020-2022 Integrated Report. The specific waterbody-pollutant combinations were identified in

CalWQA with the TMDL requirement status of 5C, indicating the waterbody-pollutant combinations are being addressed by actions other than a TMDL. Additional information can be found in the following decisions:

- Palo Verde Outfall and Lagoon: DDT (Decision ID 127938)
- Palo Verde Outfall and Lagoon: Toxaphene (Decision ID 127640)

### **7.2.2. Coachella Valley Stormwater Channel: DDT, Dieldrin, PCBs and Toxaphene**

The Coachella Valley Stormwater Channel (“CVSC”) is listed on the 303(d) list as impaired by multiple legacy organochloride compounds. Concentrations of DDT, dieldrin, polychlorinated biphenyls (“PCBs”), and toxaphene do not attain established water quality objectives. To address these impairments, a TMDL alternative is being implemented by Order R7-2020-0026, *General Waste Discharge Requirements for Discharges of Waste from Irrigated Agricultural Lands for Dischargers that are Members of a Coalition Group in the Coachella Valley*. The General WDRs outline management practices and monitoring and reporting requirements to determine compliance with water quality objectives. The General WDRs are expected to result in attainment of DDT, dieldrin, PCBs, and toxaphene water quality standards. If DDT, dieldrin, PCBs, and toxaphene were the only pollutants impairing the Coachella Valley Stormwater Channel, the waterbody would be placed into Integrated Report Condition Category 4b. However, because the waterbody is also impaired by other pollutants and a TMDL or other action to address those impairments is not currently in place, the Coachella Valley Stormwater Channel waterbody was placed in Integrated Report Condition Category 5 for the 2020-2022 Integrated Report. The specific waterbody-pollutant combinations were identified in CalWQA with the TMDL requirement status of 5C, indicating the waterbody-pollutant combinations are being addressed by actions other than a TMDL. Additional information can be found in the following decisions:

- Coachella Valley Stormwater Channel: DDT (Decision ID 127872)
- Coachella Valley Stormwater Channel: Dieldrin (Decision ID 127641)
- Coachella Valley Stormwater Channel: PCBs (Decision ID 127642)
- Coachella Valley Stormwater Channel: Toxaphene (Decision ID 127643)

## 8. Recommended 303(d) List

A tally of new listing and delisting recommendations, as well as the total number of impaired waterbodies, for the 303(d) list portion of the 2020-2022 California Integrated is shown in Table 8-1, below. The second column lists the number of waterbody-pollutant combinations currently listed as impaired on the 303(d) list. The two subsequent columns contain a count of recommended new listings and recommended new delistings. The last column includes the total number of listings for 2020 – 2022 that would result if all recommendations are adopted. A comprehensive list can be found in Appendix A: Recommended 2020-2022 303(d) list of Impaired Waters.

**Table 8-1: Recommended New Listings and Delistings for the 303(d) List Portion of the 2020-2022 California Integrated Report**

Region	2018 303(d) Listings	New Listings	Delistings	Total 2020-2022 303(d) Listings
North Coast	217	0	0	217
San Francisco Bay	348	0	0	348
Central Coast	922	401	146	1,177
Los Angeles	875	0	0	877
Central Valley	906	337	45	1,202
Lahontan	256	0	0	256
Colorado River Basin	94	16	0	110
Santa Ana	144	0	0	142
San Diego	609	257	33	844
<b>TOTALS</b>	4,371	1,011	224	5,173

## 9. 305(b) Integrated Report Condition Categories

For the 2020-2022 listing cycle, a total of 3,246 waterbodies (containing 53,187 waterbody-pollutant combinations) were evaluated. See Table 5-1 and Table 5-2, for a summary of the number of waterbodies both current and proposed in each of the five Integrated Report condition categories. Categories 1, 2, 3, and 4c are informational and do not require Water Boards approval. Waterbodies placed in those categories will be submitted as part of the 305(b) portion of the 2020-2022 California Integrated Report to the U.S. EPA for their biennial report to Congress. Categories 4a, 4b, and 5 are the 303(d) list.

**Table 9-1: Count of Waterbodies in 305(b) Integrated Report Condition Categories – Streams and Rivers**

Integrated Report Condition Category	2018 Streams per Category	Proposed New Revisions	2020-2022 Sum of Current and Proposed New Revisions
1	478	178	656
2	547	171	718
3	8	60	68
4A	183	-8	175
4B	42	0	42
4C	4	-1	3
5	880	120	1000
<b>TOTAL</b>	2,142	520	2,662

*Count of current and proposed categorization of streams, rivers, and other linear surface waterbodies statewide.*

**Table 9-2: Count of Waterbodies in 305(b) Integrated Report Condition Categories – Lakes and Reservoirs**

<b>Integrated Report Condition Category</b>	<b>2018 Lakes &amp; Reservoirs per Category</b>	<b>Proposed New Revisions</b>	<b>2020-2022 Sum of Current and Proposed New Revisions</b>
<b>1</b>	25	-1	24
<b>2</b>	194	33	227
<b>3</b>	1	6	7
<b>4A</b>	29	-1	28
<b>4B</b>	6	0	6
<b>4C</b>	1	0	1
<b>5</b>	272	19	291
<b>TOTAL</b>	528	56	584

*Category assessments of lakes, reservoirs, and other non-linear surface waters statewide.*

## 10. References

*For a complete list of references (data, QAPPs, evaluation guidelines, etc.) used in all the Waterbody Fact Sheets, see Appendix G.*

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