DIRECT COST ANALYSIS
FOR
PROPOSED UPDATES TO
CANNABIS CULTIVATION POLICY

State Water Resources Control Board
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CHAPTER 1 – INTRODUCTION

This report presents an analysis of the potential costs to cannabis cultivators to comply with the proposed updates to the *Cannabis Cultivation Policy – Principles and Guidelines for Cannabis Cultivation* (Cannabis Policy). This analysis is only for the proposed updates to the Cannabis Policy and is an addendum to the original *Direct Cost Analysis for the Proposed Cannabis Cultivation Policy* dated October 2017 (2017 Direct Cost Analysis), which is incorporated by reference. The Cannabis Policy established principles and guidelines (requirements) for cannabis cultivation activities to ensure that the diversion of water and discharge of waste associated with cannabis cultivation does not have a negative impact on water quality, aquatic habitat, wetlands, and springs. The Cannabis Policy area covers the entire state of California, as depicted in Figure 1. The requirements established by the Cannabis Policy are implemented through five regulatory programs:

- State Water Resources Control Board's (State Water Board) *General Waste Discharge Requirements and Waiver of Waste Discharge Requirements for Discharges of Waste Associated with Cannabis Cultivation Activities* (Cannabis Cultivation General Order) or any waste discharge requirements addressing cannabis cultivation activities adopted by a Regional Water Quality Control Board;
- State Water Board's General Water Quality Certification for Cannabis Cultivation Activities;
- State Water Board's Cannabis Small Irrigation Use Registration Program;
- State Water Board's Water Rights Permitting and Licensing Program; and
- California Department of Food and Agriculture's CalCannabis Cultivation Licensing Program[1].

This report evaluates the direct costs of reasonably foreseeable methods of compliance with the Cannabis Policy as implemented through the five regulatory programs. Potential costs of compliance with the proposed updates include regulatory program application and annual fees, preparing monitoring plans, and implementation of water quality protection measures as expressly required by the updates to the Cannabis Policy. Potential costs to cannabis cultivators to comply with the updates to the Cannabis Policy will vary from cultivator to cultivator depending on many factors, including cannabis cultivation site size, location, and the extent of existing environmental issues. Additionally, this report identifies possible sources of funding to assist the cultivator with implementation costs. This report does not evaluate the economic impact of potential indirect effects that may arise from the updates to the Cannabis Policy, such as the economic impact of developing alternative water supplies.

This analysis applies only to the new and updated requirements in the final proposed updates to the Cannabis Policy. As such, the cost of complying with the overall Cannabis Policy is not included in this analysis unless the costs have changed due to the proposed updates. Accordingly, this report provides estimated ranges of anticipated costs that cannabis cultivators may incur to comply with the proposed updates to the Cannabis Policy. The estimated ranges of costs are based primarily on existing regulatory programs, State Water Board professional judgment, and reasonable implementation expectations. The costs are also based on the use of outside contractors to provide labor and materials in connection with compliance activities. Throughout this report, it is acknowledged that

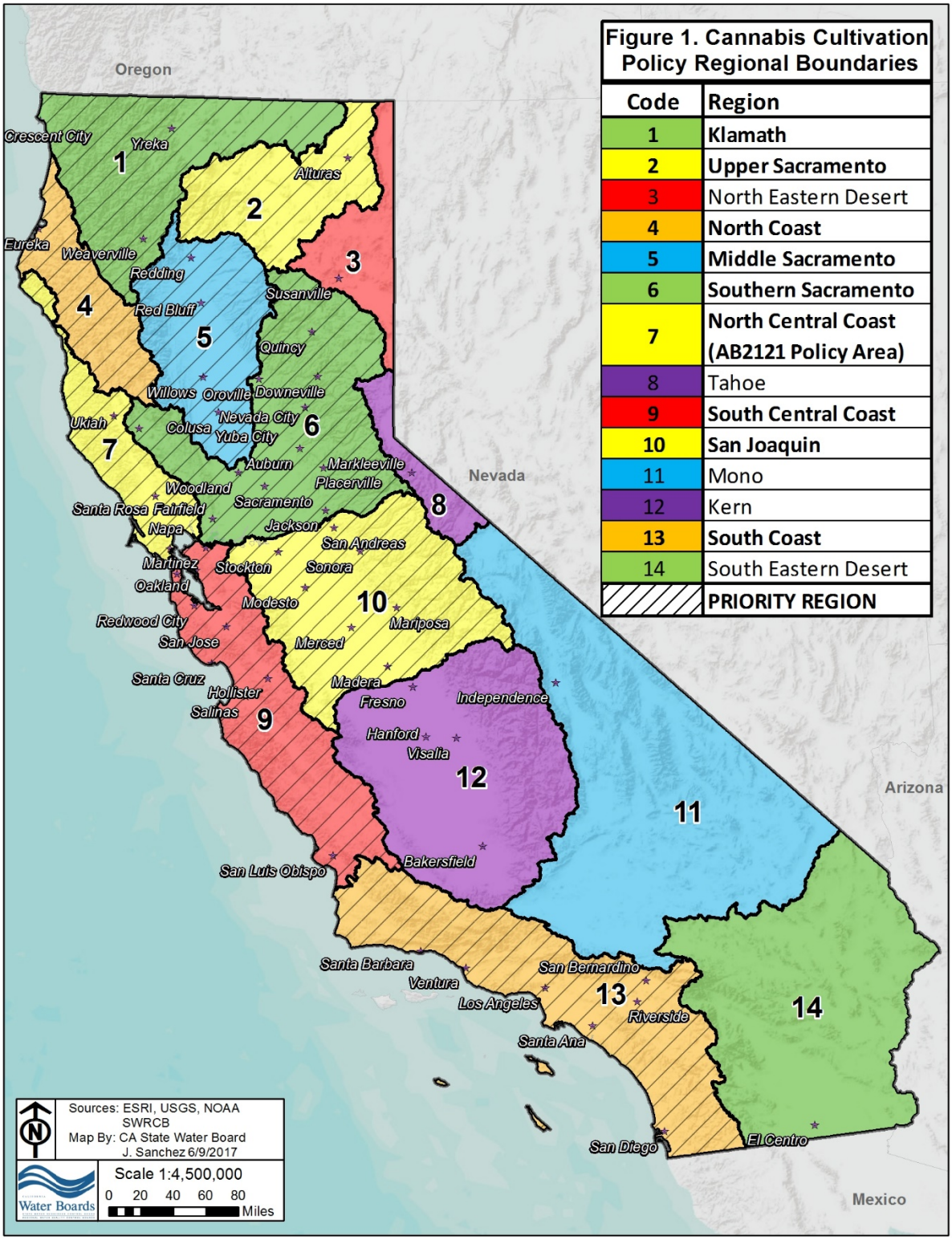
[1] Business and Professions Code section 26060(b)(1).

many of the potential costs are subject to variation based on site-specific circumstances.

1.1 ORGANIZATION OF THE REPORT

This analysis is organized as follows: Chapter 2 provides a brief overview of the final proposed updates to the Cannabis Policy; Chapter 3 presents the estimated ranges of anticipated costs cannabis cultivators may incur to comply with the proposed updates to the Cannabis Policy; Chapter 4 identifies potential sources of funding to assist cannabis cultivators in complying with the final proposed updates to the Cannabis Policy; and Chapter 5 includes references used in the development of this analysis.

Figure 1. Policy Area



CHAPTER 2 – DESCRIPTION OF THE FINAL PROPOSED UPDATES TO THE CANNABIS POLICY

The purpose of the Cannabis Policy is to ensure that the diversion of water and discharge of waste associated with cannabis cultivation does not have a negative impact on water quality, aquatic habitat, riparian habitat, wetlands, and springs. The Cannabis Policy applies to the following cannabis cultivation activities throughout California:

- Commercial Recreational
- Commercial Medical
- Personal Use Medical

The Cannabis Policy does not apply to recreational cannabis cultivation for personal use, which is limited to six plants under the Adult Use of Marijuana Act (Proposition 64, approved by voters in November 2016)[2].

On September 28, 2018, the State Water Board released a *Notice of Opportunity for Public Comment, Staff Informational Workshop, Board Workshop, and Public Hearing to Consider Adoption of Proposed Updates to: (1) Cannabis Cultivation Policy; and (2) General Waste Discharge Requirements and Waiver of Waste Discharge Requirements for Discharges of Waste Associated with Cannabis Cultivation Activities*. In response to comments, on January 10, 2019, the State Water Board released a *Notice of Opportunity for Public Comment Concerning Winterization Revisions to Proposed Updates to the Cannabis Policy and Staff Report*. The final proposed updates to the Cannabis Policy are focused on requirements related to:

- onstream reservoirs,
- tribal buffers,
- requirements for conditionally exempt indoor cultivation sites, and
- winterization.

The updates also include minor clean-up and clarifications of the Cannabis Policy based on feedback received from stakeholders during initial implementation efforts.

[2] Recreational cannabis cultivation for personal use as defined in Health and Safety Code section 11362.1(a)(3) and section 11362.2.

CHAPTER 3 – ESTIMATED COSTS

This chapter provides a discussion of estimated potential costs that cannabis cultivators may incur to comply with the proposed updates to the Cannabis Policy. It was determined that the only additional costs to cannabis cultivators as a result of the proposed updates to the Cannabis Policy will arise from requirements related to onstream reservoirs. It is anticipated that existing onstream reservoirs that may be approved for continued operation under the Cannabis Small Irrigation Use Registration (SIUR) Program will primarily be small capacity reservoirs located on small ephemeral (Class III) streams or swales with small drainage areas. Only under unique circumstances would an existing onstream reservoir be approved for continued operation on Class I or Class II streams. This chapter focuses only on those requirements, with costs estimated for the following:

- technical reports related to onstream reservoir requirements,
- onstream reservoir storage measurement requirements,
- installation of bypass structures,
- other modifications of onstream reservoirs to ensure compliance with all requirements of the Cannabis Policy, and
- decommissioning of an onstream reservoir.

The estimated costs are based on previous cost evaluations of existing regulatory programs and similar state government activities. The costs also are based on the use of outside contractors to provide labor and materials in connection with compliance activities. Major costs not included in this analysis are permitting costs at the county and local level, and permits required for work not related to the proposed updates to the Cannabis Policy. Because the State Water Board has not yet established fees for cannabis cultivators with onstream reservoirs that obtain a SIUR certification, it is not currently possible to include these costs. Stakeholders will have the opportunity to review and comment on proposed fees when the fee regulation for this program is adopted.

General Assumptions

The cost of compliance in the sections below were developed using the same assumptions as the 2017 Direct Cost Analysis. Three primary references were used to determine the costs presented in this report:

- Recovery Strategy for California Coho Salmon (CDFW 2004)
- Direct Cost Analysis for the Proposed North Coast Instream Flow Policy (Stetson Engineers Inc. 2007)
- FY17 – Practice Payment Scenarios for Conservation Activity Plans and Conservation Practices (USDA 2016)

Analysis based on these references shows that consultant labor costs for activities similar to those required for cannabis cultivation have remained relatively constant over the last 15 years and allow some level of confidence in the estimated costs. The higher cost was generally selected if there were differences in the costs assessed from the references. Therefore, the cost assumptions are conservative. The costs presented in the 2017 Direct Cost Analysis are also assumed to be consistent with current costs, as no significant economic changes in the past year have affected these estimates. General inflation between 2017 and 2018 is assumed to be approximately three percent (3%), which for the purposes of the estimates in this analysis is negligible (California Department of Finance 2019).

Table 3.1 compares the cost assumptions between the references and what is used in this analysis. Table 3.1 shows that the more recent document estimated lower hourly costs for engineers and scientists; however, this analysis uses the highest rate found in the references, with actual costs likely to be lower.

Table 3.1 – Comparison of Hourly Labor Costs between References and this Cost Analysis

Category	CDFA 2004	Stetson Engineers Inc. 2007	USDA 2016	Cannabis Cost Analysis
General Labor	$18-25/hr	n/a	$24/hr	$25/hr
Engineer Labor	n/a	$120/hr	$89/hr	$120/hr
Environmental Scientist Labor	n/a	$100/hr	$74/hr	$100/hr

3.1 COSTS FOR TECHNICAL REPORTS

Enrollees under the Cannabis Cultivation General Order are required to submit technical reports to the appropriate Regional Water Quality Control Board. The cost to develop a compliance plan, scope of work, and schedule for compliance for an approved onstream reservoir (collectively Compliance Plan) is anticipated to be comparable to the costs associated with preparation of other reports presented in the 2017 Direct Cost Analysis. The cost of a report is based on a combination of field and in-office work performed by qualified professionals, as described in the Cannabis Policy requirements. The hours of work required for a report relies on the information contained in the references listed in the general assumptions and State Water Board staff professional judgment. Actual costs will also vary depending on the speed and efficiency of the professionals involved in developing any plan.

Compliance Plan

The Compliance Plan is required for onstream reservoirs that obtain a Cannabis SIUR certification. Cannabis cultivators are required to submit a Compliance Plan to the Deputy Director of the Division of Water Rights (Deputy Director) (or designee) within six months of determinations by the Deputy Director (or designee) and California Department of Fish and Wildlife (CDFW) regarding modifications and operation provisions for the onstream reservoir that are necessary to protect water quality and aquatic resources. The Compliance Plan shall include a scope of work and schedule for completion of modifications necessary to operate the onstream reservoir in compliance with the determination and Cannabis SIUR. It is anticipated that a qualified professional would prepare the Compliance Plan and that it would build on the Site Management Plan. Similar to off-stream reservoirs, the Site Management Plan should include, as needed, information related to: applicable monitoring equipment and related activities (for onstream reservoirs this includes the development of an area-capacity curve for the onstream reservoir), invasive species management, reservoir structural stability, and stabilization, riparian habitat mitigation, and any other additional information to address compliance with the Cannabis Policy (refer to 2017 Direct Cost Analysis for costs related to the development of a Site Management Plan). If this information is not included in the Site Management Plan, it would be incorporated into the Compliance Plan

Table 3.1-1 reflects the costs for a Compliance Plan for a cultivation site that includes an existing onstream reservoir, as this is the only updated requirement that is expected to affect costs.

Table 3.1-1. Summary of Estimated Costs for the Compliance Plan

Task	Environmental Scientist Labor ($100/hr)	Engineering Labor ($120/hr)	Total
Field Inspection/Survey	0 - 10 hrs	8 - 24 hrs	$960 - $3,880
In-Office Report Production	0 - 10 hrs	14 - 34 hrs	$1,680 - $5,080
Subtotal	**$0 - $2,000**	**$2,640 - $6,960**	**$2,640 - $8,960**

3.2 COSTS FOR ONSTREAM RESERVOIR MEASUREMENT

The proposed updates to the Cannabis Policy would add costs that would be reasonably required for the cost of measuring and monitoring water diverted and stored for cannabis cultivation. The Cannabis Policy requires cannabis cultivators to install and maintain a measuring device(s) for surface water or subterranean stream diversions. The measuring device shall be, at a minimum, equivalent to the requirements for direct diversions greater than 10 acre-feet per year in California Code of Regulations, Title 23, Division 3, Chapter 2.7.

Table 3.2-1 outlines the accuracy and monitoring requirements to meet the measuring device requirements for onstream reservoirs, as presented in the proposed updates to the Cannabis Policy. Table 3.2-2 details the expected costs of measurement devices. As with all other sections in this analysis, these are not meant to be the exhaustive list of devices that can be used for measurement, but rather a representation of potential reasonable measurement methods. Not included in this is the cost of professional consultation for the actual installation and maintenance of the measurement devices; however, this is assumed to be included in the cost of developing the Site Management Plan or Compliance Plan (see Section 3.1).

Table 3.2-1. Summary of Onstream Reservoir Accuracy and Monitoring Requirements (Cannabis Policy, Attachment A, Section 2, Requirement 83)

Required Device Accuracy	Required Monitoring Frequency	Installation and Certification
10%	Hourly	Qualified Professional

Table 3.2-2. Summary of Water Measurement Device Costs

Category	Device/Service	Cost Range	
		Low	High
Reservoir Storage	Staff Gauge	$300	$500
	Water Level Sensor (e.g., Pressure Transducer)	$300	$1,000
State Water Board 2016, *Emergency Regulation for Measuring and Reporting Water Diversions.* Available at http://www.waterboards.ca.gov/waterrights/water_issues/programs/measurement_regulation/docs/measure_cost_tables.pdf			

3.3 COST FOR RESERVOIR MODIFICATIONS FOR COMPLIANCE WITH FINAL PROPOSED UPDATES TO CANNABIS POLICY

Other modifications that may be required of an onstream reservoir to comply with the Cannabis Policy are similar to the costs and modifications required for off-stream reservoirs (e.g., spillway stabilization, reservoir structural integrity improvements, reservoir bank stabilization). For potential cost of compliance associated with both onstream and off-stream reservoirs, please refer to the 2017 Direct Cost Analysis. The costs for reservoir modifications discussed in this section are limited to those that are anticipated to be specific to onstream reservoirs. The need and associated costs for the modifications discussed below will vary based on the onstream reservoir location, size, and condition.

Costs for Installation of Flow Bypass Structures

The costs associated with the installation of bypass structures assumes that the onstream reservoir has not previously undergone permitting through a State Water Board or CDFW process. The general costs would fall under the same categories as seen in Table 3.3-1 as establishment of a bypass structure would likely include similar land-moving, drainage, and erosion protection, and aquatic organism protection activities. Bypass structures can range in design from relatively simple manual bypass systems (e.g., outlet pipe, pump and siphon) and engineered bypass structures (e.g., step pool weir) to more complex passive bypass systems and complex automated systems that are dependent on numerous factors concerning the cultivation site location within a watershed and the area geomorphology. As discussed earlier, it is anticipated that most onstream reservoirs will be relatively small capacity reservoirs located on Class III streams. It is therefore assumed that most cannabis cultivators would incur costs associated with the installation of manual bypass systems or in some situations where aquatic organism passage is needed (i.e., small Class II streams), engineered bypass structures. Passive bypass systems may need to be installed on large Class II streams.

According to *Direct Cost Analysis for the Proposed Policy for Maintaining Instream Flows in Northern California Coastal Streams* (Stetson Engineering, Inc. 2007), a Class III stream passive bypass structure may cost between $3,000 and $20,000 for a direct diversion structure, while a storage reservoir with passive bypass may cost between $25,000 and $150,000. Based on the information contained in Table 3.3-1 and State Water Board staff

professional judgment, it is anticipated that the range of costs associated with installation of manual bypass systems and engineered bypass structures would be similar to those identified in Stetson Engineering, Inc. 2007 for a Class III stream passive bypass structure for a direct diversion and cost between $3,000 and $20,000. Costs for onstream reservoirs on small Class III streams would be in the lower range and costs would increase toward the higher end of the range for onstream reservoirs that are located on small Class II streams as more ecological considerations are needed. Onstream reservoirs on large Class II streams may be required to install passive bypass systems and incur costs between $25,000-$150,000, as identified in Stetson Engineering, Inc. 2007.

Costs of activities beyond those discussed in this section (e.g., automated bypass systems, fish passage structures), that may be incurred in unique site-specific situations (e.g., large onstream reservoirs on Class I streams) can be found in *Direct Cost Analysis for the Proposed Policy for Maintaining Instream Flows in Northern California Coastal Streams* (Stetson Engineering, Inc. 2007).

Table 3.3-1. Summary of Land Development and Maintenance, Erosion Controls, and Bypass System Unit Costs

Component	Scenario	Description	Unit	Cost
Diversion	Small, <= 0.5 Cubic Yard/Linear Foot	Length of Diversion	Foot	$2.20
	Medium-Small, 0.5 – 1 Cubic Yard/Linear Foot	Length of Diversion	Foot	$4.00
Earthen Dam Removal	Decommissioning	Volume of Earth Removed	Cubic Yard	$132.14
Land Stabilization	Rock/Gravel	Area of Rock and or Gravel	Square Foot	$1.46
Open Channel	Excavation, Normal Conditions	Volume of Material Removed	Cubic Yard	$2.87
Structure for Water Control	Fish Screen, Irrigation Type	Rate of Water Screened	Cubic Foot per Second	$1,600.85
Aquatic Organism Passage	Step Pool Weir	Area of Material	Cubic Yard	$110.53
Precision Land Forming	Minor Shaping	Area of Land Treated	Acre	$472.09
	Site Stabilization	Volume of Material Moved	Cubic Yard	$7.54
	Habitat Excavation	Volume Excavated	Cubic Yard	$14.26
Mulching	Natural Materials	Area Covered	Acre	$289.66
	Hydromulch	Area Covered	Square Foot	$0.06
	Geotextile	Area Covered	Square Foot	$0.29

Stormwater Runoff Control	Silt Fence	Length Treated	Foot	$0.91
	Straw Bales	Number of Items	Each	$5.00
	Straw Wattles	Length Treated	Foot	$0.99
Structure for Water Control (No aquatic organism passage)	Corrugated Metal Pipe Culvert <30 inches	Diameter of Pipe by Length Required	Diameter Inch Foot	$10.23
	Corrugated Metal Pipe Culvert >=30 inches	Diameter of Pipe by Length Required	Diameter Inch Foot	$7.67
Surface Drain, Field Ditch	Drainage Ditch, <= 3 Feet Deep	Length Treated	Foot	$3.39

USDA 2016, *FY17 Practice Payment Scenarios for Conservation Activity Plans and Conservation Practices.* Available at: https://efotg.sc.egov.usda.gov/references/public/CA/FY17_ScenarioDescriptions-wBookMarks.pdf

3.4 COSTS FOR DECOMMISIONING AN ONSTREAM RESERVOIR

It is anticipated that not every onstream reservoir will be approved under the final proposed updated to the Cannabis Policy. There will be instances where cannabis cultivators will be required to decommission existing onstream reservoirs in order to comply with all requirements of the Cannabis Policy. Decommissioning of an onstream reservoir can be achieved through the total removal of the reservoir or rendering the reservoir incapable of storing water. The appropriate method will be determined based on review of site specific conditions. The costs associated with the decommissioning of an onstream reservoir depend on the size of the existing reservoir and the severity of environmental impacts it is causing. The disturbed area indicates the threat to water quality because level of threat is proportional to the area of disturbed soil, the amount of diverted water stored, and the potential for storm water runoff impacts.

3.4.1 Decommissioning, Erosion Controls, and Drainage Features

The costs related to decommissioning an onstream reservoir are assumed to originate from the professional development of plans to control discharges (sediment control plan) (see Section 3.1) and from the actual cost of control activities needed to decommission an existing onstream reservoir and bring the cultivation site into compliance with the requirements of the Cannabis Policy. Table 3.3-1 summarizes the unit cost of activities to comply with the requirements related to decommissioning, erosion controls, and drainage features. All costs are listed by unit as each cultivation site will have varying degrees of need. Table 3.3-1 is not meant to be an exhaustive list of activities that could occur under this section, but rather representations of potential reasonable actions. State Water Board staff estimate the cost of decommissioning an existing onstream reservoir will range between $2,000 and $20,000 depending on the size and complexity of the reservoir structure. The costs associated with the decommissioning of an existing onstream reservoir located on Class I stream could be significantly higher. A large portion of this cost is also based on whether the reservoir can be simply breached and stabilized to prevent storage of water and on the level of revegetation, mitigation, and streambed stabilization is required. Further cost associate with revegetation are included in Section 3.6.2. The estimated cost does not include the cost of permits required by other local, state, and/or federal agencies.

3.4.2 Restoration

In addition to the costs estimated in Section 3.3.1 restoration is a large variable in both bringing a onstream reservoir up to compliance or decommissioning the reservoir. While a general cost range for decommissioning is given in Section 3.4 there could be a smaller cost range if restoration is the only activity needed to meet the updated requirements. It is assumed for this scenario that any decommissioning, whether through breach or through complete removal, would require vegetation clearing during and riparian vegetation planting after the process. Simple to moderate restoration is estimated to cost between $2,000 and $16,000 depending on the existing riparian vegetation, the area disturbed during decommissioning (if applicable), and the size of the reservoir itself.

Table 3.6-2. Summary of Cleanup, Restoration, and Mitigation Unit Costs

Component	Scenario	Description	Unit	Cost
Herbaceous Weed Control	Hand Tools	Area of Land Treated	Acre	$343.06
	Competing Vegetation Control	Area of Land Treated	Acre	$1,142.47
Clearing and Snagging	Vegetation Removal	Length of Clearing	Foot	$16.78
	Rock Removal	Length of Clearing	Foot	$29.13
	Instream Structure Removal	Volume of Material Removed	Cubic Yard	$22.56
Critical Area Planting	Hydroseed	Area Treated	Acre	$2,157.02
Riparian Herbaceous Cover	Riparian Broadcast Seeding	Area Treated	Acre	$1,367.39
	Plug Planting	Area Treated	Acre	$26,705.04
Riparian Forest Buffer	Seeding	Area Treated	Acre	$211.00
	Cuttings, Small to Medium	Area Treated	Acre	$1,808.81
	Cuttings, Medium to Large	Area Treated	Acre	$4,688.87
	Bare Root, Hand Planted	Area Treated	Acre	$1,547.02

USDA 2016, *FY17 Practice Payment Scenarios for Conservation Activity Plans and Conservation Practices.* Available at: https://efotg.sc.egov.usda.gov/references/public/CA/FY17_ScenarioDescriptions-wBookMarks.pdf

CHAPTER 4 – POTENTIAL FUNDING SOURCES

This chapter has not changed. Potential funding sources can be found in the 2017 Direct Cost Analysis.

CHAPTER 5 – REFERENCES

California Department of Fish and Wildlife (CDFW). 2004. *Recovery Strategy for California Coho Salmon*. Available at: http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=99401

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