Chapter 5
OTHER STATUTORY CONSIDERATIONS

5.1 Introduction

This chapter presents discussions of irreversible impacts, significant and unavoidable impacts, growth-inducing impacts, and cumulative impacts as required by the California Environmental Quality Act (CEQA) Guidelines (see generally Cal. Code. Regs., tit. 14, § 15000 et seq. [hereafter, CEQA Guidelines]).

5.2 Irreversible Impacts

CEQA Guidelines (Cal. Code Regs. tit. 14, §15126.2 subdiv. (c)) requires that an EIR identify any irreversible impacts, also referred to as irreversible environmental changes that may be caused by a proposed project including current or future commitments to using non-renewable resources, secondary, or growth-inducing impacts that commit future generations to similar uses. Section 15126 of the CEQA Guidelines states that significant irreversible environmental changes associated with a proposed project may include the following:

- uses of non-renewable resources during the initial and continued phases of the project which may be irreversible because a large commitment of such resources makes removal or nonuse thereafter unlikely;
- primary impacts and, particularly, secondary impacts (such as highway improvement that provides access to a previously inaccessible area) that commit future generations to similar uses; and
- irreversible damage, which may result from environmental accidents associated with the project.

The irretrievable commitment of nonrenewable resources would occur as a result of the Proposed Program, as follows. Implementation would involve the permitting of an activity which involves the use of fossil fuels and other non-renewable resources for equipment construction, operation and travel. In addition, the activity itself would extract non-renewable resources within the Program Area in the form of mineral deposits (gold). However, the total amount of gold recovered under the Program is anticipated to be low relative to the total placer gold present in the state, and as such is not considered to be a large commitment of gold resources. Furthermore, the Program, by making permits available, would not make extraction of gold compulsory. Also, the Program is not anticipated to have secondary impacts that commit future generations to similar uses or result in irreversible damage from accidents.

5.3 Significant and Unavoidable Impacts

Section 15126.2(b) of the CEQA Guidelines further requires an EIR to describe any significant impacts that cannot be mitigated to a level of insignificance. The analysis of Program effects did not identify any significant impacts which could be reduced to a level of less-than-significant through implementation of stand-alone mitigation measures; rather,

because the Proposed Program consists of proposed statewide regulations, measures to reduce or avoid impacts were incorporated directly into the proposed regulations where feasible given the scope of CDFG's jurisdictional authority with respect to suction dredging. CDFG's authority is limited to impacts that are deleterious to fish pursuant to the provisions of Fish and Game Code section 5653. As a result, adverse impacts were found to be either *less-than-significant* (i.e., the proposed regulations would ensure that impacts are not significant) or *significant and unavoidable* (i.e., the proposed regulations would not reduce impacts to a level of insignificance and it was determined to be infeasible to implement further mitigation).

The following impacts have been identified as significant and unavoidable.

- *Impact WQ-4*: Effects of Mercury Resuspension and Discharge from Suction Dredging
- *Impact WQ-5*: Effects of Resuspension and Discharge of Other Trace Metals from Suction Dredging
- *Impact BIO-WILD-2:* Effects on Special-Status Passerines Associated with Riparian Habitat
- *Impact CUL-1:* Substantial Adverse Changes, When Considered Statewide, in the Significance of Historical Resources
- *Impact CUL-2:* Substantial Adverse Changes, When Considered Statewide, in the Significance of Unique Archaeological Resources
- *Impact NZ-1:* Exposure of the Public To Noise Levels in Excess of City of County Standards

In addition, the Program would result in significant and unavoidable contributions to adverse cumulative impacts. These are discussed in greater detail in Section 5.5, below.

5.4 Growth Inducement

Section 15126.2(d) of the state's CEQA Guidelines requires an EIR to include a detailed statement of a proposed project's anticipated growth-inducing impacts. The analysis of growth-inducing impacts must discuss the ways in which a proposed project could foster economic or population growth or the construction of additional housing in the project area. The analysis must also address project-related actions that, either individually or cumulatively, would remove existing obstacles to population growth. A project would be considered growth inducing if it induces growth directly (through the construction of new housing or increasing population) or indirectly (increasing employment opportunities or eliminating existing constraints on development). Under CEQA, growth is not assumed to be either beneficial or detrimental.

The Proposed Program would not involve new development or infrastructure installation that could directly induce population growth in the Program Area. Additionally, the Program would not involve construction of new housing or create a demand for additional housing. The proposed amendments to the regulations have been designed so that additional staff would not be required to administer the Program. Furthermore, the Proposed Program would not displace any existing housing units or persons. Finally, suction dredging is not

anticipated to generate sufficient economic activity in communities near dredging locations such that they would experience substantial population growth.

Therefore, the Proposed Program would have a less than significant impact on population growth or housing demand.

5.5 Cumulative Impacts

A cumulative impact refers to the combined effect of "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines § 15355). As defined by the state of California, cumulative impacts reflect "the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time." (CEQA Guidelines, § 15355, subdiv. (b).) Under CEQA, an EIR must discuss the cumulative impacts of a project when the project's incremental contribution to the group effect is "cumulatively considerable." An EIR does not need to discuss cumulative impacts that do not result in part from the project evaluated in the EIR.

In order to meet the adequacy standard established by section 15130 of the CEQA Guidelines, an analysis of cumulative impacts must contain the following elements.

- An analysis of related future projects or planned development that would affect resources in the project area similar to those affected by the proposed project.
- A summary of the environmental effects expected to result from those projects with specific reference to additional information stating where that information is available.
- A reasonable analysis of the combined (cumulative) impacts of the relevant projects.

It must also evaluate a proposed project's potential to contribute to the significant cumulative impacts identified, and discuss feasible options for mitigating or avoiding any contributions assessed as cumulatively considerable.

The discussion of cumulative impacts is not required to provide as much detail as the discussion of the effects attributable to the project alone. Rather, the level of detail should be guided by what is practical and reasonable.

5.5.1 Methods Used in this Analysis

Section 15130 of the CEQA Guidelines provide two recommended approaches for analyzing and preparing an adequate discussion of significant cumulative impacts. The approaches as defined in section 15130 of the CEQA Guidelines are either:

- the list approach, which would involve listing past, present, and reasonably probable future projects producing related or cumulative impacts, including those projects outside the control of the lead agency; or

- the projection approach, which utilizes a summary of projections contained in an adopted general plan, a related planning document, or an adopted environmental document that evaluated regional or area-wide conditions contributing to the cumulative impact.

This discussion will utilize the list approach for the cumulative impact analysis. The level of detail of a cumulative impact analysis should consider a proposed project's geographic scope and other factors (e.g., a project's construction or operation activities) to ensure that the level of detail is practical and reasonable. Because of the broad geographic range of CDFG's Program, involving numerous suction dredge locations scattered statewide, this section provides a discussion of impacts by subject area (e.g., climate change) with representative examples of major projects rather than mention of all individual projects contributing to the possible cumulative effect. The discussion focuses on the potential cumulative impacts of the Program for relevant resource areas analyzed in previous chapters.

Table 5-1 defines the geographic scope that will be used in the impact analysis for each resource area.

TABLE 5-1. GEOGRAPHIC SCOPE FOR RESOURCES WITH POTENTIAL CUMULATIVE IMPACTS

Resource	Scope
Air Quality	Statewide and Global
Biological Resources	Statewide suction dredge locations
Water Quality and Toxicology	At and downstream of suction dredge locations
Noise	Statewide suction dredge locations

5.5.2 Cumulative Impact Analysis

Cumulative Setting

Projects and activities described in this analysis include those that occur in the same geographic area and produce similar impacts on biological and other resources as those of the Program. The broad geographic range of the Program's suction dredge locations requires an analysis of a number of past, current, and foreseeable activities that have affected California's surface waters and other resources. Specific past, current, and reasonably foreseeable future activities considered in this analysis are listed in Table 5-2. Table 5-2 also identifies the potential impacts by resource area resulting from each activity.

TABLE 5-2. OTHER ACTIVITIES (PAST, EXISTING, AND FUTURE) THAT MAY CUMULATIVELY AFFECT RESOURCES OF CONCERN OF THE PROGRAM

Other Activity Description	Potential Cumulative Impacts by Resource Area			
	Biological Resources	*Air Quality*	*Water Quality and Toxicology*	*Noise*
Agriculture	X	X	X	
Aquaculture	X	X	X	
Climate Change	X	X	X	
Commercial Fishing	X	X		

Other Activity Description	Potential Cumulative Impacts by Resource Area			
	Biological Resources	***Air Quality***	***Water Quality and Toxicology***	***Noise***
Dams	X		X	
Effluent Pollution	X		X	
Introductions of nonnative species	X			
Mining	X	X	X	
Recreational Activities (i.e., camping, off-road vehicle use, rafting, and trail construction or use)	X	X	X	X
Recreational Fishing	X			
Streambed Alteration	X		X	
Timber Harvest	X	X	X	X
TMDL Plans (related to mercury especially)	X		X	
Tribal Fishing	X			
Urbanization	X	X	X	X
Water Diversions	X		X	
Wildfire, fire suppression, and fuels management	X	X	X	

Agriculture

Agricultural activities, including farming and livestock grazing, may cumulatively affect the biological resources and water quality of California surface waters in addition to the effects from the Program. Agriculture may affect biological and water quality resources via the runoff and transport of pollutants, removal of stream bank vegetation, straightening of natural streams, removal of woody debris, water diversions, and excessive irrigation (State Water Resources Control Board [SWRCB] 2000). Typical potential pollutants resulting from agricultural operations include sediments; animal wastes; salts; and pesticides, herbicides, and fertilizers (SWRCB, 2000). The removal of stream bank vegetation or woody debris and the straightening of natural streams may affect the aquatic habitat complexity (ex., depth of pools) and stream water temperatures (Knight and Boyer, 2007). Grazing may also affect surface water quality and aquatic biota through direct loadings of animal wastes, reductions of streamside vegetation, increasing temperatures, siltation of spawning habitats, and erosion of streambanks.

Aquaculture

The operation of aquaculture facilities, including hatcheries, may contribute pollutants via direct discharges from the facilities to waters potentially affected by the Program. Potential pollutants of aquaculture facilities include but are not limited to: herbicides, sediments, and waste products. The CDFG issues licenses for every aquaculture operation that is involved in the controlled growing and harvesting of fish, shellfish and plants in marine, brackish and fresh water for human consumption or bait purposes. In addition, aquaculture facilities may require water diversions that have the potential to affect aquatic biological resources through entrainment and/or reduced downstream flows.

Aquaculture facilities may also impact native fish species through predation or competition between the native and hatchery-reared (i.e., stocked) fish. As an example, although many of CDFG's stocked trout, salmon, and steelhead hatcheries would have beneficial or less than

significant impacts on native fish species populations, the release of hatchery-reared Chinook salmon and steelhead would potentially cause substantial competition and predation impacts on the Klamath and Trinity rivers' natural coho salmon and fall-run Chinook salmon populations (ICF Jones & Stokes, 2010). Thus, aquaculture may be a significant contributor to cumulative impacts on fish or aquatic species in streams with suction dredging.

Air Quality

Regulatory Setting - Federal Regulations.

The U.S. Environmental Protection Agency (EPA) carries out the provisions of the federal Clean Air Act (CAA), originally passed in 1963 and amended six times, most recently in 1990. U.S. EPA implements programs under the CAA that focus on reducing ambient air pollutant concentrations, reducing emissions of toxic pollutants, and phasing out production and use of chemicals that destroy stratospheric ozone. U.S. EPA sets ambient air limits, the National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: particulate matter, carbon monoxide, nitrogen oxides, sulfur oxides, ground-level ozone, and lead. Primary standards are set for protection of human health and secondary standards are set for environmental protection. Areas which meet the primary standards are considered in "attainment" while areas with air quality not meeting the primary standards are in "nonattainment."

Regulatory Setting - State Regulations

California Air Resources Board. The California Air Resources Board (CARB) was established in 1967. CARB has set California Ambient Air Quality Standards (CAAQSs) that are more stringent than the NAAQS for most contaminants. These include standards for additional contaminants not covered in the NAAQS, including visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. The California Clean Air Act was passed in 1988 and requires nonattainment areas to achieve and maintain the CAAQSs by the earliest time practicable, and local air districts to develop attainment plans for state standards.

CARB regulates motor vehicle emissions in the State, while local air quality management district's permit stationary sources.

CARB has designated 15 air basins in the State. The basin boundaries were decided by grouping similar geographic features together. Within the 15 air basins, thirty-five local air quality management districts are responsible for attainment and permitting in each basin and subbasin area.

Climate Change/Greenhouse Gas Emissions. In 2002, Assembly Bill 1493 (AB 1493) launched an innovative and pro-active approach to dealing with greenhouse gas (GHG) emissions and climate change at the state level. AB 1493 requires CARB to develop and implement regulations to reduce automobile and light truck GHG emissions; these regulations will apply to automobiles and light trucks beginning with the 2009 model year. AB 1493 cited several potential risks that California faces from climate change, including reduction in the state's water supply, increased air pollution creation by higher temperatures, harm to agriculture, and increase in wildfires, damage to the coastline, and economic losses caused by higher food, water, energy, and insurance prices. Further, the

legislature stated that implementing technological solutions to reduce greenhouse gas emissions would stimulate California economy and provide jobs.

Attempts by CARB to receive the authority to implement the GHG emission reduction standards required by AB 1493 were initially denied. In March 2008, the U.S. EPA denied CARB's December 2005 waiver request that would grant CARB the required authority. The reasons for the waiver denial were based "on a finding that California's request to reduce GHG emissions from passenger vehicles did not meet the CAA requirement of showing that the waiver was needed to meet 'compelling and extraordinary conditions'" (CARB, 2010a). However, on June 30, 2009, the U.S. EPA rejected the earlier denial reasoning by returning to and applying EPA's traditional waiver review principles. Therefore, CARB expects that the Pavley regulations will reduce GHG emissions from California passenger vehicles by about 22 percent in 2012 and about 30 percent in 2016. (CARB, 2010a).

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order is to reduce California's GHG emissions to: (1) 2000 levels by 2010; (2) 1990 levels by 2020; and (3) 80% below the 1990 levels by the year 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that CARB create a plan (including market mechanisms), and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team.

An approved CARB-prepared scoping plan to implement AB 32 was adopted on December 12, 2008. Key strategies of the scoping plan include: 1) a broad-based cap-and-trade program; 2) transportation reductions; 3) improved energy and efficiency use; 4) industry reductions; 5) high global warming potential gases reduction; 6) forestry projects; 7) agricultural reductions; and 8) waste and recycling reductions. The cap-and-trade program would cover 85% of California's emissions (e.g., electricity generation, large industrial sources, transportation fuels, and residential and commercial use of natural gas) and would involve connections to the Western Climate Initiative that would provide greater environmental and economic benefits. Transportation emission reduction efforts include reducing vehicle greenhouse gas emissions (known as Pavley standards) and implementing a low-carbon fuel standard, better land use planning, and more efficient truck delivery and goods movement. The improved energy and efficiency use strategy implements appliance efficiency standards and other aggressive energy efficiency measures. The industry reduction strategy would include an audit of the 800 largest emission sources in California to identify and implement greenhouse gas reduction opportunities or opportunities to reduce fugitive emissions. Actions to reduce high global warming potential gases will include capture of refrigerants and other high global warming potential gases already in use, and implementation of leak-resistant equipment and other restrictions or fees to reduce the potential for future impacts. Preserving forest sequestration and encouraging the use of forest biomass for sustainable energy generation are the primary components of the forestry strategy. Agricultural actions to reduce emissions would include utilizing more efficient agricultural equipment and fuel and water use approaches. Waste and recycling measures would include methane emissions reductions from landfills and increased recycling. The estimated reductions from the use of cap-and-trade and complementary measures and uncapped sources/sectors is, respectively 146.7 and 27.3 million tons of carbon dioxide

equivalent (MMTCO2E). Thus, the total reduction toward the 2020 target from the strategies described above is estimated to be 174 MMTCO2E. (CARB, 2010b).

Climate change and GHG reduction is also a concern at the federal level; however, at this time, no legislation or regulations have been enacted specifically addressing GHG emissions reductions and climate change.

Existing Conditions

Air Quality Attainment Status. Since 1989, the CARB has provided area designations that establish if an air basin has met (i.e., attained) the CAAQSs for ten criteria pollutants. As necessary, these designations have been revised annually. The most current adopted area designations (i.e., the 2006 area designations) became effective on July 26, 2007. No revisions to the designations have been adopted since that time (CARB, 2010c). However, the CARB has proposed area designation modifications for 2010 based on data collected during 2006-2008 (CARB, 2010d). Following a public hearing to consider the proposed 2010 area designations, the CARB determined that the proposed designations should be adopted and submitted a final rulemaking package to the Office of Administrative Law (OAL) on July 15, 2010 (CARB, 2010d). The OAL has until August 26, 2010 to make a determination on the proposed designation modifications. Tables 5-3 and 5-4 illustrate the 2006 adopted state area designations and the proposed 2010 area designation modifications.

The CARB is also responsible for submitting recommended area designations to the U.S. EPA that illustrate which California air basins are in compliance with the NAAQSs. The U.S. EPA then reviews and adopts or modifies the CARB-recommended designations. The U.S. EPA-adopted NAAQS area designations for the 13 air basins are shown in Table 5-5.

TABLE 5-3. 2006 ADOPTED AREA DESIGNATIONS FOR CAAQSS BY AIR BASIN

	CAAQS Compliance									
Air Basin	**Ozone**	**PM2.5**	**PM10**	**CO**	**NO2**	**SO2**	**Sulfates**	**Hydrogen Sulfide**	**Lead**	**Visibility Reducing Particles**
Great Basin Valleys	U/N	U	N	U/A	A	A	A	U/A	A	U
Lake County	A	A	A	A	A	A	A	A	A	A
Lake Tahoe	U	A	N	A	A	A	A	U	A	U
Mojave Desert	N	U/N	N	U/A	A	A	A	U/N	A	U
Mountain Counties	U/N	U/N	U/N	U/A	A	A	A	U/N	A	U
North Central Coast	N	A	N	U/A	A	A	A	U	A	U
North Coast	N/A[1]	U	A/N[3]	U/A	A	A	A	U/A	A	U
Northeast Plateau	U/N	U	A/N[4]	U	A	A	A	U	A	U
Sacramento Valley	N/NT	U/N	N	U/A	A	A	A	U	A	U
Salton Sea	N	U/N	N	A	A	A	A	U	A	U
San Diego	N	N	N	A	A	A	A	U	A	U
San Francisco	N	N	N	A	A	A	A	U	A	U

	CAAQS Compliance									
Air Basin	**Ozone**	**PM2.5**	**PM10**	**CO**	**NO2**	**SO2**	**Sulfates**	**Hydrogen Sulfide**	**Lead**	**Visibility Reducing Particles**
San Joaquin Valley	N	N	N	U/A	A	A	A	U	A	U
South Central	N	A/U/N[2]	N	A	A	A	A	A/U	A	U
South Coast	N	N	N	A	A	A	A	U	A	U

Footnotes:
N = nonattainment A = attainment U = unclassified
NT = nonattainment-transitional
[1] = Sonoma County is in nonattainment and the rest of the basin is in attainment.
[2] = San Luis Obispo, Santa Barbara, and Ventura counties are in attainment, unclassified, and nonattainment, respectively.
[3] = Sonoma County is in attainment and the rest of the basin is in nonattainment.
[4] = Siskiyou County is in attainment. All other counties in the basin are in nonattainment.
Source: California Air Resources Board, 2010d

TABLE 5-4. 2010 PROPOSED AREA DESIGNATIONS FOR STATE AMBIENT AIR QUALITY STANDARDS BY AIR BASIN

	State Ambient Air Quality Standard Compliance									
Air Basin	**Ozone**	**PM2.5**	**PM10**	**CO**	**NO2**	**SO2**	**Sulfates**	**Hydrogen Sulfide**	**Lead**	**Visibility Reducing Particles**
Great Basin Valleys	U/N	***A***	N	U/A	A	A	A	U/A	A	U
Lake County	A	A	A	A	A	A	A	A	A	A
Lake Tahoe	***N***	A	N	A	A	A	A	U	A	U
Mojave Desert	N	U/N	N	U/A	A	A	A	U/N	A	U
Mountain Counties	U/N	U/N	U/N	U/A	A	A	A	U/N	A	U
North Central Coast	N	A	N	U/A	A	A	A	U	A	U
North Coast	***A***	U	A/N[4]	U/A	A	A	A	U/A	A	U
Northeast Plateau	U/***NT***	U	A/N[5]	U	A	A	A	U	A	U
Sacramento Valley	N/***NT***[1]	***A***/N/U[2]	N	U/A	A	A	A	U	A	U
Salton Sea	N	U/N	N	A	A	A	A	U	A	U
San Diego	N	N	N	A	A	A	A	U	A	U
San Francisco	N	N	N	A	A	A	A	U	A	U
San Joaquin Valley	N	N	N	U/A	A	A	A	U	A	U
South Central	N	A/U/N[3]	N	A	A	A	A	A/U	A	U
South Coast	N	N	N	A	***N***	A	A	U	***N***	U

Footnotes:
N = nonattainment A = attainment U = unclassified
NT = nonattainment-transitional
Bold and italicized area designations indicate a change from the adopted 2006 designations.
[1] = The CARB has proposed to designate Sutter and Yuba counties as nonattainment-transitional areas from an existing designation of nonattainment. This change occurs by operation of law under Health and Safety Code section 40925.5.

	State Ambient Air Quality Standard Compliance									
Air Basin	**Ozone**	**PM2.5**	**PM10**	**CO**	**NO2**	**SO2**	**Sulfates**	**Hydrogen Sulfide**	**Lead**	**Visibility Reducing Particles**

[2] = The CARB has proposed to designate Colusa, Placer, Shasta, Sutter and Yuba counties as attainment areas. The adopted designation for these counties was nonattainment for Placer County and unclassified for the other counties.
[3] = San Luis Obispo, Santa Barbara, and Ventura counties are in attainment, unclassified, and nonattainment, respectively.
[4] = Sonoma County is in attainment and the rest of the basin is in nonattainment.
[5] = Siskiyou County is in attainment. All other counties in the basin are in nonattainment.
Source: California Air Resources Board 2010d and 2010e

TABLE 5-5. CURRENT ADOPTED AREA DESIGNATIONS FOR NAAQSS BY AIR BASIN

	NAAQS Criteria Compliance						
Air Basin	**Ozone**	**PM2.5**	**PM10**	**CO**	**NO2**	**SO2**	**Lead[1]**
Great Basin Valleys	U/A	U/A	N/U	U/A	U/A	U	U/A
Lake County	U/A	U/A	U	U/A	U/A	U	U/A
Lake Tahoe	U/A	U/A	U	U/A	U/A	A	U/A
Mojave Desert	N/U/A	U/A	N/U/A	U/A	U/A	U	U/A
Mountain Counties	N/U/A	U/A/N	U	U/A	U/A	U	U/A
North Central Coast	U/A	U/A	U	U/A	U/A	U	U/A
North Coast	U/A	U/A	U	U/A	U/A	U	U/A
Northeast Plateau	U/A	U/A	U	U/A	U/A	U	U/A
Sacramento Valley	N/U/A	U/A/N	N/U	U/A	U/A	U	U/A
Salton Sea	N	U/A/N	N/U	U/A	U/A	U/A	U/A
San Diego	N	U/A	U	U/A	U/A	A	U/A
San Francisco	N	N	U	U/A	U/A	A	U/A
San Joaquin Valley	N	N	A	U/A	U/A	U/A	U/A
South Central	N/U/A	U/A	U	U/A	U/A	U/A	U/A
South Coast	N	N	N	U/A	U/A	A	U/A

Footnotes:
N = nonattainment A = attainment U = unclassified
NT = nonattainment-transitional
1 = CARB's recommended area designation for the 2008 federal lead standard is nonattainment for Los Angeles County of the South Coast Air Basin based on 2006-2008 lead air quality data. Additionally, Imperial County is the only county for which CARB recommends an attainment designation. All other counties/air basins are unclassifiable due to a lack of data.
Source: California Air Resources Board 2010c and 2009a, U.S. Environmental Protection Agency 2010

Class 1 Areas. Section 169A of the CAA established a national goal of preventing any future, and remedying any existing, impairment to natural visibility in designated "Class 1 areas" by 2064 (Parker and Blodgett, 2006; CARB, 2009b). Class 1 areas are designated national parks and wilderness areas. California has 29 Class 1 areas. The CARB prepared a Regional Haze Plan (RHP) in 2009 to establish a strategy for California to demonstrate reasonable progress in reducing haze by 2018, the first benchmark year established to meet the 2064 goals (CARB, 2009b). Table 5-6 provides the current visibility measurements in California's Class 1 areas and the future natural condition goals for the year 2064. The visibility improvement needed in the Class 1 areas from the current conditions to meet the 2064 goals ranges from 25-70% (CARB, 2009c).

TABLE 5-6. SUMMARY OF CALIFORNIA CLASS 1 AREAS CURRENT VISIBILITY CONDITIONS AND FUTURE VISIBILITY GOALS

California Class 1 Areas (Visibility Calculated in Deciviews)[1]			Current Conditions (2000-2004)		Future Natural Conditions (2064 Goals)		
IMPROVE Monitor Name and Elevation in meters)[2]		**Class 1 Area(s)**	**Worst Days**	**Best Days (maintain in future years)**	**Natural Worst Days**	**Deciview Hurdle (baseline to 2064)**	**Improvement from Current Visibility on Worst Days (%)**
Northern California							
TRIN (1014 m)	Trinity	Marble Mountain Wilderness, Yolla Bolly-Middle Eel Wilderness	17.4	3.4	7.9	9.5	55
LABE (1460 m)	Lava Beds	Lava Beds National Monument, South Warner Wilderness	15.1	3.2	7.9	7.2	48
LAVO (1733 m)	Lassen Volcanic	Lassen Volcanic National Park, Caribou Wilderness, Thousand Lakes Wilderness	14.1	2.7	7.3	6.8	48
Sierra California							
BLIS (2131 m)	Bliss	Desolation Wilderness, Mokelumne Wilderness	12.6	2.5	6.1	6.5	52
HOOV (2561 m)	Hoover	Hoover Wilderness	12.9	1.4	7.7	5.2	40
YOSE (1603 m)	Yosemite	Yosemite National Park,	17.6	3.4	7.6	10.0	57

California Class 1 Areas (Visibility Calculated in Deciviews)[1]			Current Conditions (2000-2004)		Future Natural Conditions (2064 Goals)		
IMPROVE Monitor Name and Elevation in meters)[2]		**Class 1 Area(s)**	**Worst Days**	**Best Days (maintain in future years)**	**Natural Worst Days**	**Deciview Hurdle (baseline to 2064)**	**Improvement from Current Visibility on Worst Days (%)**
		Emigrant Wilderness					
KAIS (2598 m)	Kaiser	Ansel Adams Wilderness, Kaiser Wilderness, John Muir Wilderness	15.5	2.3	7.1	8.4	54
SEQU (519 m)	Sequoia	Sequoia National Park, Kings Canyon National Park	25.4	8.8	7.7	7.7	70
DOME (927 m)	Dome Lands	Dome Lands Wilderness	19.4	5.1	7.5	11.9	61
Coastal California							
REDW (244 m)	Redwood	Redwood National Park	18.5	6.1	13.9	4.6	25
PORE (97 m)	Point Reyes	Point Reyes National Seashore	22.8	10.5	15.8	7.0	31
PINN (302 m)	Pinnacles	Pinnacles Wilderness, Ventana Wilderness	18.5	8.9	8	10.5	57
RAFA (957 m)	San Rafael	San Rafael Wilderness	18.8	6.4	7.6	11.2	60
Southern California							
SAGA (1791 m)	San Gabriel	San Gabriel Wilderness, Cucamonga Wilderness	19.9	4.8	7.0	12.9	65
SAGO (1726 m)	San Gorgonio	San Gorgonio Wilderness, San Jacinto Wilderness	22.2	5.4	7.3	14.9	67
AGTI (508 m)	Agua Tibia	Agua Tibia	23.5	9.6	7.6	15.9	68
JOSH (1235 m)	Joshua Tree	Joshua Tree National Park	19.6	6.1	7.2	12.4	63

California Class 1 Areas (Visibility Calculated in Deciviews)[1]		Current Conditions (2000-2004)		Future Natural Conditions (2064 Goals)		
IMPROVE Monitor Name and Elevation in meters)[2]	Class 1 Area(s)	Worst Days	Best Days (maintain in future years)	Natural Worst Days	Deciview Hurdle (baseline to 2064)	Improvement from Current Visibility on Worst Days (%)

[1] Deciview units are the natural logarithm of light extinction, which affects the visibility or clarity of objects viewed at a distance by the human eye. The deciview scale is zero for pristine conditions and increases as visibility degrades. Each deciview change represents a perceptible change in visual air quality to the average person. Generally, a one deciview change in the haze index is likely perceptible by a human regardless of background visibility conditions. This is approximately a 10 percent change in the light extinction reading.
[2] The IMPROVE (Interagency Monitoring of Protected Visual Environments) monitoring network is deployed throughout the United States. Seventeen sites (listed above) are operated in California.
Source: California Air Resources Board 2009c.

Greenhouse Gases. Anthropogenic emissions of greenhouse gases are widely accepted in the scientific community as contributing to global warming. According to Climate Change 2007: The Physical Science Basis: Summary for Policymakers (Intergovernmental Panel on Climate Change (IPCC) 2007), there is no doubt that the climate system is warming. Global average air and ocean temperatures, as well as global average sea level, are rising. Between 1995 and 2006, 11 years have ranked as among the warmest on record since 1850. While some of the increase is explained by natural occurrences, the 2007 report asserts that the increase in temperature is very likely (> 90%) due to human activity, most notably the burning of fossil fuels.

For California, similar effects are described in Our Changing Climate: Assessing the Risks to California (California Climate Change Center 2006). Based on projections using state of the art climate modeling, the temperatures in California are expected to rise between 3 degrees Fahrenheit (°F) and 10.5°F (1.7 degrees Celsius [°C] and 5.8°C) by the end of the century, dependent on how much California is able to reduce its GHG emissions. The report states that these temperature increases will negatively impact public health, water supply, agriculture, plant and animal species, and the coastline.

Climate change is a global problem, and GHGs are global pollutants, unlike criteria air pollutants (such as ozone precursors) and Toxic Air Contaminants, which are pollutants of regional and local concern. Worldwide, California is the 12th to 16th largest emitter of CO2 (California Energy Commission [CEC], 2006), and is responsible for approximately 2% of the world's CO2 emissions (CEC, 2006).

The IPCC has been established by the World Meteorological Organization and United Nations Environment Program to assess scientific, technical, and socio-economic information relevant to the understanding of climate change, its potential impacts and options for adaptation and mitigation. The IPCC predicts substantial increases in temperatures globally may affect the natural environment in California in the following ways, among others:

- rising sea levels along the California coastline, particularly in San Francisco and the San Joaquin Delta due to ocean expansion;

- extreme-heat conditions, such as heat waves and very high temperatures, which could last longer and become more frequent;
- an increase in heat-related human deaths, infection diseases, and a higher risk of respiratory problems caused by deteriorating air quality;
- reduced snow pack and stream flow in the Sierra Nevada, affecting winter recreation and water supplies;
- potential increase in the severity of winter storms, affecting peak stream flows and flooding;
- changes in growing season conditions that could affect California agriculture, causing variations in crop quality and yield; and/or
- changes in distribution of plant and wildlife species due to changes in temperature, competition from colonizing species, changes in hydrologic cycles, changes in sea levels, and other climate-related effects.

GHG emissions in California are attributable to human activities associated with industry/ manufacturing, utilities, transportation, residential, and agricultural sectors (CEC, 2006) as well as natural processes. Transportation is responsible for 41% of the state's GHG emissions, followed by the electricity generation (23%), industrial sector (20%), agriculture and forestry (8%) and other sources (8%) (CEC, 2006). Emissions of CO2 and NO2 are byproducts of fossil fuel combustion, among other sources. Methane, a highly potent GHG, results from off-gassing associated with agricultural practices and landfills, among other sources. Sinks of CO2 include uptake by vegetation and dissolution into the ocean.

Commercial Fishing

Commercial fishing may be another historic, current, and/or future contributing factor to the cumulative effects on California's anadromous fish populations (e.g., Chinook salmon). The National Marine Fisheries Service (NMFS) regulates commercial, recreational, and tribal fishing of anadromous fish populations native to California, Oregon, and Washington through its Pacific Coast Salmon Fishery Management Plan (SFMP). The goals of the SFMP are to "achieve optimum yield, prevent overfishing, and ensure rebuilding of salmon stocks if their abundance has been depressed to an overfished level" (NMFS, 2010). By establishing an annual goal for the number of spawners of the major salmon stocks ("spawner escapement goals") and allocating the harvest among different groups of fishermen (commercial, recreational, tribal, various ports, ocean, and inland), the SFMP manages the fishing of Chinook salmon (NMFS, 2010). Annual goals are based on the geographic range and specific stocks (e.g., winter, fall, or spring runs).

In recent years, Chinook salmon stocks in California have not met the NMFS-designated spawner encasement objectives. The forecasted 2008 preseason spawner escapement for the Sacramento River fall Chinook salmon was 59,000 adults (NMFS, 2009). During that year, the actual spawner escapement for the Sacramento River fall Chinook salmon stocks was approximately 66,264 adults, which is the lowest escapement estimate on record and < 54% of the lower end of the SFMP conservation objective of 122,000 to 180,000 natural and hatchery adults (NMFS, 2009). The 2008 actual spawner escapement for the Klamath River fall Chinook salmon was approximately 30,925 adults, which was approximately 76% of the preseason forecasted escapement of 40,700 adults (NMFS, 2009). As a result of the failure of

the preseason forecasted spawner escapement values to meet the minimum SFMP conservation goals , NMFS closed nearly all ocean fisheries potentially affecting Chinook salmon south of Cape Falcon, Oregon in 2008 (NMFS, 2009). Therefore, commercial fishing is managed to help minimize adverse effects on anadromous fish populations.

Dams

Dams are generally constructed and operated for flood control, recreation, water supply, and/or hydroelectric generation purposes. However, the implementation and operation of dams has multiple effects on the downstream biological resources, particularly to fish habitats, and water quality. Effects of dams typically include:

- creating migration barriers;
- blocking/reducing spawning and rearing habitat;
- reducing gravel transport downstream;
- altering the downstream hydrologic regime (e.g., flow quantities, flood pulse flows);
- creating slow water habitat unsuitable for native stream/river species; and/or
- altering downstream water temperatures (Knight and Boyer, 2007).

Almost every stream or river in the western Sierra Nevada has at least one dam or diversion to capture the water supplies from the Sierra Nevada snowpack (Moyle et al., 1996). These dams have blocked approximately 95% of the spawning and holding habitats for spring-run Chinook salmon and substantially reduced access to habitats for other runs of salmon, steelhead, and Pacific lamprey (Moyle et al., 1996). Additionally, alterations to a stream or lake by dams commonly allows for the presence or invasion of non-native species (Moyle et al., 1996).

In the Klamath River Basin, 4 hydroelectric dams currently operate along 300 miles of the Klamath River in southern Oregon and northern California. In addition to impeding the passage of anadromous fish, the presence of these dams have resulted in increased water temperatures, elevated nutrient levels, low dissolved oxygen concentrations, elevated pH, increased incidence of fish disease, and abundance of aquatic plant growth, all of which have led to a decreased the quality and quantity of suitable habitat for fish and aquatic life (SWRCB, 2010a). In addition, over-allocation of water resources related to the dams have contributed to the decline of endemic fish species, including the Lost River sucker and the short-nosed suckers of the Upper Klamath Lake and coho salmon in the Klamath River, which are a traditional food source of local tribes (Foster, 2002). The license to operate these dams expired in 2006 though in lieu of relicensing, several proposals are underway to study the costs and benefits of dam removal and to reach a comprehensive settlement for Klamath water usage.

Effluent Pollution

A variety of nonpoint and point sources may contribute pollutants to water bodies where suction dredge activities would occur. Point sources are defined as “any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel,

tunnel, conduit, and well" (SWRCB, 2010b)." Types of point sources may include discharges from wastewater treatment plants and industrial or commercial uses. Nonpoint sources are diverse and widespread and commonly include agriculture, construction activities, forestry, mining, and urbanized areas. Rainfall and snowmelt runoff transport pollutants from nonpoint sources to surface waters as the runoff travels over and through the ground surface (U.S. EPA, 1994).

Water quality impairments in California's surface waters have been identified and categorized on the SWRCB's 303(d) list. Types of pollutant impairments include: mercury, other metals, nutrients, other inorganics, other organics, pathogens, pesticides, salinity, sediment, and toxicity. Other metals, mercury, and sediments are relevant to the Proposed Program as discussed in Chapter 4.2 *Water Quality and Toxicology*. As shown in Table 4.2-1 in the Water Quality and Toxicology chapter, 178 California water bodies have mercury impairments, 407 have other metal impairments, and 728 water bodies have sediment impairments. These pollutants can affect aquatic species directly (e.g., diseases or bioaccumulation) or indirectly (i.e., alteration of habitat type/quality due to altered sediment loads).

Introductions of Non-Native Species

Introductions of non-native fish species and other species are a cumulatively contributing factor to the decline of many native fish species. Non-native fish species may affect native fish species through predation, competition for prey, habitat destruction, harassment of adult fish, or serving as a food source for native species. Thirty species of non-native fish have been introduced into or have invaded most waters of the Sierra Nevada range in California (Moyle et al., 1996). Many of the non-native fish species are now located in waters, mainly at high elevations, that originally did not have fish. These non-native fish have had strong negative effects on ten of twenty fish species identified by Moyle et al. (1996) as being in decline with most significant effects occurring on native trout species. In addition to the direct effects on native species from the introduced species, efforts to remove introduced species may also cumulatively affect native species.

Mining

The California gold rush and the resulting extensive immigration of miners and use of hydraulic mining have had lasting cumulative impacts on the water quality and biological resources of California. Historic mining activities, particularly hydraulic mining, affected aquatic species through the release of great quantities of sediment into streams and the removal of large amounts of fish habitat. Mining activities have contributed to low fish populations in some areas through the lasting effects (i.e., siltation, streambank alteration) of hydraulic mining and the roads and tailing piles associated with hardrock mines (Moyle et al., 1996). As discussed in Chapter 4.2, *Water Quality and Toxicology*, mercury is a constituent of concern from past mining activities and is an identified 303(d) list impairment for numerous water bodies in California.

Also, it is important to note that there are other placer gold mining activities which take place within the riverine environment in similar locations as suction dredging. These include panning, high-banking, sluicing, power sluicing, use of non-motorized suction dredge equipment, etc. Some of these activities may have impacts which are similar to those of

suction dredging, although in some cases (e.g., high-banking), the primary material that is being mined is above the existing water line.

Recreational Activities

Recreational activities may result in numerous potential cumulative impacts on resources at or near suction dredge locations, including potential impacts on air quality, biological resources, climate change, hydrology and water quality, and noise. Types of recreational activities may include but not be limited to: off-road vehicle use, camping, rafting, and the construction and/or use of trails. Travel to and from recreational areas and the use of off-road vehicles may cumulatively contribute to air quality impacts. The recreational activities could result in the disturbance or displacement of biological species (including nesting raptors) and loss of riparian habitat. In addition, according to Moyle et al. (1996) the success of fish spawning may be reduced by heavy use of streams by rafters or anglers and disturbances to fish that are holding or spawning. Cumulative water quality impacts of recreational activities would potentially be related to erosion caused by off-road vehicle use and any improper disposal of human waste or trash. In addition, recreationists may alter the short-term noise levels of outdoor areas primarily through the use of off-road vehicles. Short-term noise impacts may affect terrestrial biological resources, including nesting bird species.

Recreational Fishing

Recreational fishing of Chinook salmon and other fish species could cumulatively contribute to impacts on aquatic resources potentially affected by the Program. Declines in anadromous fish populations have resulted in NMFS-designated restrictions on recreational fishing for Chinook salmon (Pacific Fishery Management Council, 2009). In 2008, time harvest regulations severely restricted recreational angling in Central Valley Rivers relative to recent years. Approximately 1 percent (650 adults) of the Sacramento River fall Chinook salmon run was harvested (Pacific Fishery Management Council, 2009). Harvest rates in previous years (1991-2007) averaged approximately 14 percent of the river run. Additionally, the majority of the San Joaquin River has been closed to recreational salmon fishing because of the low escapements in the Stanislaus, Tuolumne, and Merced rivers since the late 1990s (Pacific Fishery Management Council, 2009).

Streambed Alteration

Numerous alterations of California streambeds have occurred in the past for flood control, water supply, agriculture, and other purposes. The alterations generally occur to deepen, straighten, enlarge, or relocate a stream or river channel (SWRCB, 2000). Types of alterations to streams include but are not limited to: channelization, straightening, levee construction, streambank stabilization, and woody debris removal.

Streambed alterations can cumulatively affect the water quality and the terrestrial and aquatic biological resources of surface waters potentially affected by the Program. Water quality effects of the streambed alteration activities may include altering the water temperature, changing the natural supply quantity or path of fresh water to a water body, and altering the rates and paths of sediment erosion, transport, and deposition (SWRCB, 2000). Levee, streambank stabilization, or channelization activities may accelerate the movement of surface water and pollutants from the upper to lower reaches of watersheds

(SWRCB, 2000). In addition, channelization of streams or rivers can "reduce the suitability of instream and streamside habitat for fish and wildlife by depriving wetlands and estuarine shorelines of enriching sediments, affecting the ability of natural systems to filter pollutants, and interrupting the life stages of aquatic organisms" (SWRCB, 2000). Alterations to streambeds are likely to continue in the future.

Timber Harvest

Timber harvesting is a cumulative contributor to impacts affecting climate change, water quality, and biological resources. The removal of trees may cumulatively contribute to climate change-related impacts as fewer plants would be available to absorb carbon dioxide, a greenhouse gas. Water quality impacts from timber harvesting are related to erosion and sediment transport from the construction of roads, increased flows, and altered peak runoff rates resulting from the removal of the land cover (i.e., trees). Historically, timber harvesting in the 1950s through the 1970s increased erosion and sediment delivery rates to extreme levels across the north coast of California (Klein, 2008). Although historic harvesting activities may have a continued impact on water quality or biological resources, current timber harvesting has a greater impact on these resource areas. Klein (2008) found that the turbidity concentrations of small streams in north coastal California were dramatically impacted by the extent of current timber harvesting activities within the respective watersheds. Stream turbidity concentrations in zero harvest (0%/year), low harvest (0.1-1.5%/year), and high harvest (>1.5%/year) watersheds were, respectively, 13, 20, and 61 formazin nephelometric units (FNU[1]). Both the low harvest and high harvest watersheds exceeded the California regulatory limit (20% above background) for northern streams by 38% and 349%, respectively (Klein, 2008). Removal of timber can affect biological resources via loss of shade and increased water temperatures, increased erosion and deposition of sediments on spawning habitats, and less woody debris in streams and less potential fish/aquatic organism habitat.

TMDL Plans

As described in Chapter 4.2 *Water Quality and Toxicology*, TMDLs for listed pollutants and water bodies, are an estimate of the total load of pollutants from point, non-point, and natural sources that a water body may receive without exceeding applicable water quality standards (with a "factor of safety" included). The SWRCB has identified 691 water bodies in California that require the development of TMDLs, 220 water bodies that are currently being addressed by TMDLs, and eight water bodies where actions other than TMDLs are being implemented to improve water quality (SWRCB, 2007). Thus, there are a number of water bodies that still require the implementation of TMDLs. Once established, the TMDL allocates the permissible contaminant loading among current and future pollutant sources to the water body to ensure that water bodies maintain compliance with the established water quality standards. As described in the Effluent Pollution discussion above, TMDLs can be prepared for a variety of pollutants, including mercury, heavy metals, and sediments. When implemented, TMDLs can improve water quality and reduce existing water quality impairments.

[1] FNU is a measurement of turbidity that is similar but not identical to nephelometric turbidity units (NTU). The difference is based on the wavelength of light used to make the measurement. Due to the fact that suspended particles scatter light of different wavelengths with varying efficiency, FNU data often are not directly comparable to NTU data. (USGS, 2005).

Tribal Fishing

Federally-recognized Native American tribes provide fisheries and wildlife resources management over approximately 52 million acres of reservation lands in the lower 48 states (Native American Fish and Wildlife Society [NAWFS], 2010). In addition, federally-recognized Native American tribes have co-jurisdiction over approximately 38 million acres of "Ceded and Usual and Accustomed Areas," which are lands outside of the reservations that allow a co-management status between tribes and states due to federal court decisions or voluntary cooperative agreements (NAWFS, 2010). There are 107 federally-recognized tribes in California and one in the Klamath Basin (USFWS, 2010).

The USFWS has established tribal partnerships to support fish and wildlife conservation efforts. As part of this partnership, the USFWS has a Tribal Wildlife Grant Program that provides funding to "federally-recognized tribes to develop and implement programs for the benefit of wildlife and their habitat, including species of Native American cultural or traditional importance and species that are not hunted or fished" (USFWS, 2010). From these grants, tribes have been able to increase their management capacities, enhance relationships with partners, and enhance recovery efforts for threatened and endangered species, in addition to other grant-supported actions (USFWS, 2010).

Fishery and wildlife resources management by tribes may allow for tribal fishing. Tribal fishing is typically conducted for ceremonial, subsistence, or commercial fisheries purposes that are managed to be consistent with federal fishery management goals. As described under the Commercial Fishing discussion above, NMFS annually allocates the salmon harvest among different groups of fishermen, including Native American tribes, and has historically limited or banned salmon harvests if the actual populations did not meet anticipated minimum SFMP conservation goals. Therefore, tribal fishing is managed to help minimize adverse effects on anadromous fish populations.

Urbanization

Continued population growth in California and the increasing conversion of lands to urbanized uses may contribute to cumulative impacts on climate change and the water quality and biological resources of California surface waters. Table 5-7 provides the projected population changes in California counties from 2010 to 2050 (California Department of Finance, 2007). Nearly all counties would experience population growth and some counties would experience greater than 100% growth. Increasing populations in California may lead to additional impacts on climate change, aquatic resources, and water quality through:

- Increased impermeable surfaces and greater or more polluted runoff loadings;
- Increased water demands and usage;
- Increased energy needs and consumption, including vehicle fuel usage; and
- Increased recreational use.

The primary pollutants found in runoff from urban areas include sediment, nutrients, oxygen-demanding substances, road salts, heavy metals, petroleum hydrocarbons, pathogenic bacteria, and viruses (SWRCB, 2000). Construction areas are a major source of

suspended sediments, which contribute the largest mass of pollutant loadings to receiving waters from urban areas (SWRCB, 2000).

Increased water demands and usage could result in greater water diversions and the resulting impacts on aquatic biological resources, and greater energy usage to transport waters to urban areas. Energy use increases would result in the release of additional greenhouse gases and cumulatively contribute to climate change. An increased population may lead to an increase in recreational activities and the subsequent disturbances to aquatic or terrestrial habitats or water quality impacts.

TABLE 5-7. PROJECTED CALIFORNIA POPULATION CHANGES BY COUNTY, 2010 TO 2050

County	2010	2050	Change	County	2010	2050	Change
Alameda	1,550,133	2,047,658	32.1%	Orange	3,227,836	3,987,625	23.5%
Alpine	1,369	1,377	0.6%	Placer	347,543	751,208	116.1%
Amador	40,337	68,487	69.8%	Plumas	21,824	28,478	30.5%
Butte	230,116	441,596	91.9%	Riverside	2,239,053	4,730,922	111.3%
Calaveras	47,750	80,424	68.4%	Sacramento	1,451,866	2,176,508	49.9%
Colusa	23,787	41,662	75.1%	San Benito	64,230	145,570	126.6%
Contra Costa	1,075,931	1,812,242	68.4%	San Bernardino	2,177,596	3,662,193	68.2%
Del Norte	30,983	56,218	81.4%	San Diego	3,199,706	4,508,728	40.9%
El Dorado	189,308	314,126	65.9%	San Francisco	818,163	854,852	4.5%
Fresno	983,478	1,928,411	96.1%	San Joaquin	741,417	1,783,973	140.6%
Glenn	30,880	63,586	105.9%	San Luis Obispo	269,734	364,748	35.2%
Humboldt	134,785	152,333	13.0%	San Mateo	736,667	819,125	11.2%
Imperial	189,675	387,763	104.4%	Santa Barbara	434,497	534,447	23.0%
Inyo	19,183	25,112	30.9%	Santa Clara	1,837,361	2,624,670	42.8%
Kern	871,728	2,106,024	141.6%	Santa Cruz	268,016	333,083	24.3%
Kings	164,535	352,750	114.4%	Shasta	191,722	331,724	73.0%
Lake	67,530	106,887	58.3%	Sierra	3,628	3,547	-2.2%
Lassen	37,918	55,989	47.7%	Siskiyou	47,109	66,588	41.3%
Los Angeles	10,514,663	13,061,787	24.2%	Solano	441,061	815,524	84.9%
Madera	162,114	413,569	155.1%	Sonoma	495,412	761,177	53.6%
Marin	253,682	307,868	21.4%	Stanislaus	559,708	1,191,344	112.9%
Mariposa	19,108	28,091	47.0%	Sutter	102,326	282,894	176.5%
Mendocino	93,166	134,358	44.2%	Tehama	65,593	124,475	89.8%
Merced	273,935	652,355	138.1%	Trinity	15,172	30,209	99.1%
Modoc	10,809	24,085	122.8%	Tulare	466,893	1,026,755	119.9%
Mono	14,833	36,081	143.2%	Tuolumne	58,721	73,291	24.8%
Monterey	433,283	646,590	49.2%	Ventura	855,876	1,229,737	43.7%
Napa	142,767	251,630	76.3%	Yolo	206,100	327,982	59.1%
Nevada	102,649	136,113	32.6%	Yuba	80,411	201,327	150.4%
Total (State)	39,135,676	59,507,876	52.1%				

Source: California Department of Finance, 2007

Water Diversions

Surface water bodies provide a substantial portion of California's water supply and can be potentially impacted by numerous water diversions on each water body. The multiple purposes of water diversions may include serving as a water supply for municipal, industrial or agricultural irrigation uses, electricity generation, and other uses. Water diversions state-wide can cumulatively affect the biological resources and water quality of diverted or downstream water bodies potentially affected by the suction dredge activities.

Water diversions can impact biological resources through entrainment, capture on fish screens that result in death or injury, dewatering of stream reaches, reduced or altered hydrologic flow patterns, and/or effects on water quality, especially water temperature. Similar to dams, water diversions may also contribute to biological resource impacts by blocking movements and migrations, isolating populations, and causing increased human use of the watersheds (Moyle et al., 1996). In addition, alterations to the water quality of diverted water bodies may affect aquatic resources by changing the concentration of pollutants and impacting the potential toxicity or accumulation in food webs (Monsen et al., 2007). As an example, losses of fish at the State Water Project and Central Valley Project pumping facilities were up to 10% of Sacramento River Chinook salmon and 1-50% of adult Delta smelt (Kimmerer, 2008). In addition, NMFS estimates that the mortality rate for entrained fish at the State Water Project and Central Valley Project pumping facilities is approximately 65-84% (NMFS, 2009).

Other impacts of water diversions are on the water quality of diverted water bodies. Diversions can reduce downstream flows, which can lead to increased downstream water temperatures. In the Sacramento-San Joaquin River Delta, the large water diversions at the pumping facilities of the State Water Project and Central Valley Project can alter the water circulation pattern in Delta channels. Subsequent impacts of these water diversions include alterations to the source mixture of water (i.e., fresh waters from the Sacramento and San Joaquin River or estuarine waters from tidal exchange with the San Francisco Estuary), and the flushing time to carry nutrients or pollutants downstream (Monsen et al., 2007).

Wildfire, Fire Suppression, and Fuels Management

- Forest fires may contribute to numerous cumulative effects on the biological resources (e.g., riparian species, amphibians, and fish) and water quality at suction dredge locations. Additionally, forest fires may contribute cumulatively to climate change. Specific impacts that could affect biological resources and water quality include:
- Channel scour,
- Combustion,
- Debris flow and woody debris inputs,
- Decreased cover,
- Hydroperiod (increased surface water),
- Increased nutrients,
- Increased temperature,

- Sedimentation,
- Ash and fine silt in runoff from burned area (Pilliod et al., 2003).

Forest fire fuel management and/or suppression efforts include prescription burning; mechanical fuel reduction, thinning, and logging; construction of fire roads and firebreaks; and chemical applications. Many of the impacts described above relating to biological resources or water quality may occur as a result of the forest fire fuel management or suppression efforts. Fire management practices (ex., use of fire roads and chemical flame retardants) could contribute pollutants (ex., sediments, ammonia- based fire retardants or surfactant-based foams, etc.) to local water bodies. The chemical retardants can be slightly to moderately toxic to algae and invertebrates and moderately to highly toxic to fish (Pilliod et al., 2003). In addition, management of post-wildfire areas via timber harvesting may contribute to erosion depending on the extent of ground disturbance by equipment and road use, the size of the area to be harvested (Peterson, 2009). Forest fires and fuel management efforts (i.e., prescription burning) may contribute to climate change through the removal of trees, which can absorb the greenhouse gas carbon dioxide, and through the emission of carbon dioxide as the vegetation is burned.

5.5.3 Cumulative Impacts

Impact CUM-1. Effects on Fish Species and their Habitats (Less than Significant)

Tables 4.3-1 and 4.3-2 list the *Fish* species considered in this SEIR. *Fish* species include "wild fish, mollusks, crustaceans, invertebrates, and amphibians, including any part, spawn, or ova thereof." Potential adverse effects of suction dredging on *Fish* species may include: direct entrainment, creation of barriers to movement/migration, stress or other behavior impacts, alteration of prey base, alteration of flow rates, and degradation of habitat and/or water quality (See Chapters 4.1 through 4.3 for complete description of impacts). Non-program related activities that may impact *Fish* species either through increased competition, water quality degradation, flow alterations, barriers to movement/migration, or alterations to the natural hydrologic processes include: agriculture, aquaculture, climate change, dams, effluent pollution, introductions of nonnative species, recreational activities, streambed alteration, timber harvest, urbanization, water diversions, and wildfire, fire suppression, and fuels management. Additionally, commercial and recreational fishing have contributed to declines of select fin fish species, particularly salmonids.

Fish species listed in Tables 4.3-1 and 4.3-2 have been designated as special-status by the CDFG, USFWS, or NMFS, or are considered by CDFG to meet the criteria for "rare" as defined under section 15380 of the California Code of Regulations. The population status and/or viability varies for each of these species. For example, the Central California Coast Coho ESU is gravely imperiled and has entered into an extinction vortex (NOAA, 2010); even minor impacts could accelerate this ESU's decline and negate restoration and conservation efforts. Other species/ESUs have less dire population status (e.g., Klamath-Trinity rivers spring-run Chinook ESU), but remain vulnerable to anthropogenic impacts and natural environmental perturbations that further stress the species. In nearly all cases, declines in *Fish* species populations are primarily due to long-term degradation of environmental conditions, which is largely the cumulative result of the suite of anthropogenic activities listed above. Thus, by definition, it is cumulative impacts that threaten the viability of the *Fish* species considered

in this SEIR (i.e., there is not a single project or impact that is responsible for the decline of these *Fish* species). The decline of these species is considered to be a significant cumulative impact.

When developing the Proposed Program regulations CDFG considered the population-level effects of suction dredging in the context of the cumulative stresses on *Fish* species with respect to the baseline condition. For example, the Proposed Program regulations close all streams within the range of Central California Coast Coho ESU, thus avoiding an incremental contribution to the cumulative impact affecting this ESU. This approach of avoiding an incremental contribution that would be cumulatively considerable is the only biologically sound manner to develop regulations that ensure deleterious effects are not likely to occur. As such, the cumulative effects of all known projects, foreseeable impacts, and environmental stressors have been considered in designing the suction dredging regulations such that the Proposed Program would not make a cumulatively considerable contribution to the decline of any *Fish* species. Thus, the incremental contribution of the Proposed Program is considered less than significant.

Impact CUM-2. Effects on Wildlife Species and their Habitats (Significant and Unavoidable)

Wildlife (non-*Fish*) species include non-riverine aquatic invertebrates, reptiles, birds and mammals. Tables 4.3-3 and 4.3-4 list the non-*Fish* species considered in this SEIR. Potential adverse effects of suction dredging and ancillary activities such as encampments on these species may include: direct physical disturbance such as trampling; indirect stress-inducing disturbances such as noise; creation of barriers to movement, migration or dispersal; and degradation of habitat (See Chapters 4.1 through 4.3 for complete description of impacts). Non-Program related activities that may impact terrestrial wildlife species either through direct disturbance or habitat alteration include: agriculture, aquaculture, climate change, dams, effluent pollution, introductions of nonnative species, recreational activities, streambed alteration, timber harvest, urbanization, water diversions, and wildfire, fire suppression, and fuels management.

Species listed in Tables 4.3-3 and 4.3-4 have been designated as special-status by the CDFG or USFWS, or are considered by CDFG to meet the criteria for "rare" as defined under section 15380 of the California Code of Regulations. The population status and/or viability vary for each of these species. Similar to *Fish* species, declines in non-*Fish* species populations are largely due to long-term degradation of environmental conditions. With few exceptions, the declines in the population of a non-*Fish* species are the result of the synergistic effects of anthropogenic activities, and not a single causative agent or project. Thus, by definition, it is cumulative impacts that threaten the viability of non-*Fish* species, and the Proposed Program has the potential to contribute to these significant cumulative impacts.

With respect to non-riverine invertebrates (e.g., vernal pool fairy shrimp, Valley elderberry longhorn beetle and Trinity bristle snail) suction dredging and ancillary activities are not likely to result in substantial loss or degradation of habitats that support these species, and direct impacts to individuals are unlikely. This conclusion is based on the known distribution of these organisms and their habitats in relationship to historical and anticipated dredging activity. Thus, the incremental contribution of the Proposed Program is not considered cumulatively considerable, and is considered less than significant.

Based on historical information and the distribution of placer gold, Western pond turtle (*Clemmys marmorata*) is the only reptile species for which suction dredging activities are anticipated to regularly occur in suitable habitat. Dredging may displace Western pond turtles from suitable habitat and ancillary activities may degrade suitable breeding/nesting habitat. However, given the baseline conditions for this species, it is not likely that these activities would contribute substantially to any foreseeable decline in the range or population viability of Western pond turtle. Thus, the incremental contribution of the Proposed Program is not considered cumulatively considerable, and is considered less than significant.

Suction dredging and ancillary activities are likely to occur in areas that provide habitat for several mammal species. Based on historical information and the known distribution of placer gold, suction dredging activities are not anticipated to occur in suitable habitat for federally or state listed threatened or endangered mammals such as the riparian brush rabbit (*Sylvilagus bachmani riparius*), riparian woodrat (*Neotoma fuscipes riparia*), and San Bernardino kangaroo rat (*Dipodomys merriami parvus*). Suction dredging and ancillary activities are likely to occur in areas that provide habitat Species of Concern such as snowshoe hare (*Lepus americanus* ssp.). The incremental effects of the Proposed Program on mammal Species of Concern would not be cumulatively considerable because these species are not likely to be particularly susceptible to suction dredging-related impacts (i.e., the animals can avoid the activity), and the magnitude of impact that may occur is not likely to contribute substantially to any foreseeable decline in the range or population viability of any decision mammal species given the anticipated level and temporal nature of the activity. Thus, the incremental contribution of the Proposed Program is not considered cumulatively considerable, and is considered less than significant.

Suction dredging and ancillary activities are likely to co-occur with several bird species. Of greatest concern are the incremental effects of the Proposed Program on species that are very rare and are likely to occur in close proximity to suction dredging activities. These species include those listed in Table 4.3-3. As described in Impact BIO-WILD-2, suction dredging activities may lead to significant impacts on several of these species at the individual (Proposed Program) level. The incremental contribution of these impacts is also considered considerable at the cumulative level. This impact is considered significant; as described in Impact BIO-WILD-2, no feasible mitigation is available, and as such, the impact is considered significant and unavoidable.

Impact CUM-3. Effects on Special-Status Plant Species (Less than Significant)

CDFG recognizes 293 special-status aquatic and wetland-associated plant species and 912 special-status upland plant species with the potential to be affected by the Proposed Program (Tables 4.3-5 and 4.3-6, respectively). Special-status plant species have the potential to be adversely affected by suction dredging through: access to and egress from streams; establishment of encampments in riparian areas; the dispersal of non-native or invasive species; and unauthorized dredging-associated activities such as direct removal of aquatic or riparian vegetation, destabilization of streambanks, or release of noxious materials (e.g., fuel). Non-program related activities that may impact special-status plant species either through direct disturbance or habitat alteration include: agriculture, climate change, dams, effluent pollution, introductions of nonnative species, recreational activities,

streambed alteration, timber harvest, urbanization, water diversions, and wildfire, fire suppression, and fuels management. The primary causes of habitat destruction, degradation or fragmentation are conversion of natural areas to developed land uses and introduction of nonnative species. These factors, and others, act cumulatively to destroy or degrade suitable for special status plant species. Thus, the decline of these species is considered to be a significant cumulative impact.

Proposed Program activities have the potential to locally damage, disturb or destroy individuals or populations; contribute to the introductions of nonnative species; and contribute to climate change. As such, the Proposed Program has the potential to contribute to these significant cumulative impacts.

With respect to upland plant species (Table 4.3-6), suction dredging and ancillary activities are not likely to result in substantial loss or degradation of habitats that support these species, and direct impacts to individuals or populations are unlikely. This conclusion is based on the known distribution of these organisms and their habitats in relationship to historical and anticipated dredging activity. Thus, the incremental contribution of the Proposed Program is not considered cumulatively considerable, and is considered less than significant.

Dredging would be more likely to contribute to cumulative impacts on aquatic and wetland plant species (Table 4.3-5). However, as described in Impact BIO-PLANT-1, various program regulations (such as those prohibiting dredging of vegetation) would provide protection for these species. With these measures in place, the incremental contribution of the Proposed Program is not considered cumulatively considerable, and is considered less than significant.

Impact CUM-4. Contributions to Non-Attainment Status (Less than Significant)

Criteria pollutant emissions can result from the gasoline combustion engines typically used during suction dredge operations. The U.S. EPA establishes emission standards under the federal CAA for small non-road engines such as those used for suction dredges or other suction dredge-related equipment (e.g., generators) (U.S. EPA, 2008). The California Air Resources Board (CARB) has taken initiatives to further control emissions from most mobile sources, including small engines (25 HP or less) (CARB, 2009d).

Various regions in the state are in non-attainment for a range of these criteria pollutants (see Tables 5-3 through 5-5 above). Attainment plans have been developed for these pollutants, and the emissions associated with small engine mobile sources such as suction dredging and related activities are generally considered in the baseline emissions inventories in these plans. Regardless, the level of emissions of criteria pollutants in non-attainment areas (including those from suction dredging) are considered a significant cumulative impact.

Emissions from suction dredging, however, would be consistent with the amounts assumed in the baseline emissions inventories of the attainment plans, and would be relatively small compared to other sources of emissions, considering the number of dredgers, the emissions from the dredges, the frequency of use and distribution of use of the dredgers, and total emissions of the state. Further, on-road emissions associated with travel to/from dredge sites would decrease over time due to replacement of older, high emitting vehicles with

newer, lower emitting ones. In addition, the Pavley rule, which is designed to reduce CO_2 emissions, will also reduce criteria pollutant emissions because vehicles will on average be more efficient and burn less fuel (and generate less emissions) per vehicle mile traveled (VMT).

For these reasons, the incremental contribution of emissions associated with suction dredging to the significant cumulative impact would not be cumulatively considerable.

Impact CUM-5. Greenhouse Gas Emissions (Less than Significant)

GHG emissions can result from a variety of sources, including the gasoline combustion engines typically used during suction dredge operations and the vehicles driven to and from dredge sites. Considered at a regional, statewide, or even global scale, the emission of GHGs (which includes emissions from suction dredge operations) is considered a significant cumulative impact due to its contribution to the problem of global climate change.

Information from the Suction Dredge Survey (Appendix F) was used to estimate the magnitude of GHG emissions resulting from the Proposed Program. Note that the future amount of suction dredging and related activity may be different under the Proposed Program than it was in 2008 (under the prior regulations). However, the survey was the best data source available to estimate the level of activity, and is considered adequately representative for the purposes of this analysis.

Two sources of emissions were estimated: (1) emissions from vehicles travelling to/from dredge sites; and (2) emissions from the suction dredges themselves. While other sources of emissions associated with suction dredging are possible (e.g., emissions from generators used at campsites), the two aforementioned sources are believed to be the major sources of emissions associated with the activity.

To calculate vehicle emissions, vehicle miles travelled (VMT) were derived and multiplied by an emissions factor, as follows:

TABLE 5-8. ESTIMATED VEHICLE EMISSIONS

	California Residents	Non-California Residents	Total
Average one-way distance travelled (miles)	132.66	850.65	
Average number of trips	14.69	4.10	
Average number of miles driven	3897.55	6969.19	
Average number of permits issued	3,200	450	
Estimate of VMT	12,472,173	3,136,136	15,608,309
	Estimated tons of annual CO_2 emissions[1]		**6,009**

[1] *Emissions were calculated at 0.77 pounds of CO_2 emitted per VMT*

Emissions from suction dredges were derived by calculating the total hours spent dredging, and once again multiplied by an emissions factor, as follows:

TABLE 5-9. ESTIMATED EMISSIONS FROM SUCTION DREDGES

	California Residents	Non-California Residents	Total
Average time spent dredging per day (hours)	5.24	5.43	
Average number of days spent dredging	30.06	33.39	
Average number of hours spent dredging in 2008 per dredger	157.51	181.31	
Average number of permits issued	3,200	450	
Estimate of total hours spent dredging	504,032	81,590	
Average engine horsepower	7.65	8.53	
Total horsepower-hours	3,855,845	695,963	4,551,808
	Estimated tons of annual CO_2 emissions[1]		**1,857**

[1]*Emissions were calculated at 370 grams of CO_2 emitted per horsepower-hour*

Considering the small size of the engines, the relatively small number of dredges that could be operated under the Proposed Program, and the temporary and seasonal nature of those operations, the emissions from suction dredge operations are exceedingly small even when considered at a local or regional scale, let alone a statewide or global scale. In addition, California Air Resources Board's recent Low Carbon Fuels Standard will reduce the carbon content and associated CO_2 emissions from gasoline and diesel fuel combustion by 10% by 2020. Further, as described above in Impact CUM-4, the Pavley regulation will additionally reduce CO_2 emissions from on-road travel to and from dredge sites by requiring miles per gallon efficiency improvements in the light duty car and truck vehicle fleet between 2009 and 2020. The combined effect of these rules should substantially reduce CO_2 emissions from suction dredge-related on-road travel when compared to 2008 conditions. Finally, over time, newer more efficient engines will be purchased as replacements for older higher emitting engines. This engine turnover should also reduce suction dredge CO_2 emissions.

The emissions from suction dredge operations are not anticipated to have a measurable effect on the State's ability to meet its greenhouse gas reduction goals under AB 32, and are therefore not considered to make a cumulatively considerable contribution to this significant cumulative impact. In making this determination, CDFG is keenly aware of the important issues faced by the State of California in terms of expected climate change. CDFG would like to be clear against this backdrop that its cumulative impacts significance determination is not based on a proportional comparison of expected project emissions relative to much larger emissions expected at a regional, statewide, national, or even global scale. That is, CDFG's determination that Program-related GHG emissions are not cumulatively considerable is not based on a conclusion that expected Program GHG emissions are small compared to a much larger problem. Rather, CDFG's determination is based on the extremely small quantity of GHG emissions expected with the Proposed Program and the conclusion that, with that small quantity, approval of the Proposed Program is not expected to have a measurable effect on or otherwise impair the State's ability to achieve its long term GHG reduction goals under AB 32.

Impact CUM-6. Turbidity/TSS Discharges from Suction Dredging (Significant and Unavoidable)

Approximately 3.8% of water bodies in CA are listed on the 303(d) list for turbidity/TSS impairments and have an existing TMDL or require implementation of one (SWRCB, 2007). Other past, present, and future pollutant sources that would contribute to the existing turbidity/TSS impairments include: agriculture, aquaculture, effluent pollution, streambed alteration, recreation, urbanization, timber harvest, and wildfire, fire suppression, and fuels management. Generation of turbidity/TSS (including that associated with suction dredging) in a waterbody listed as impaired would be considered a significant cumulative impact.

For 303(d)-listed waters, water quality conditions would improve as TMDL programs are completed. Additionally, implementation of regulations under the Proposed Program to restrict nozzle and hose sizes, prohibit motorized winching or import of fill material, minimize disturbances of streambanks and vegetation, and use reasonable care to avoid dredging silt and clay materials, would minimize the potential incremental contribution of the suction dredge discharges to a cumulative impact in impaired waters.

However, sediment discharges would not be entirely avoided under the Program, and where such discharges are occurring in water bodies with existing turbidity/TSS impairments, the incremental contribution from suction dredging would, to some extent, impede the improvement of these waters under the TMDL program. Thus, the Program's incremental contribution to the significant cumulative impact is determined to be cumulatively considerable. To reduce these effects, potential mitigation includes closures or restrictions on suction dredging in areas impaired for sediment. However, such closures are not within CDFG's jurisdiction to implement since they are not believed to be necessary to avoid deleterious effects to fish, are therefore considered infeasible. No other feasible mitigation measures exist. Therefore, this impact would be significant and unavoidable.

Impact CUM-7. Cumulative Impacts of Mercury Resuspension and Discharge from Suction Dredging (Significant and Unavoidable)

Approximately 178 water bodies in CA are listed on the 303(d) list (Table 4.2-1) for mercury impairments. Additionally, approximately 19% of California water bodies have metal/metalloid impairments, which include Hg impairments (SWRCB, 2007). Discharges of additional mercury to water bodies listed as impaired would be considered a significant cumulative impact due to the lack of assimilative capacity for mercury discharges in those water bodies.

The disturbance of existing river bed sediments and the potential use of mercury (Hg) during suction dredging activities in water bodies listed as impaired for mercury would contribute to a cumulative Hg discharge or impairment downstream. As detailed in Chapter 4.2 *Water Quality and Toxicology*, Hg is present in the sediments of historic gold-mining and gold-bearing regions, particularly in areas known as Hg "hot-spots," because elemental Hg was historically used in both placer and hard-rock gold mining. Disturbances of Hg in these sediments by suction dredging activities would potentially result in "flouring" of Hg and, ultimately, the potential for increased conversion of Hg to its methylmercury (MeHg) form, which can bioaccumulate in fish tissue and pose a human and ecological health hazard.

As detailed in Chapter 4.2 *Water Quality and Toxicology*, the discharge and transport of total Hg (THg) loads from suction dredging of areas containing sediments highly elevated in Hg and elemental Hg is substantial relative to background watershed loadings. Additionally, the flouring of elemental Hg during the suction dredging process would result in an increased Hg surface area and increased potential for downstream transport of Hg to areas favorable to methylation (i.e., downstream reservoirs and wetlands). Therefore, suction dredging has the potential to contribute considerably to: (1) watershed Hg loading to downstream reaches within the same water body and to downstream water bodies, (2) MeHg formation in the downstream reaches/water bodies, and (3) bioaccumulation in aquatic organisms in these downstream reaches/water bodies.

As described in Chapter 3 *Activity Description*, Hg may be used by miners at the suction dredging sites to process any collected gold (i.e., through the amalgamation process). If this Hg was spilled during storage, transport, or use, it could potentially contribute to a cumulative mercury impairment. However, as described in Chapter 4.4 *Hazards and Hazardous Materials*, the Proposed Program's regulations and guidance information would minimize the potential for any mercury discharges resulting from the use of Hg by suction dredging miners. Therefore, the use of Hg by suction dredging miners during processing would not be expected to result in a considerable contribution to cumulative Hg-related water quality impacts.

Other past, present, and future pollutant sources that have contributed to the existing mercury impairments include: effluent pollution, mining, and urbanization. Ultimately, water quality conditions in 303(d)-listed waters would improve as TMDL programs are completed. Additionally, implementation of the regulations under the Program related to nozzle size restrictions may reduce the potential for flouring and reduce the potential incremental contribution of the suction dredge discharges to the significant cumulative impact.

However, Hg discharges would not be entirely avoided under the Program, and the increment of such discharges would make a cumulatively considerable contribution to existing cumulative impacts related to watershed Hg loading, MeHg formation in downstream areas, and bioaccumulation in aquatic organisms (and associated risks related to human or wildlife consumption). To reduce these effects, potential mitigation includes closures or restrictions on suction dredging in areas impaired for Hg, or further restrictions on nozzle size, number of permits, and hours/days spent dredging. However, such closures are not within CDFG's jurisdiction to implement since they are not believed to be necessary to avoid deleterious effects to fish, and are therefore considered infeasible. No other feasible mitigation measures exist. Therefore, this impact would be significant and unavoidable.

Impact CUM-8. Cumulative Impacts of Resuspension and Discharge of Other Trace Metals from Suction Dredging (Less than Significant)

As identified in Table 4.2-1 in the *Water Quality and Toxicology* chapter, the Regional Water Boards have identified 407 stream segments on the 303(d) list of impaired water bodies for various trace metals. Additionally, approximately 19% of California water bodies have metal/metalloid impairments, which include other trace metal impairments (SWRCB, 2007). Past, present, and future pollutant sources that have contributed to the existing trace metal impairments include: effluent pollution (especially from industries), mining, and urbanization. Discharges of trace metals to water bodies listed as impaired for these

substances would be considered a significant cumulative impact due to the lack of assimilative capacity for these contaminants in such water bodies.

The disturbance of creek sediments during suction dredging activities authorized under the Proposed Program could potentially result in discharges of trace metals. Trace metals besides Hg (i.e., copper, lead, silver, cadmium, and zinc) may be present in relatively elevated concentrations in the creek bed sediments from historic mining activities, industrial discharges, or other past sources. These metals would typically be adsorbed to sediment particles (in a total recoverable fraction) and not in a dissolved form.

Total recoverable and dissolved concentrations of trace metals could potentially increase downstream of creek bed sediment disturbances by suction dredge miners. Total recoverable trace metal fractions that are mobilized by suction dredging (i.e., fraction adsorbed to larger sediment particles) generally would settle out within a few hundred meters of the dredging site. The result is that trace metal concentrations that may be elevated in the dredging discharge tend to return to background levels within close proximity to the dredge. However, dissolved forms of trace metals may remain in the downstream water column, remain bioavailable (i.e., the ability for a metal to be taken into the body of an aquatic organism), and potentially affect a water body's ability to meet its beneficial uses. The specific water chemistry (ex., hardness) of a water body would dictate the fraction of the dissolved metals that is bioavailable. Discharges of dissolved trace metals from suction dredging activities would potentially affect aquatic life beneficial uses, which are the most sensitive beneficial uses to ambient water body concentrations of most trace metals.

As detailed in Chapter 4.2 *Water Quality and Toxicology*, suction dredging would not result in substantial, long-term degradation of trace metal conditions that would cumulatively cause substantial adverse effects to one or more beneficial uses of unimpaired water bodies. Aquatic organisms would not be exposed to toxic conditions in the temporary discharge plumes. Additionally, because trace metals addressed in this assessment are not bioaccumulative constituents, the potential to mobilize the trace metals discussed herein would not substantially increase the health risks to wildlife (including fish) or humans consuming these organisms through bioaccumulative pathways.

However, suction-dredging related disturbances of sediments with other trace metals could incrementally contribute to a cumulative impact for receiving water bodies with existing trace metal impairments. Suction dredging at known trace metal hot-spots having acid mine drainage issues and associated low pH levels and high sediment and pore water metal concentrations, including high dissolved and bioavailable forms of metals, has the potential to increase levels of one or more trace metal in water body reaches such that it would cumulatively adversely affect a water body's beneficial uses.

Ultimately, water quality conditions in 303(d)-listed waters would improve as TMDL programs are completed. Additionally, implementation of the regulations under the Program to restrict nozzle sizes, minimize disturbances of streambanks and vegetation, and use reasonable care to avoid dredging silt and clay materials may reduce the potential for dissolved trace metal discharges and reduce the potential incremental contribution of the suction dredge discharges to the cumulative impact. The increase in trace metal discharges

as a result of suction dredging is anticipated to be relatively small and would not be considered a cumulatively considerable contribution to this cumulative impact.

Impact CUM-9. Cumulative Impacts on Ambient Noise Levels in Suction Dredge Locations (Less than Significant)

Suction dredge activities would potentially contribute to increases in existing ambient noise levels through the use of gasoline-powered engines for the suction dredging and/or the use of generators at the dredgers' campsites. The extent to which the noise from suction dredging is perceptible is variable based on the ambient noise environment. Engine noise is expected to be most apparent within 700 ft. of suction dredging locations, and although temporary, this stationary source of noise may affect sensitive receptors. Receptors, both permanent (residents) and temporary (recreationists), are anticipated to experience varying levels of sensitivity towards the activity, partially guided by the relative increase in ambient noise level and/or duration of exposure. Sensitivity may be attributable to their personal views of the activity, their goals for recreation, and the importance that is attached to the existing ambient noise environment.

The ambient noise environment at suction dredging locations is affected by the land uses and recreational activities, including suction dredging, in the vicinity and the noise generated by the river itself. Activities that would potentially contribute to ambient noise level increases near suction dredging locations are other recreational motorized activities (e.g., motorized boats, off-road vehicles, or campers with generators), timber harvesting, urbanization, and suction dredging. Recreational activities may contribute to the ambient noise levels through the use of motorized boats, motorized equipment, or generators used by campers. Timber harvesting may contribute to increases in ambient noise levels through noises generated from the tree-cutting machinery and logging trucks used to transport the fallen trees. Urbanization near potential suction dredging areas may contribute to ambient noise level increases through motor vehicle traffic, aircraft noise, emergency service sirens, construction activities, motorized landscaping equipment, or other sources. Noise generated from suction dredging engines would not differ from those used in motorized boats or other motorized recreational equipment, except that engines for suction dredging activities are usually stationary and operated for extended periods throughout the day. Generators are commonly used by campers in general, and noise generated specifically from suction dredge miners would not be substantially different or greater than that generated by other campers. Timber harvesting may contribute to increases in ambient noise levels through noises generated from the tree-cutting machinery and logging trucks used to transport the fallen trees. Urbanization near potential suction dredging areas may contribute to ambient noise level increases through motor vehicle traffic, aircraft noise, emergency service sirens, construction activities, motorized landscaping equipment, or other sources.

There was no evidence obtained from the research conducted for this EIR indicating that ambient noise levels at sensitive receptor locations along the water bodies covered by the Proposed Program currently occur at levels that would adversely affect such receptors in a widespread geographic context or that noise levels are likely to significantly increase in the future under the cumulative environment (including suction dredging). With the exception of urbanization, most of these activities are temporary or intermittent. Thus, this impact is not considered to be a significant cumulative impact to which suction dredging operations would make a cumulatively considerable incremental contribution.

Impact CUM-10. Cumulative Impacts on Recreational Facility Use or Availability (Less than Significant)

Suction dredge miners would utilize existing recreational facilities and trails in California. This use could potentially increase the use of recreational facilities, decrease the availability of these facilities for other recreationists, and potentially displace other recreational users. Recreational facilities in California at or near suction dredging locations may include the facilities and resources of recreational areas in the vicinity, such as rivers, streams, trails, campsites, restrooms, and picnic tables. Both land-based and water-based recreationists may utilize these facilities. As described in Chapter 4.8 *Recreation*, land-based recreationists may include ATV users, RV campers, hunters, horse-back riders, picnickers, hikers, campers, and wildlife or scenery viewers. Water-based recreationists may include boaters, suction dredgers, fishermen, kayakers, rafters, and swimmers.

There was no evidence obtained from the research conducted for this EIR indicating that recreational facilities in California at or near suction dredging locations are currently over-used to such a degree as to constitute a significant cumulative impact or that the increase in use of facilities by permitted suction dredgers under the Proposed Program would significantly increase the demand for or use of such facilities in a widespread geographic context. Thus, this impact is not considered to be a significant cumulative impact to which suction dredging operations would make a cumulatively considerable incremental contribution.