In the Supreme Court of the State of California

THE PEOPLE OF THE STATE OF CALIFORNIA,

Plaintiff and Respondent,

v.

BRANDON LANCE RINEHART,

Defendant and Appellant.

Case No. S222620

Third Appellate District, Case No. C074662
Plumas County Superior Court, Case No. M1200659
The Honorable Ira Kaufman, Judge

PEOPLE'S SUPPLEMENTAL REQUEST FOR JUDICIAL NOTICE

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Pursuant to Evidence Code section 459 and California Rules of Court, rules 8.252(a) and 8.520(g), respondent the People of the State of California hereby requests that the court take judicial notice of the following attached documents:

R. Chapter 4.2 (Water Quality) of the California Department of Fish and Game's Draft Subsequent Environmental Impact Report for its Suction Dredge Permitting Program, dated February 2011 ("Suction Dredge DEIR") (all of the suction dredge environmental review documents are available at https://www.wildlife.ca.gov/Licensing/Suction-Dredge-Permits);

S. Selected pages of chapter 4.3 (Biological Resources) of the Suction Dredge DEIR;

T. Chapter 4.5 (Cultural Resources) of the Suction Dredge DEIR;

U. Chapter 4.7 (Noise) of the Suction Dredge DEIR;

V. Findings of Fact of the California Department of Fish and Game as a Lead Agency under the California Environmental Quality Act (Pub. Resources Code, § 21000 et seq.) for the Suction Dredge Permitting Program (Fish & G. Code, § 5653 et seq.) as analyzed in the Suction Dredge Permitting Program Subsequent Environmental Impact Report (SCH No. 2009112005), March 16, 2012;

W. Declaration of Burrett W. Clay in Support of Defendants' Opposition to Plaintiffs' Motion for Summary Adjudication Re: Preemption in *New 49ers v. State of Calif.*, and cover page showing filed Jan. 28, 2014 in *Suction Dredge Mining Cases*, San Bernardino County Superior Court, Coord. No. JCC4720; and

X. Stipulation and [Proposed] Order Setting Briefing and Hearing Dates for (1) Miners' Motion(s) for an Injunction (2)

CEPA/APA Hearing, dated May 14, 2015, filed in *Suction Dredge Mining Cases*.

Exhibits R, S, T, U, V, and X are relevant to the Appellant's new argument that the environmental effects of suction dredge mining are negligible, which is addressed at pages 23 to 24 of the People's reply brief. Exhibit W is relevant to Appellant's argument relying on a recent trial court order for a judgment in this case as a matter of law, which is addressed at pages 26 to 27 of the People's reply brief.

Exhibits R, S, T, U, and V are judicially noticeable under Evidence Code section 452, subdivision (c), as official acts of an executive department of this state. (See *Etcheverry v. Tri-Ag Serv., Inc.* (2000) 22 Cal.4th 316, 331 [taking judicial notice of government report].) Exhibits W and X are pleadings filed in the San Bernardino County Superior Court in *Suction Dredge Mining Cases*. These documents are judicially noticeable under Evidence Code section 452, subdivision (d), as records of a court of this state.

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None of these documents were presented to the trial court or the Court of Appeal.

Dated: June 10, 2015

Respectfully submitted,

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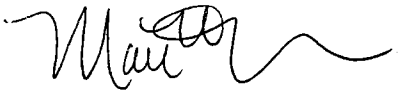

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Chapter 4.2
WATER QUALITY AND TOXICOLOGY

4.2.1 Introduction

CDFG's suction dredging permit program is statewide. Thus the affected environment is all water-bodies in the state where dredging may occur, and the adjacent shoreline zones which dredge operators use to base their activities.

4.2.2 Regulatory Setting

Federal Laws, Regulations, and Polices

Clean Water Act and Associated Programs

There are several sections of the Federal Water Pollution Control Act (33 U.S. Government Code [U.S.C.] §1251 et seq. (1972)), a.k.a. "Clean Water Act" (CWA), which is administered primarily by the U.S. Environmental Protection Agency (EPA) that pertain to regulating discharges of waste to waters of the United States, including Sections 303, 401, 402, and 404. Each of these regulatory sections of the CWA is described below.

Congress enacted the federal CWA "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[1] Section 301 of the CWA prohibits "the discharge of any pollutant by any person" except in compliance with the CWA; i.e., without obtaining a permit.[2] The "discharge of any pollutant" means any addition of any pollutant to navigable waters from any point source. One type of permit authorized by CWA Section 402 is National Pollutant Discharge Elimination System (NPDES) permits.

Section 303

As defined by U.S. EPA, water quality standards consist of: 1) the designated beneficial uses of a water segment, 2) the water quality criteria (referred to as "objectives" by the state) necessary to support those uses, and 3) an antidegradation policy that protects existing uses, future uses, and high water quality. The State of California adopts water quality standards (see discussion of state water quality standards below) to protect beneficial uses of state waters as required by Section 303 of the CWA and the Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne). Section 303(d) of the CWA requires States to develop lists of water bodies (or sections of water bodies) that will not attain water quality standards after implementation of minimum required levels of treatment by point-source dischargers (i.e., municipalities and industries). Section 303(d) requires States to develop a total maximum daily load (TMDL) for each of the listed pollutants and water bodies, which is intended to guide the attainment of state water quality standards. A TMDL is an estimate

[1] 33 U.S.C. § 1251(a).

[2] 33 U.S.C. § 1311(a).

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). 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.

Sections 401 and 404

For an applicant of a federal permit or license to conduct any activity that may result in a discharge of a pollutant to a water of the United States, Section 401 of the CWA requires the state to issue a certification that the activity is consistent with the state's water quality standards. The state may grant, grant with technical conditions imposed on the project activity, or deny the Section 401 certification.

The discharge of dredged or fill material into waters of the United States, including wetlands, as determined by the U.S. Army Corps of Engineers (USACE), is subject to permitting specified under Section 404 of the CWA (Discharges of Dredge or Fill Material), which is administered by USACE. A Section 401 water quality certification is required for all Section 404 permitted activities.

Section 402

The 1972 amendments to the Federal Water Pollution Control Act established the NPDES permit program to control discharges of pollutants from point sources (Section 402). NPDES is the primary federal program that regulates point-source discharges to waters of the United States. The 1987 amendments to the CWA created a new sub-section of the CWA devoted to stormwater permitting (Section 402[p]). Section 402 of the CWA authorizes the EPA, or a state with an approved program, to issue NPDES permits for the discharge of pollutants other than dredged or fill material.[3] Within California, the Legislature has delegated its rights and responsibilities under the CWA, including the issuance of NPDES permits, to the State Water Resources Control Board (SWRCB).

Suction dredging involves the removal of material from the streambed to a sluice box. The material is separated into recoverable gold and remaining spoil. The spoil is then discharged from the sluice box directly back into the stream. Congress defined "pollutant" to include "dredged spoil, rock, sand..."[4] The discharge of the spoil from a suction dredging sluice box has been determined by the courts to constitute a discharge that may be regulated with permits issued pursuant to Section 402 of the CWA.[5] As such, the SWRCB or the Regional Water Quality Control Boards (RWQCBs) may require suction dredge operators to obtain NPDES permits in order to ensure that they are in compliance with the CWA and with California's water quality standards. Several other western states also regulate recreational dredging activities through permit procedures associated with their wastewater discharge statutes and regulations; a summary of these other state's permit procedures is provided in Appendix E.

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[3] 33 U.S.C. § 1342.

[4] 33 U.S.C. § 1362(6).

[5] *Rybachek v. U.S. Environmental Protection Agency* (9th Cir. 1990) 904 F.2d 1276.

National Toxics Rule and California Toxics Rule

The National Toxics Rule (NTR) was issued by the EPA on December 22, 1992, and amended on May 4, 1995, and November 9, 1999, to establish numeric criteria for 42 priority toxic pollutants. As a result of a court-ordered revocation of California's statewide water quality control plan for priority pollutants in September 1994, the EPA initiated efforts to issue numeric water quality criteria for California. On May 18, 2000, the EPA promulgated the California Toxics Rule (CTR) in the Federal Register as a final rule (Federal Register, Volume 65, page 31682 [65 FR 31682]). The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. For California, the criteria in the CTR supplement the criteria in the NTR (i.e., the CTR does not change or supersede any criteria previously promulgated for California in the NTR, but it does include them in the table of criteria for convenience).

Federal Anti-degradation Policy

The federal anti-degradation policy is designed to protect existing beneficial uses and the level of water quality necessary to protect existing uses, and provide protection for high quality waters and national water resources. The federal policy directs states to adopt a statewide policy that includes the following primary provisions (40 CFR 131.12):

> (1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.
>
> (2) Where the quality of waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the state finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the state's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located...
>
> (3) Where high quality waters constitute an outstanding National resource, such as waters of National and state parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

Federal Mining and Land Use Regulations

Many of the water bodies where suction dredging may occur in California occur on federal lands under the jurisdiction of either the U.S. Bureau of Land Management (BLM) or the U.S. Forest Service (USFS) National Forest system. Other federal lands (i.e., National Park Service, National Monument, military bases), Indian reservations, and U.S. Bureau of Reclamation reservoirs are not typically open to mineral exploration. The General Mining Law of 1872 and accompanying BLM regulations (43 CFR Parts 3800-3870) provide the primary rules governing mineral prospecting activities on public lands, including the filing of claims and patents and environmental provisions (excepting activities that started prior to October 1976 and have not undergone any changes). Similarly, federal regulations applicable to the USFS contain provisions for minerals exploration (36 CFR Part 228). The environmental protection requirements for BLM (43 CFR Part 3802.3) and USFS (36 CFR

Part 228.9) are similar and generally require activities to abide by state and Federal water quality standards, solid waste disposal and removal (i.e., trash, wastes), and construction of access routes in a manner to provide adequate drainage (i.e., dips, water bars, culverts), be shaped to as near a natural contour as practicable, be stabilized, and be reclaimed and revegetated when activities are discontinued.

State Laws, Regulations, and Policies

Porter-Cologne Water Quality Control Act and California Water Code

The Porter-Cologne Water Quality Control Act, passed in 1969, implements the CWA in California. It established the SWRCB and divided the state into nine regions, each overseen by a Regional Water Quality Control Board. The SWRCB is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies, but much of its daily implementation authority is delegated to the nine RWQCBs, which are responsible for implementing CWA Sections 401, 402, and 303(d). In general, the SWRCB manages both water rights and statewide regulation of water quality, while the RWQCBs focus exclusively on water quality within their regions. Porter-Cologne authorizes the RWQCBs to issue waste discharge requirements (WDRs), including NPDES permits, and requires the RWQCBs to adopt water quality control plans (Basin Plans) for the protection of surface water and groundwater quality. Additionally, the SWRCB may adopt water quality control plans for waters of the state. A Basin Plan must identify beneficial uses of surface water or groundwater to be protected, establish water quality objectives to ensure the reasonable protection of beneficial uses, and establish a program for implementing and achieving the water quality objectives. Basin Plans also incorporate by reference the state's "Anti-degradation Policy," which is discussed further below.

Section 13050(f) of the Porter-Cologne Act defines "beneficial uses" as uses of waters of the state (i.e., surface water or groundwater) that must be protected against water quality degradation. Potential beneficial uses include domestic and municipal, agricultural, and industrial water supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves (Section 13050[f]). Most water bodies have multiple designated beneficial uses. SWRCB policies have provided additional guidance regarding how the SWRCB and RWQCBs must regulate discharges to waters of the state in order to protect beneficial uses.

In 1988, the SWRCB adopted Resolution 88-63, the Sources of Drinking Water Policy. This policy stated, "All surface and ground waters of the state are considered to be suitable, or potentially suitable, for municipal or domestic water supply and should be so designated by the Regional Boards...," with a few minor exceptions. Therefore, the SWRCB and RWQCBs regulate almost all surface water and groundwater of the state as a potential drinking water source.

Basin Plans establish specific numeric and narrative water quality objectives for a number of physical parameters, chemical inorganic and organic constituents, biological factors, and toxic priority trace metal and organic compounds. Numerical objectives are typically applied to conventional parameters such as coliform bacteria, dissolved oxygen (DO), pH, pesticides, electrical conductivity (EC), total dissolved solids, temperature, or turbidity. Several of the Basin Plans also contain specific numerical objectives for some of the trace metals or organic compounds. Basin Plans also commonly contain narrative water quality

objectives for parameters such as suspended sediment, taste and odor, color, biostimulatory substances, oil and grease, pesticides, and toxicity. Water quality objectives for toxic pollutants in the Basin Plan complement the federal water quality standards adopted in the CTR and NTR. State objectives may be equal to, or more restrictive than federal criteria, but cannot be less restrictive than federal criteria.

Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California

In 1994, the SWRCB and the EPA agreed to a coordinated approach for addressing priority toxic pollutants in inland surface waters, enclosed bays, and estuaries of California. In March 2000, the SWRCB adopted the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, commonly referred to as the State Implementation Policy (or SIP). The SIP implements NTR and CTR criteria, and applicable Basin Plan objectives, for toxic pollutants. When the RWQCBs issue any permit allowing the discharge of any toxic pollutant(s) pursuant to the CWA or the Porter-Cologne, the permit's promulgation and implementation must be consistent with the SIP's substantive or procedural requirements. Any deviation from the SIP requires the concurrence of U.S. EPA if the RWQCBs are issuing any permit pursuant to the CWA.

California Anti-Degradation Policy (SWRCB Resolution No. 68-16)

The goal of SWRCB Resolution No. 68-16 ("Statement of Policy With Respect to Maintaining High Quality Waters in California") is to maintain high quality waters where they exist in the State. State Board Resolution No. 68-16 states, in part:

> "1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the state that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.
>
> 2. Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained."

The SWRCB has interpreted Resolution No. 68-16 to incorporate the federal anti-degradation policy, which is applicable if a discharge that began after November 28, 1975, will lower existing surface water quality.

California Fish and Game Code Sections 5650-5652 and 5655

The California Fish and Game Code section 5650 prohibits the discharge of petroleum products and other miscellaneous materials, or any substance deleterious to fish, plant life, mammals, or bird life into waters of the state. For conditions where CDFG finds that a

continuing and chronic condition of pollution exists, section 5651 requires CDFG to coordinate with the RWQCBs in obtaining correction and abatement of the problem. Section 5652 prohibits discharge of refuse to waters of the state or within 150 feet of the high water mark of waters of the state. Section 5655 allows CDFG to collect funds and conduct cleanup and abatement actions for spills of petroleum or petroleum products by a discharger, or require the discharger who caused the spill to conduct the cleanup.

Local Laws and Regulations

Because suction dredging typically occurs as temporary activities, involves access and setup of small and dispersed sites in remote locations, and often access through Federal public lands, the activities are unlikely to require application or approval under local land use regulations that may involve water quality protection either directly or indirectly (e.g., grading and erosion control ordinances, building permits, stormwater management regulations).

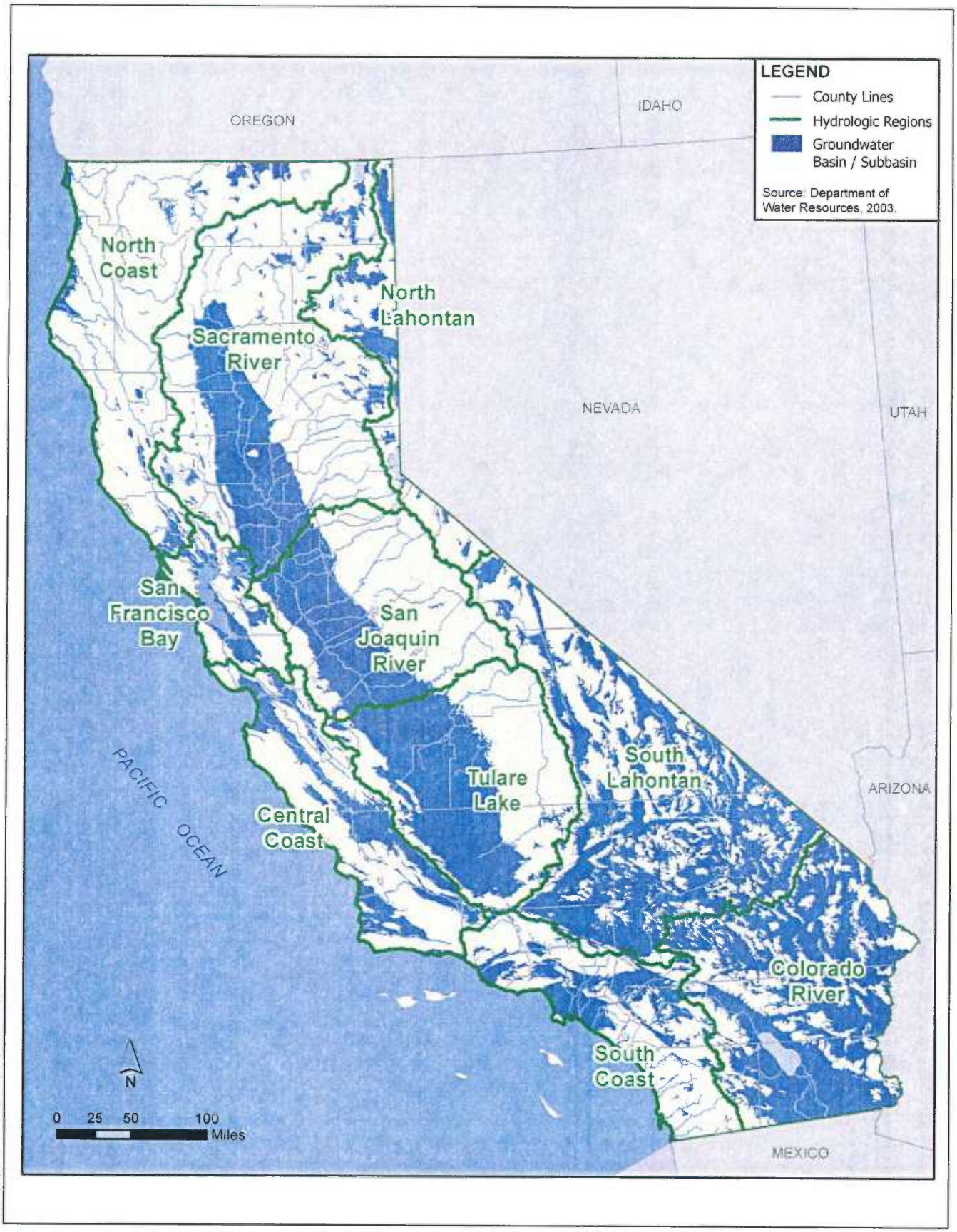
4.2.3 Environmental Setting

A Literature Review (Appendix D) was conducted in preparing this EIR section to identify and evaluate available information that exists regarding the potential environmental effects to water resources that suction dredging activity may cause. Based on the Literature Review, and the results of the agency and public issues-scoping process conducted for this EIR, it was determined that the major water quality issues of potential concern associated with suction dredging activity under the Proposed Program were waste discharges of dispersed encampments, instream waste discharges from dredging equipment, and instream resuspension of sediments and related sediment-derived contaminants. As proposed, the Program will apply statewide, thus the setting below addresses existing conditions at an appropriate regional scale. The following sections describe relevant regional climate, hydrology, water quality, and environmental toxicology conditions in California that may be affected by suction dredging activity, or may influence the environmental effects of suction dredging activity.

Regional Climate and Hydrology

The Department of Water Resources (DWR) divides the state into ten hydrologic regions which are designated in Water Code Section 13200, and based on boundaries of major river system watersheds. The boundaries of the nine RWQCBs also are defined (for the most part) by these boundaries. These hydrologic region boundaries are shown in Figure 4.2-1, along with major defined groundwater basins of the state (DWR, 2003). The location of groundwater basins are only partially related to the boundaries of major surface watersheds.

Most of California experiences a Mediterranean climate with cool, wet winters and warm, dry summers. However, the state also contains deserts that experience arid climatic conditions and mountains with subarctic climate patterns. In California, most precipitation (i.e., rain and snow) and peak stream runoff events occur primarily during the months of October–April, and are usually most extreme between November and March. Precipitation rates vary greatly across the state from the northern to southern regions, and the state contains many desert regions where annual total precipitation averages less than about 7 inches. In general, the April to July period is characterized by moderately high runoff from



Horizon WATER and ENVIRONMENT

Figure 4.2-1
Hydrologic Regions and Groundwater Basins in California

snowmelt in watersheds that receive a substantial snowpack, much of which is captured in reservoirs. Mountain snowmelt and seasonal release of stored water from the reservoirs generally provides surface water flows into or throughout the summer months in the major streams and rivers located downstream in the Sacramento Valley, San Joaquin Valley, and northern California.

Many rivers are controlled by dams and levees for a variety of purposes, including but not limited to, flood control, water storage and transport, and recreation. Rivers and streams in the Klamath/North Coast region are largely uncontrolled, with the exception of the Trinity River where Lewiston Reservoir provides substantial storage and flows are diverted into the Sacramento River basin, and the Klamath River. Most of the rivers on the west side of the Sierra Nevada Mountains are controlled, to some degree, by dams and diversions. The climate and hydrology of each hydrologic region are described in detail below.

North Coast Hydrologic Region

The North Coast hydrologic region covers approximately 12.46 million acres (19,470 square miles) and encompasses Siskiyou, Del Norte, Trinity, Humboldt, Mendocino, Sonoma, and small areas of Marin Counties. The region extends from the Oregon border south to Tomales Bay and includes portions of the northern Coast Ranges, the Mad River drainage, the Klamath Mountains, and the coastal mountains. The majority of the population is located along the Pacific Coast and in the inland valleys north of the San Francisco Bay Area. The northern mountainous portion of the region is rural and sparsely populated, and most of the area is heavily forested. Average annual precipitation in this hydrologic region ranges from 100 inches in the Smith River drainage to 29 inches in the Santa Rosa area.

The climate in inland areas is characterized by distinct rainy, cool winters and hot, dry summers, while coastal areas experience cool and wet conditions year-round with little temperature variation. Precipitation is predominantly rainfall, and average annual precipitation in the region is 53 inches. Runoff characteristics include the highest peak discharges recorded and highest total sediment yields in the state.

San Francisco Bay Hydrologic Region

The San Francisco Bay hydrologic region covers approximately 2.88 million acres (4,500 square miles) and encompasses San Francisco and portions of Marin, Sonoma, Napa, Solano, San Mateo, Santa Clara, Contra Costa, and Alameda Counties. The San Francisco Bay hydrologic region is dominated by the Coast Ranges. Significant geographic features include the Marin and San Francisco peninsulas; San Francisco, Suisun, and San Pablo bays; and the Santa Cruz Mountains, Diablo Range, Bolinas Ridge, and Vaca Mountains of the Coast Ranges. Although this is the smallest hydrologic region in the state, it contains the second largest human population.

The climate in coastal areas is characterized by cool and foggy conditions year-round, with rain in the winter and small seasonal temperature variations, while inland areas experience warmer, dry summers with cooler, rainy winters. Precipitation is mostly rainfall, with insignificant snowfall. Average annual precipitation is 31 inches, with greater than 50 inches in some parts. Runoff characteristics include high peak discharges due to small, steep watersheds. Local rivers are susceptible to severe flooding during high rainfall events. Some watersheds produce high sediment yields due to unstable rock types/soils.

Central Coast Hydrologic Region

The Central Coast hydrologic region covers approximately 7.22 million acres (11,300 square miles) in central California and includes all of Santa Cruz, Monterey, San Luis Obispo, and Santa Barbara Counties, most of San Benito County, and parts of San Mateo, Santa Clara, and Ventura Counties. The climate and runoff experienced is similar to that described above for the San Francisco Bay Hydrologic Region. Annual average precipitation is 20 inches.

South Coast Hydrologic Region

The South Coast hydrologic region includes all of Orange County; most of San Diego and Los Angeles Counties; parts of Riverside, San Bernardino, and Ventura Counties; and a small portion of Kern and Santa Barbara Counties. Approximately half of California's population, or about 17 million people, live within the boundaries of the South Coast hydrologic region. This, combined with its comparatively small surface area of approximately 6.78 million acres (10,600 square miles) gives it the highest population density of any hydrologic region in California.

The region has a Mediterranean climate with mostly dry years interrupted by infrequent high precipitation years. It is generally characterized by warm, dry summers and mild, wet winters, though it also can experience intense subtropical storms. Precipitation is generally rainfall, with insignificant snowfall contribution. Average annual precipitation is 18.5 inches. Locally heavy storms have the highest 24-hour rainfall totals in the state. Rivers and streams are largely ephemeral and fed by rainfall. Rivers are susceptible to frequent flooding due to high peak discharge events. Sediment yields are locally high due to intense urbanization, low vegetation cover and unstable soils. Debris flows and mudflows are frequent in some drainages.

Central Valley Hydrologic Region

At over 38 million acres (59,450 square miles), the Central Valley hydrologic region is the largest in California, and encompasses the three subregions described below. The climate in the Central Valley is characterized by hot, dry summers and cool, wet winters, while mountainous areas experience mild summers with intermittent thundershowers and heavy winter snowfalls above 5,000 feet. Lowland areas receive winter rainfall, and mountains receive moderate to heavy snowfall. Total average annual precipitation ranges from 36 inches in the Sacramento River region to 13-14 inches for the San Joaquin Valley and Tulare Lake regions. Runoff is characterized by prolonged spring runoff fed by Sierra Nevada snowpack. The region experiences generally low sediment yields due to widespread vegetation and stable rock types/soils, though high sediment yields are experienced locally due to land uses (e.g., logging, grazing, and urbanization). The natural hydrology has been highly modified by the introduction of dams, timing and location of water uses, and conveyance systems.

Sacramento River Hydrologic Subregion

The Sacramento River hydrologic subregion covers 27,250 square miles and includes all or a portion of 20 predominantly rural northern California counties. The city of Sacramento is the most densely populated portion of this region. The region extends from the crest of the Sierra Nevada in the east to the summit of the Coast Ranges in the west, and from the

Oregon border north downstream to the Sacramento–San Joaquin Delta. It includes the entire drainage area of the Sacramento River, the largest river in California, and its tributaries.

San Joaquin River Hydrologic Subregion

The San Joaquin River hydrologic subregion is bordered on the east by the crest of the Sierra Nevada Mountains and on the west by the crest of the coastal mountains of the Diablo Range. It extends from the southern boundary of the Sacramento–San Joaquin Delta to the southern extent of the San Joaquin River drainage in Madera County. It consists of the drainage area of the San Joaquin River, which at approximately 300 miles long is one of California's longest rivers, although substantial portions have only intermittent flow, and also encompasses approximately half of the Sacramento–San Joaquin Delta. The San Joaquin River hydrologic region covers approximately 9.7 million acres (15,200 square miles).

Tulare Lake Hydrologic Subregion

The Tulare Lake hydrologic subregion is located in the southern end of the San Joaquin Valley and includes all of Tulare and Kings Counties and most of Fresno and Kern Counties. Major cities include Fresno, Bakersfield, and Visalia. The region covers approximately 10.9 million acres (17,000 square miles). The surface water hydrology of this region has been greatly modified and there is generally no discharge of river flow out of the region, with the exception of infrequent high flow events when there may be some flow into the San Joaquin basin to the north. The ancestral Tulare Lake is now completely under agriculture.

Lahontan Hydrologic Region

The Lahontan hydrologic region encompasses the North and South Lahontan subregions covering approximately 25.1 million acres (39, 200 square miles). Valleys are semi-arid high desert with hot, dry summers, mild, dry winters, and locally intense thunderstorms. Mountainous areas experience cool to mild summers and cold winters. Precipitation is low to moderate in valleys due to the rain-shadow effects of the Sierra Nevada and Cascade Mountains. The mountains experience regionally heavy winter snowfall and intense summer thunderstorms. Average annual precipitation ranges from 8 inches in the south to 32 inches in the north.

North Lahontan Hydrologic Subregion

The North Lahontan hydrologic subregion extends south from the Oregon border approximately 270 miles to the South Lahontan region. Extending east to the Nevada border, it consists of the western edge of the Great Basin, and water in the region drains eastward toward Nevada. The subregion, corresponding to approximately the northern half of the Lahontan RWQCB, covers approximately 3.91 million acres (6,110 square miles) and includes portions of Modoc, Lassen, Sierra, Nevada, Placer, El Dorado, Alpine, Mono, and Tuolumne Counties.

South Lahontan Hydrologic Subregion

The South Lahontan hydrologic subregion in eastern California, which includes approximately 21% of the state, covers approximately 21.2 million acres (33,100 square miles). This region contains both the highest (Mount Whitney) and lowest (Death Valley) surface elevations of the contiguous United States. It is bounded on the west by the crest of

the Sierra Nevada and on the north by the watershed divide between Mono Lake and East Walker River drainages; on the east by Nevada and the south by the crest of the San Gabriel and San Bernardino mountains and the divide between watersheds draining south toward the Colorado River and those draining northward. The subregion includes all of Inyo County and parts of Mono, San Bernardino, Kern, and Los Angeles Counties.

Colorado River Hydrologic Region

The southeast portion of California comprises the Colorado River hydrologic region, which contains 12% of the state's land area at approximately 12.8 million acres (20,000 square miles). The Colorado River forms most of the region's eastern boundary except for a portion of Nevada at the northeast, and extends south to the Mexican border. The region includes all of Imperial County, approximately the eastern one-fourth of San Diego County, the eastern two-thirds of Riverside County, and the southeastern one-third of San Bernardino County. It includes a large portion of the Mojave Desert and has variable, arid desert terrain that includes many bowl-shaped valleys, broad alluvial fans, sandy washes, and hills and mountains.

This is an arid desert region with hot, dry summers, locally intense thunderstorms, and mild winters. Rainfall is limited to a few storms per year. All precipitation falls in the form of rain. This region has the lowest annual precipitation totals in the state, with some areas receiving less than 2 inches. Average annual regional rainfall region-wide rainfall is 5.5 inches. Runoff is low due to limited rainfall, but locally heavy during infrequent storm events. Overall sediment yields are low, but produce debris flows during storms.

Water Quality

As determined in the Literature Review (Appendix D), and further detailed below under the "Impact Analysis – Methodology" section, research studies, surveys, and other resource agency information have been compiled that have evaluated the water quality effects of suction dredging activities that have been conducted in the past in California and in other states. Based on the Literature Review, the major water quality constituents of potential concern associated with suction dredging activity are expected to be associated with waste discharges that occur in relation to instream resuspension of sediments and related sediment-derived contaminants. Therefore, the following section describes available and relevant information on existing regional water quality conditions that may be affected by suction dredging activity.

The water quality of surface waters and groundwater varies throughout California. Potential sources of water quality impairments include point sources (direct discharges to water bodies) and non-point sources. Pollutants from non-point sources are transported primarily via surface water runoff, but in some cases by groundwater discharge. In urban areas, typical non-point pollutant sources include city streets, parking lots, lawns, gardens, and industrial areas. Runoff from roads and parking lots carry oil and other gasoline-related contaminants, as well as trace metals such as copper and zinc. Typical pollutants in stormwater runoff from lawns and agricultural areas include pesticides, herbicides, and nutrients from fertilizers. Other non-point pollutants include trash, sediments, and pathogens. Surface waters such as rivers and streams may be affected by a large variety of pollutants, including sediments, pathogens, pesticides, trace metals, and legacy contaminants (pollutants that have been banned or replaced and are no longer supplied to

the environment in large quantities, but that remain in the environment for an extended period after deposition with little degradation) such as dichlorodiphenyltrichloroethane (DDT) and other chlorinated hydrocarbon pesticides, and polychlorinated biphenyl compounds (PCBs).

Primary water quality issues vary around the state depending on the location and type of water resources present in an area, the size and extent of the watershed and regional water resources, the location of the water body with respect to potential pollutant sources, seasonal and climatic factors, and many other interacting physical, chemical, and biological processes.

Water Quality Monitoring and Section 303(d) Listed Water Bodies

Monitoring for water quality protection purposes is conducted through a variety of federal, state, and local programs. The SWRCB conducts monitoring of surface waters through the Surface Water Ambient Monitoring Program (SWAMP). Water quality monitoring is conducted for the State Water Project (SWP) administered by the Department of Water Resources, and Central Valley Project (CVP) administered by the U.S. Bureau of Reclamation. In particular, extensive monitoring and special studies have been conducted in the Sacramento River-San Joaquin River Delta (Delta), San Francisco Bay, and surrounding tributaries over the past 30 years to manage the SWP/CVP operations and understand chemical fate and transport processes affecting these water bodies. Additionally, the U.S. Geological Survey (USGS) has conducted assessments through the National Water-Quality Assessment Program (NAWQA) of the Sacramento River, San Joaquin-Tulare, and Santa Ana Basins to understand the status of water quality trends and how natural and anthropogenic factors affect water quality.

The state evaluates current water quality conditions and prioritizes funding efforts for protection, cleanup, and monitoring programs through individual water quality assessments that are compiled into the Section 305(b) reporting process, which is mandated under the federal CWA. The most recent Section 305(b) report was prepared in 2002 and reported that of 32,536 miles of rivers/streams assessed, 27,449 miles were impaired for one or more beneficial uses. Out of 576,013 acres of lakes/reservoirs assessed, 361,128 acres were impaired for one or more beneficial uses (SWRCB, 2003).

CWA Section 303(d) lists identify water bodies that do not meet applicable water quality standards or designated beneficial uses that are subject to technology-based controls for waste discharges. Table 4.2-1 shows the number of water bodies on the 2006 statewide 303(d) list by region and pollutant type. Of the total number of listings, 2,238 require preparation of TMDLs, reflecting either a new listing since the prior 2004 list or an existing listed water body awaiting development of the TMDL. The number of TMDLs that have been prepared to date is substantially less than the actual number of 303(d) listings. The state has completed compilation of the recommended 2010 update of the Section 303(d) list of impaired water bodies in an Integrated Report (SWRCB, 2010), and EPA approval of the list is pending, at which point the state will have a fully adopted 2010 Section 303(d) list. The 2010 Integrated Report identifies that there are an additional 1,464 listings that will require TMDL development, and 195 recommended delistings. Because the 303(d) listing process is data driven, and as evidenced by the large number of new listings for 2010, it should be noted that the 303(d) listing process does not necessarily completely represent

the actual number of impaired water bodies. In particular, water bodies in rural or remote areas where there is not an active data collection program may not be represented in the listing process.

Constituents of Concern for the Proposed Program

As noted above, the Literature Review (see Appendix D) was conducted to identify potential water quality effects that suction dredging may have, to identify information gaps on water quality topics important to the assessment, and to direct the development of the assessment methodology. The following sections summarize information from the Literature Review regarding the characteristics of suction dredging activity that can lead to waste discharges from: (a) encampment activities; (b) sediment resuspension; (c) dredging discharges of sediment-associated and elemental Hg; and, (d) dredging discharges of other metals or organic compounds. A final section summarizes the key findings of the Literature Review regarding the water quality concerns of chemical constituents that may be discharged, the routes of exposure to sensitive beneficial uses of the water bodies affected, and the status of the available data (or data gaps) and level of understanding of suction dredging effects.

Contaminant Discharges from Onshore Dredge Site Encampments

Many areas where suction dredging is conducted are remote and distant from developed facilities. As such, activities associated with suction dredging may include gaining access to stream sites with motorized transportation (e.g., boats, automobiles, off-highway vehicles), establishment and occupation of temporary encampments for extended stay periods, use of fuels for suction dredges and other hazardous substances (e.g., oil for equipment maintenance, and use of chemicals for dredge material processing including primarily nitric acid and/or mercury), creation of wastewater if encampments are remotely located from campground or overnight facilities, or incidental discharges of trash or other debris. Suction dredges operate using internal combustion engines while floating on the surface of the water. Therefore, the potential exists for oil and gas leaks or spills to occur, resulting in direct discharges of these contaminants to water bodies and possible adverse water quality affects. There have been no specific technical studies that have evaluated the effects of suction dredging encampments on water quality.

TABLE 4.2-1. NUMBER OF WATER-BODIES WITH 303(d) LISTINGS (I.E., IMPAIRED WATER BODIES) FOR WATER QUALITY CONSTITUENTS, BY REGION

	REGION NUMBER									
Pollutant Type	1	2	3	4	5	6	7	8	9	**Total**
Hydromodification				10						10
Mercury	10	100	2	8	51	3	1	2	1	178
Other Metals		55	15	115	77	75	6	18	46	407
Miscellaneous [1]	201	13	1	28	16			2	22	283
Nuisance [2]				14					11	25
Nutrients	110	27	114	104	21	254	10	20	81	741
Other Inorganics [3]		4		19		5			10	38
Other Organics [4]	2	69	12	89	10	2	17	10	12	223
Pathogens	10	48	141	122	33	45	7	30	55	491
Pesticides		99	69	177	145		18	16	18	542
Salinity	1	3	20	30	16	42	3	2	52	169

	REGION NUMBER									
Pollutant Type	1	2	3	4	5	6	7	8	9	**Total**
Sediment	410	20	150	23	5	85	3	15	17	728
Toxicity		3	4	32	30	1	1	7	18	96
Trash		1		37			1		3	42
Grand Total	*744*	*442*	*528*	*808*	*404*	*512*	*67*	*122*	*346*	*3,973*

[1] = Includes 303d-listed temperature, pH, and exotic species.
[2] = Includes odor and scum formation.
[3] = Includes hydrogen sulfide, sulfates, and cyanide.
[4] = Includes PCBs, dioxin/furan compounds, and polycyclic aromatic hydrocarbons (PAHs).

Turbidity and Total Suspended Solids

Turbidity is the optical property of a suspension that causes light to be scattered and absorbed rather than transmitted through the water column. The scattering and absorption of light is caused by: 1) water; 2) suspended particulate matter ranging in size from colloidal to coarse dispersions; and 3) dissolved chemicals. Suspended materials may include suspended sediments, finely divided organic and inorganic compounds, plankton, and other microscopic organisms. Because turbidity is primarily caused by suspended solids, these two parameters are often discussed together. Suspended solids concentration in water is quantified by filtering a known volume of water through a weighed standard glass-fiber filter, and drying the residue retained on the filter to a constant weight at 103-105°C. The total suspended solids (TSS) concentration within the sample is then reported as milligrams of dried residue per liter of water filtered (mg/L). Although the terms "suspended solids" and "turbidity" are sometimes used synonymously, the degree of turbidity is not equal to the suspended solids concentration; rather, turbidity is an expression of only one effect of suspended solids upon the character of water (i.e., the ability of light to penetrate through the water column). Because the particle size and nature (e.g., organic vs. inorganic) of the suspended solids affect the light scattering, different turbidities can be measured for waters having the same TSS concentration (McKee and Wolf, 1963).

All surface water bodies have quantifiable levels of suspended solids and turbidity. Turbidity levels of fresh waters vary greatly with location and season, with headwaters of streams and rivers generally having low turbidities (e.g., often below 5 Nephelometric Turbidity Units [NTUs]) throughout the year. Larger rivers, located at lower elevations, typically have higher turbidities (e.g., <10 to over 100 NTUs). The turbidity of water bodies increases during and following precipitation events that result in highly turbid runoff. TSS levels in natural waters seldom exceed 20,000 mg/L for more than a few days (Boyd, 1990).

Both turbidity and TSS are regulated water quality parameters in all of the state's RWQCBs' Basin Plans. Beneficial uses considered most sensitive to ambient levels of turbidity and TSS and/or the degree of changes in turbidity/TSS levels which may be caused by natural runoff events or manmade discharges are aquatic life and their habitats, municipal and domestic water supply, industrial water supply, and recreational/aesthetic uses. However there are no set absolute numerical turbidity or TSS objectives applicable to ambient water quality. Rather, all of the Basin Plans contain a narrative objective for TSS, generally requiring the suspended sediment load and suspended sediment discharge rate of surface waters to not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. All of the state's Basin Plans contain similar numerical turbidity objectives that limit

the allowable increase over background levels. The Basin Plan for the Central Valley Region (which includes most of the Sierra Nevada gold mining region) contains the most specific turbidity objectives in the State, as follows:

- Where natural turbidity is less than 1 NTU, controllable factors shall not cause downstream turbidity to exceed 2 NTUs;
- Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU;
- Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20%;
- Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs; and
- Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10%.

Additionally, the Central Valley Region Basin Plan states: "In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected." Moreover, the Basin Plan provides for exceptions to the above limits for dredging operations that cause an increase in turbidity stating, "In those cases, an allowable zone of dilution within which turbidity in excess of the limits may be tolerated will be defined for the operation and prescribed in a discharge permit." The North Coast Region (which includes the Klamath-Trinity gold country) limits turbidity to no more than 20 percent above naturally occurring background levels and allows zones of dilution within which higher percentages can be tolerated for specific discharges. The turbidity objectives vary among the other Basin Plans, and not all regions include considerations for mixing zones and averaging periods.

Environmental Toxicology of Metals and Organic Compounds

Environmental toxicology is the study of environmental contaminants and the health risks to humans and wildlife (including fish and aquatic organisms) associated with various routes of exposure (e.g., ingestion, drinking water, and air). Several constituent groups are of known concern for toxicological risk to fisheries and human health in water bodies in California. These include mercury, other trace metals, and synthetic organic compounds. Mercury (Hg) is the constituent that poses the greatest toxicological risk to humans and fish and wildlife in areas where suction dredging activity might occur. Potential impacts of Hg and other heavy metals on fish and aquatic organisms are also discussed in Chapter 4.3 *Biological Resources.*

As noted in the Literature Review (Appendix D), suction dredging activities typically target the known gold-bearing streams and rivers of California where much of the historic mining activity took place after the California gold rush of 1849. Elemental (i.e., liquid) mercury was used extensively in gold mining processes and much of the mercury was discharged or wasted directly to streams and river channels, resulting in extensive areas of mercury enriched channel sediments and watershed-wide contamination with elemental mercury. Based on the Literature Review, mercury is the primary constituent of concern that occurs in aquatic sediments where suction dredging might occur under the Program. Mercury is a toxic constituent that bioaccumulates in the foodchain of aquatic organisms and terrestrial

wildlife, and is ultimately a human health concern primarily through the consumption of Hg-contaminated fish. Methylmercury (MeHg) is a more bioavailable form of Hg that is produced from inorganic Hg by specific types of aquatic bacteria in rivers and reservoirs. This section briefly discusses available information regarding the extent of mercury contamination and related concerns pertaining to bioaccumulation in the food chain, which is the primary concern for Hg contamination in water bodies.

The major pathway for human and wildlife exposure to methylmercury (MeHg) is consumption of Hg-contaminated fish. Dietary MeHg is almost completely absorbed into the blood and is distributed to all tissues including the brain. In pregnant women, it also readily passes through the placenta to the fetus and fetal brain. MeHg is a highly toxic substance with a number of adverse health effects associated with its exposure in humans and animals. High-dose human exposure results in mental retardation, cerebral palsy, deafness, blindness, and dysarthria in utero and in sensory and motor impairment in adults. Although developmental neurotoxicity is currently considered the most sensitive health endpoint, data on cardiovascular and immunological effects are beginning to be reported and provide more evidence for toxicity from low-dose MeHg exposure (U.S. EPA, 2001). In birds and mammalian wildlife, high levels of MeHg can result in death, reduced reproduction, slower growth and development, and abnormal behavior (U.S. EPA, 2010).

Criteria and screening values have been developed for the protection of human health and fish-eating wildlife for Hg in fish tissue and unfiltered water-column 30-day Hg concentrations. A selection of the most relevant criteria is shown in Table 4.2-2.

Table 4.2-3 shows those water bodies in California for which the state Office of Environmental Health Hazard Assessment (OEHHA) fish tissue advisories have been issued for Hg in areas where the Hg contamination is associated with historic gold mining. Also shown are the species with the highest mean tissue concentration, what that concentration is, and the number of samples used to calculate the mean. Water bodies with Hg levels that are primarily a result of historic Hg mines or industrial sources (such as Clear Lake and San Francisco Bay area reservoirs) are not shown. All water bodies shown in the table are within the Central Valley Hydrologic Region (Region 5) or the North Coast Hydrologic Region (Region 1). However, some water bodies in the San Gabriel Mountains exhibit sufficient recent fish tissue Hg data to qualify for advisories, for example, Pyramid Lake, Lake Piru, Castaic Lake, and Lake Hansen within the South Coast Hydrologic Region (Davis et al., 2009).

Other Trace Metals and Organic Compounds

Other natural or human-generated contaminants such as trace metals or synthetic organic compounds (e.g., pesticides) may be present in the sediments where suction dredging activities typically occur. Other trace metals that may be present in California water bodies include, but are not limited to, arsenic, copper, silver, zinc, lead, chromium, nickel, antimony, cadmium, and selenium. Release of these metals is dependent on many factors, including levels present in sediment, which are variable from stream to stream and between reaches of a single stream. Little data is available to comprehensively characterize concentrations of these constituents in California rivers and streams.

TABLE 4.2-2. MERCURY CRITERIA IN FISH TISSUE AND WATER FOR PROTECTION OF HUMAN HEALTH AND WILDLIFE

Medium	Basis	Target Population	Criterion (mg/kg)	Reference Dose, µg/kg/d	Body Wt, kg	Consumption Rate, kg/day	Reference
Fish-tissue	Human Health	US General Population mean	0.3	0.1	70	0.0175	U.S. EPA, 2001
		California General Population mean	0.17	0.1	70	0.0305	U.S. EPA, 2001; Office of Environmental Health Hazard Assessment (OEHHA), 2001
		California 95th percentile	0.06	0.1	70	0.0852	USEPA, 2001; OEHHA, 2001
		California Sensitive Populations [Fish Contaminant Goal]	0.22	0.1	70	0.032	OEHHA, 2008
	Wildlife	Mammalian	0.1	18	*	*	U.S. EPA, 1995; Yeardley, 1998
		Avian	0.02	21	*	*	USEPA, 1995; Yeardley, 1998
Water (unfiltered)		Human	1.8 nanograms per liter (ng/L)				U.S. EPA, 1995
		Fish-eating Wildlife	1.3 ng/L				U.S. EPA, 1995

**=Mammalian criterion based on geometric mean of criteria for mink and river otter, whose body weights are 0.6 and 6.7 kilograms (kg), respectively, and consumption rates are 0.14 and 1.124 kg/day, respectively. Avian criterion based on geometric mean of criteria for Bald Eagle, Osprey, and Belted Kingfisher, whose body weights are 5.25, 1.75, and 0.15 kg, respectively, and whose consumption rates are 0.566, 0.350, and 0.068 kg, respectively.*

TABLE 4.2-3. WATER BODIES IN CALIFORNIA WHERE OEHHA CONSUMPTION ADVISORIES HAVE BEEN ISSUED FOR MERCURY IN ASSOCIATION WITH HISTORIC GOLD MINING

Water Body	Species with Highest Mean Tissue Concentration (n >= 6)	Highest Species Mean Tissue Concentration (mg/kg, wet weight)[1]	N [2]	Region
Lower Feather River	Striped Bass	1.27	6	5
Englebright Lake	Bass	0.45	56	5
Camp Far West Reservoir	Largemouth and Spotted Bass	0.85	38	5
Lake Combie	Largemouth Bass	0.9	19	5
Rollins Reservoir	Channel Catfish	0.36	13	5
Lower American River	Largemouth Bass	0.81	48	5
Lake Natoma	Channel Catfish	1.474	11	5
Lake Folsom	Spotted Bass	0.71	16	5
Cosumnes River	Crappie	1.38	11	5
Lower Mokelumne River	Pikeminnow	0.82	11	5
Lower Sacramento River and North Delta	Smallmouth Bass	0.86	13	5
Central and South Delta	Largemouth Bass	0.3	369	5
Trinity River Watershed	Largemouth Bass	0.55	24	1

[1] OEHHA fish tissue concentration thresholds for establishing fish consumption advisories vary from 0.06-0.22 milligrams per kilogram (mg/kg) depending on exposure routes and affected population of concern.

[2] N = number of samples of all fish species monitored and assessed.

Legacy chlorinated hydrocarbon pesticides (e.g., dieldrin, DDT, and chlordane) and PCBs can be transported to remote or high altitude waterways by atmospheric deposition. Legacy pesticides are rarely above public health thresholds in fish in upper watershed streams and lakes. PCBs have been found above threshold values in fish from lakes primarily in lowland areas of the state (Davis et al., 2009). PCB concentrations were uniformly below threshold values in fish from high elevation lakes of the Sierra Nevada and northern California mountains (Davis et al., 2009).

4.2.4 Impact Analysis

The methodology described below accounts for activities conducted in accordance with the proposed regulations contained in Chapter 2. Additional or more extensive impacts related to water quality may result for those suction dredge activities requiring notification under Fish and Game Code section 1602. Notification is required for the following activities:

- Use of gas or electric powered winches for the movement of instream boulders or wood to facilitate suction dredge activities;
- Temporary or permanent flow diversions, impoundments, or dams constructed for the purposes of facilitating suction dredge activities;

- Suction dredging within lakes; and
- Use of a dredge with an intake nozzle greater than 4 inches in diameter.

A general description of how such activities requiring Fish and Game Code section 1602 notification would deviate from the impact findings are described at the end of the impact section below.

Findings of 1994 Environmental Impact Report

The water quality impacts analyzed in the 1994 EIR analyzed included impacts resulting from accidental spills, turbidity, and heavy metals. Findings for each of these issues were as follows:

Accidental Spills

The 1994 EIR found that effects on water quality as a result of accidental oil or gas spills from the engine component of the dredges are less-than-significant. Although the regulations do not specifically address water quality issues except as they relate to fish, the 1994 EIR notes that suction dredgers are required to comply with Fish and Game Code 5650 which prohibits the deposition of petroleum or other materials deleterious to fish and wildlife into state waters.

Turbidity

The 1994 EIR found that suction dredge mining would have a less-than-significant impact on water quality related to temporary increased turbidity levels caused by the resuspension of stream bed sediments.

Heavy Metals

The 1994 EIR found that suction dredge mining would have a less-than-significant impact on water quality as it relates to mercury present in streams. At the time of the 1994 Report, adverse effects related to mercury were cited as being those associated with re-release of mercury after capture in the dredging equipment. The report noted that Fish and Game Code 5650 addresses pollution of this nature.

In addition, the 1994 Report found that suction dredging would have a beneficial impact related to the capture and removal of lead from waterways, which would help to keep lead from entering the foodchain (i.e., primarily waterfowl).

Methodology

The following sections describe: (a) a summary of the Literature Review (see Appendix D) that provided the focus for this Water Quality and Toxicology assessment; (b) screening of potential constituents of concern to be assessed in detail; and, (c) the methodologies used to assess the effects of suction dredging activity that might occur through implementation of the Program.

Literature Review of Water Quality Effects of Suction Dredging

The major findings of the Literature Review (Appendix D) related to water quality and toxicology that were used, in part, to inform and direct the focus of the water quality impact assessments are as follows.

- There is little information available regarding the environmental effects of dredge site development such as site access, land-side encampments, and fuel/chemical spills. There remains a lack of any rigorous studies on this subject.
- All scientific studies to date suggest that the effects of suction dredging on turbidity and suspended sediment concentrations as it relates to water clarity are limited to the area immediately downstream of the dredging for the duration of active dredging.
- The effects of Hg contamination from historic activities in California are being extensively studied and there is substantial literature regarding Hg fate and transport. However, there are very few published studies specifically addressing the effects of suction dredging on Hg fate and transport processes. Since the time the Literature Review (Appendix D) was prepared, USGS scientists and Hg experts provided CDFG with preliminary results of their recent research in the Yuba River which is specifically focused on assessing the potential discharge of elemental Hg and Hg enriched suspended sediment from suction dredging activities. This new information and data from USGS was used in formulating the approach to this assessment of the Program. Ongoing studies are evaluating the relative magnitude of dredging-related effects on Hg discharges compared to other causes.
- The human and aquatic toxicity of Hg discharged from suction dredging operations has not been studied. Studies have shown that remobilized Hg can be converted to MeHg, which can bioaccumulate up the food chain, and is therefore of concern to biota and human health through fish and shellfish consumption. Mercury hotspots (i.e., places where large amounts of Hg are concentrated) are known to exist but there has been no concerted effort to locate them. Fine particles (<63 µm) in sediment in historic gold mining regions have been shown to contain at least an order of magnitude higher concentration of Hg than larger size fractions. The suspended particle size fractions that are enriched in Hg and discharged from suction dredges is under investigation by USGS in the Yuba River system described above. The reactivity and speciation of mercury-enriched sediment resuspended by dredging operations is also under investigation. The transport, reactivity, and speciation of "floured" Hg (i.e., microscopic-size particles of elemental Hg created by the physical agitation and fractionation of larger particles) has not been studied. Dissolved Hg, elemental Hg, and fine particle/colloid bound Hg may be of concern for methylation (i.e., conversion to methyl mercury, which is a bioavailable form that can result in toxic effects and bioaccumulation up the food chain) in the vicinity of dredge sites if conditions are favorable or transported long distances to downstream environments (e.g., reservoirs, wetlands) favorable to methylation. Therefore, potential impacts may occur both near and away from the actual dredging locations.

- There is very little information available on the potential operations-related effects of dredging to discharges of other constituents that might reasonably be present in sediment and discharged to the water when disturbed by suction dredging activity (e.g., trace metals, organic compounds, and nutrients) or otherwise be affected by physical changes in the environment (e.g., water temperature and dissolved oxygen concentrations). Other metals that may be discharged during suction dredging include arsenic, copper, silver, zinc, lead, chromium, nickel, antimony, cadmium, and selenium, but the distribution of metals on different particle sizes, transport of released metals, biotic uptake, etc., have not been studied. Similarly, there have been no studies undertaken to determine whether suction dredging releases legacy pesticides and, if so, what the fate, transport, and effects of the chemicals are downstream.

Screening of Constituents for Assessment Purposes

Results of the Literature Review as summarized above, and in detail in Appendix D, were used to determine constituents requiring further detailed assessment and whether the impact assessment for a given water quality constituent would be qualitative (e.g., contaminants from dredge site development and use, due to the lack of quantitative information available), semi-quantitative (e.g., Hg, due to the availability of some quantitative information), or fully quantitative. Furthermore, results of the Literature Review showed that Hg was the constituent for which the assessment would be most complex.

Constituents of Concern Raised in Public Review Comments

Comments were received that indicated a concern for the effects of suction dredging on water temperature and effects of blue-green algae on suction dredgers themselves. As previously noted, the literature review provided a primary basis of information for identifying constituents of concern to be addressed by the water quality impact assessment. However, no scientific literature was identified that indicated temperature or nuisance blue-green algae were constituents of concern for suction dredging activity. Because data are lacking with respect to the effects of dredging-related turbidity and suspended sediment on water temperature, the assessment relies on scientific principles, facts, assumptions based on facts, and professional judgment.

With respect to the effects of blue-green algae (i.e., cyanobacteria) on suction dredgers, the exposure of dredging operators to nuisance blue-green algae blooms would be a risk incurred by the operators. Many blue-green algal species, when present at high enough population levels (i.e., known as blooms) and in concert with other factors (e.g., warm weather and water temperatures, sufficient light and algal nutrients), have the potential to produce specific intercellular toxins which can cause a variety of health effects to humans and animals (SWRCB, 2008). The potential health effects can be associated with skin contact (e.g., rashes, eye irritation), ingestion (e.g., gastrointestinal illness, liver damage), or inhalation exposure routes. Blue-green blooms that reach levels where presence of cyanotoxin production could produce health effects are typically associated with calm or stagnant water conditions (e.g., lakes, ponds) and do not usually attain high population densities in highly flushed environments with retention times (i.e. the time it takes for the water volume to be exchanged once) of less than 5-10 days, or in the open channels of flowing rivers (SWRCB, 2008). The risks to dredging operators from potential exposure to

blue-green algae blooms and cyanotoxins, which are a background condition that might occur where dredging is conducted, is not a responsibility of the state. Moreover, CDFG's adoption of dredging regulations under the Program would not in itself affect the allowable dredging activity such that exposure of operators to cyanotoxins would be higher than without the Program. In fact, the Program generally prohibits dredging activity in lakes and reservoirs without specific approval from CDFG and applicable RWQCB, and thus would limit potential exposure in these quiescent water bodies where blue-green algae blooms are more likely to occur. Therefore, because the Program would not adversely affect the exposure of operators to existing or potential future blue-green algae cyanotoxins, this issue is not addressed further in this assessment.

Assessment Methods for Effects of Dredge Site Development and Use

As noted in the Literature Review, there is very little new data available since the preparation of the 1994 EIR, and no substantial changes in the scientific understanding of the effects from development and operations of encampments used for suction dredging operations. Previous suction dredging activity in California permitted through CDFG's former permit system did not include formal record keeping, monitoring, or inspection protocols. Therefore, there is no specific information available regarding the distribution or location of dredging activities associated with the permits that were issued in previous years. There also is no available information maintained on any enforcement actions under the previous permit system. The Suction Dredger Survey conducted by CDFG as part of this EIR provides some level of information on the level of suction dredging activity, locations, frequency, and methods used in 2008. The representativeness of survey information used in the impact assessment was considered, as it is likely that there is no consistent and comprehensive information available. Due to the lack of specific and quantitative information, the assessment of effects from encampments on water quality is necessarily qualitative. The assessment of potential effects associated with encampment activities is qualitative and based on the Literature Review and knowledge of potential waste discharges, applicable existing regulations and terms and conditions of the Program that would serve to limit pollutant discharges, and considers dredging equipment features and practices that would be expected to influence the magnitude of potential adverse effects on water quality.

Assessment Methods for Effects of Dredging-Related Increases in Turbidity/TSS

As noted in the Literature Review, there is very little new dredging-specific data available since the preparation of the 1994 EIR, and no substantial changes in the scientific understanding of the effects of increased turbidity/TSS from suction dredging operations with respect to water clarity. The impact assessment is based on the location, frequency, duration, and size of discharge plumes, and characterization of turbidity/TSS levels within suction dredger plumes, that are anticipated to occur downstream of the dredging site based on the available literature. Prior literature studies regarding the effects of dredging activity on sediment disturbance and related effects to turbidity/TSS discharges have addressed a relatively wide range of environmental conditions. However, as the scope of any individual such study was typically project-specific, or addressed a limited set of variables (e.g., location, equipment, monitoring parameters), the available data likely does not address every possible combination of variables in which turbidity/TSS discharges may occur. Consequently, the assessment of effects of turbidity/TSS on beneficial uses necessarily involves qualitative analysis based on best professional judgment of the

scientific evidence. The turbidity/TSS levels created by suction dredging activities were compared to regulatory objectives and to tolerances of fish and aquatic organisms, and other applicable thresholds considered protective of beneficial uses. Recreational activity (e.g., swimming, boating) and visual resources may be affected by water clarity and specific turbidity/TSS discharge conditions associated with suction dredging. The "Aesthetics" and "Recreation" chapters have additional information regarding the potential effects that suction dredging activity may have on these resources. In assessing the potential effects and magnitude of turbidity/TSS caused by dredging activities, the dispersion and attenuation of the dredging plume that occurs downstream of dredging was considered.

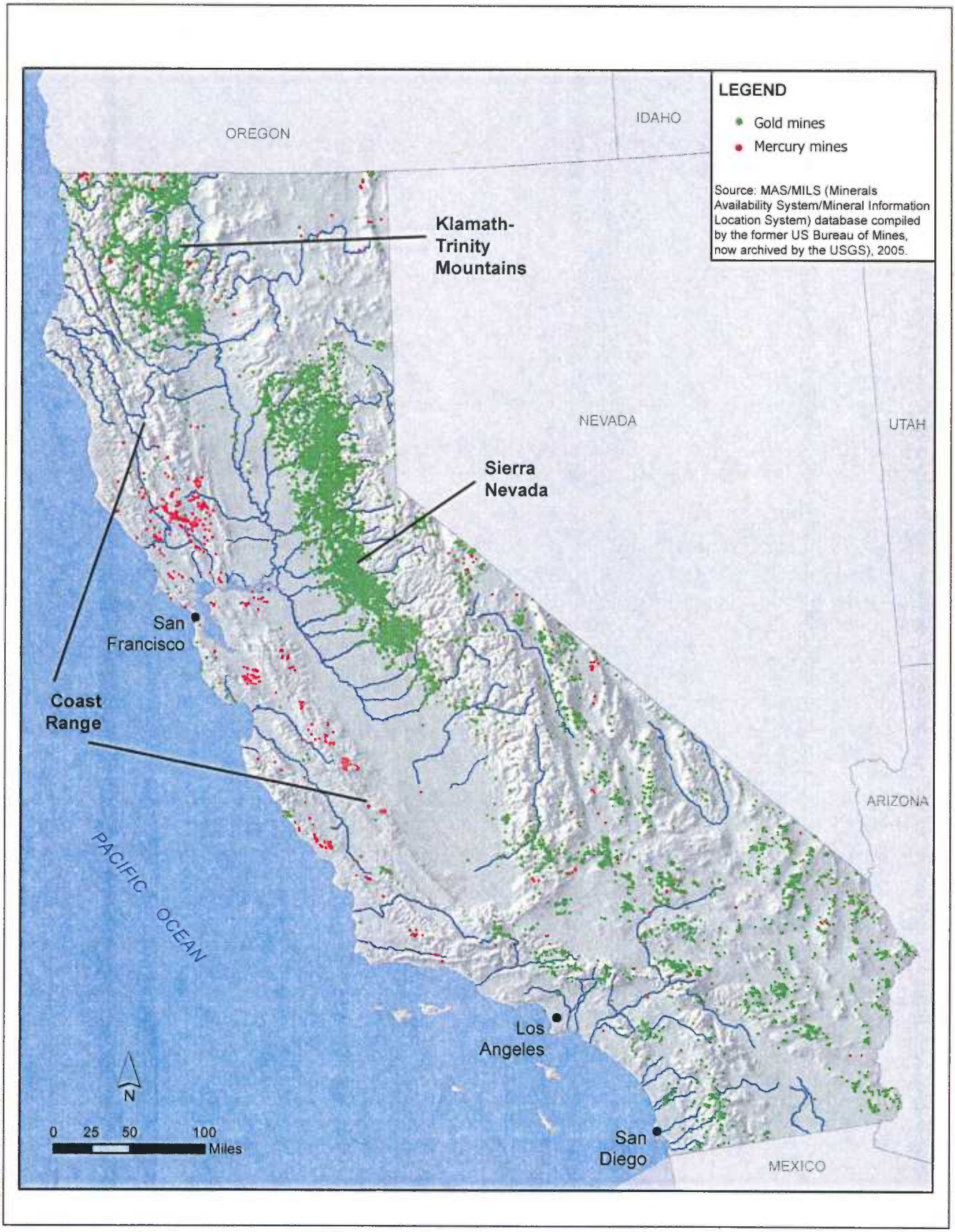
Assessment Methods for Effects of Dredging-Related Mercury Discharges

A methodology was developed to address whether suction dredging causes water quality conditions that would exceed thresholds of significance. A conceptual model, described below, was developed to examine the discharge, transport, transformation and bioaccumulation of Hg in aquatic organisms from suction dredging and background watershed sources and the potential for environmental effects of Hg resuspension and discharge from suction dredging operations. Potential toxicological risks of Hg to higher trophic levels in the wildlife food chain are also discussed in Chapter 4.3 *Biological Resources.*

Geographic Assessment

Where high sediment Hg levels and suction dredging occur in the same areas, the resuspension of sediment-associated Hg may have the potential to increase the bioaccumulation of Hg in wildlife (including fish and aquatic organisms), and thereby result in increased human health risks to people and wildlife that eat these organisms. Suction dredgers were not required to report their dredging locations under CDFG's previous suction dredging permit system, so it is not possible to document exactly where in the state suction dredging occurred and how frequently it occurred at various locations. CDFG's Suction Dredger Survey of 2008 permit holders indicates that most dredging activity occurred in the central Sierra Nevada Mountain counties, with lesser amounts in the known gold-bearing areas of Shasta and Trinity counties and several southern California counties. Given that gold still occurs in watersheds in historic gold mining areas, the spatial distribution of historic gold mining districts and mines themselves can be used to identify watersheds where suction dredging would resume upon implementation of the Program. Moreover, Hg was used in large quantities at historic gold mines and was discharged with mine waste (hydraulic mining debris, mill tailings, and dredge spoils from dragline and bucket-line dredging) into nearby watersheds. Consequently, suspended sediment enriched in Hg and elemental Hg can be found in these watersheds. A number of TMDLs have been developed or are being developed in California for mercury. Of most relevance to suction dredging are the American River Mercury TMDL (in development), Sacramento-San Joaquin Delta Methylmercury TMDL (in development), and San Francisco Bay Mercury TMDL (adopted). Because watersheds draining into these areas also contain gold and gold bound with Hg, they are targeted by suction dredgers.

Three regions where the assessment focused are based on anecdotal evidence of where suction dredging occurs and where gold has been historically located. These are the Sierra Nevada, the Klamath-Trinity Mountains, and the San Gabriel Mountains (Figure 4.2-2). Researchers from USGS have collected sediment Hg data in the Trinity River system, but at



Horizon WATER and ENVIRONMENT

Figure 4.2-2
Locations of Past-Producing Gold and Mercury Mines in California

the time of this writing, these data were not available for analysis. Little data exists in the rest of the Klamath-Trinity and San Gabriel mountains. For the purposes of the detailed quantitative assessment, the focus will be on the Sierra Nevada, and the South Yuba River will be used as a representative of Sierra Nevada streams and rivers due to the relatively large number of studies and amount of data available for this river. Assessments were accomplished for the following locations: 1) in-stream, 2) Englebright Lake, the first reservoir downstream, and 3) the San Francisco-San Joaquin River Delta. There are several reasons why such an assessment provides a good surrogate for all Sierra Nevada streams. Most Sierra Nevada streams possess similar geology, experience similar climate and rainfall, were located near extensive gold-mining operations, have at least one reservoir before joining the Sacramento or San Joaquin Rivers (with the exception of the Cosumnes River), and eventually drain into the Delta. The South Yuba River watershed experienced the most intensive level of hydraulic mining, in which mercury-contaminated hydraulic mining debris was produced and discharged into the watershed. When normalized by watershed area, it still received the greatest volume of hydraulic mining sediment production, but was only slightly above its smaller neighbors Deer Creek, the Bear River, and the similarly sized North Fork of the American River (James, 1999). Methodology for translating results of the assessment to other water-bodies and geographical regions is discussed in the section *"Geographic Translation."*

Conceptual Model and Quantitative Assessment Approach

The assessment of suction dredging-related effects on the potential for Hg discharge, transport, and contribution to fish uptake and bioaccumulation involved conducting quantitative discharge, transport, and fate calculations based primarily on recent field sediment and special study data collected by the USGS. A conceptual model was developed to frame the assessment. The model consists of four elements: 1) discharge of Hg to the stream from suction dredging; 2) discharge of Hg from background watershed sources; 3) transport of discharged Hg; and, 4) transformation/bioaccumulation of Hg. The elements of the conceptual model are shown in Figure 4.2-3. The elements of the model do not necessarily occur sequentially or at the same time. Transformation and bioaccumulation can occur simultaneously with transport and discharge. The specific assessment approach for each element is detailed in the impact assessment discussion.

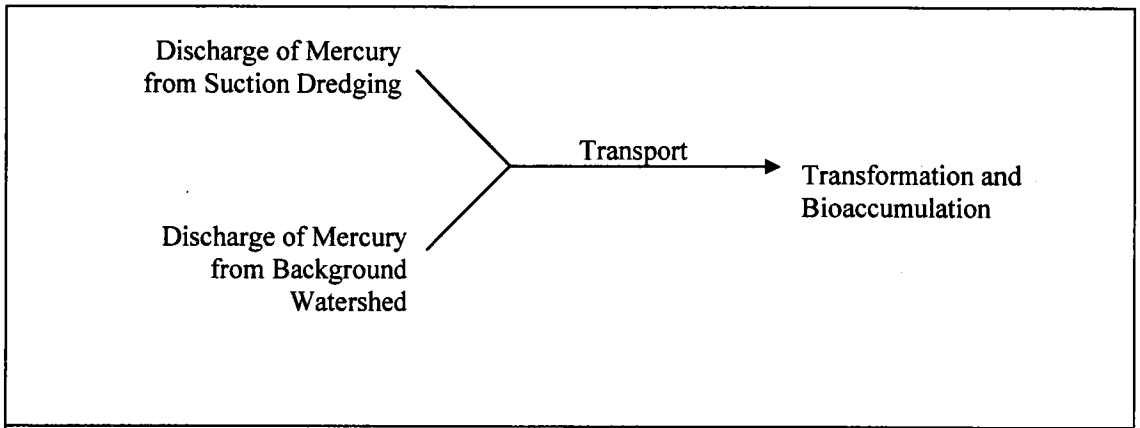


FIGURE 4.2-3. CONCEPTUAL MODEL FOR THE MERCURY IMPACT ASSESSMENT

Briefly, discharge of Hg from suction dredging was based primarily on field characterization of Hg contaminated sediments (Fleck et al., 2011). Background watershed Hg loading estimates were utilized to compare to suction dredge discharge estimates (Alpers et al., in prep). Transport of Hg associated with sediments was based on particle size distribution characterization of suspended sediments (Curtis et al., 2006) and assessment of net deposition in Englebright Lake (Alpers et al., in prep; Alpers et al., 2006). Transformation and bioaccumulation characteristics were derived from a variety of literature sources. Additional information characterizing potential impacts of elemental Hg was also used in the assessment.

Other Trace Metals

As noted in the Literature Review (Appendix D), there are very little data regarding the effects of suction dredging on trace metals mobilization. Due to the limited quantitative information, the water quality impact assessment for trace metals is largely qualitative and based on the anticipated level and nature of dredging activity that is projected to occur. Results of the Literature Review were used to characterize existing measurements of trace metals in suction dredge plumes. Measured sediment concentrations of arsenic, copper, silver, zinc, lead, chromium, nickel, and cadmium were combined with different TSS levels to characterize the potential to increase receiving water metals concentrations above aquatic life criteria. The frequency, magnitude, and size of discharge plumes were assessed relative to dilution and near field settling.

Organic Chemicals

As noted in the Literature Review (Appendix D), there is very little data regarding the effects of suction dredging on synthetic organic compounds mobilization. Moreover, there is no comprehensive information regarding presence of organic compounds in aquatic sediments in the areas of California where suction dredging is likely to occur. Unlike Hg or any other metals present as a result of natural ore, there is little reason to suspect that significant numbers of hot-spots exist containing synthetic organic compounds, or that their magnitude relative to average background levels is very great. Due to the lack of specific and quantitative information, the water quality impact assessment for organic compounds is necessarily qualitative to characterize the potential to cause receiving water concentrations to exceed applicable criteria.

Criteria for Determining Significance

For the purposes of this analysis, the Proposed Program would result in a significant impact if it would:

- Increase levels of any priority pollutant or other regulated water quality parameter in a water body such that the water body would be expected to exceed state or federal numeric or narrative water quality criteria, or other relevant effect thresholds identified for this assessment, by frequency, magnitude, and geographic extent that would result in adverse effects on one or more beneficial uses.
- Result in substantial, long-term degradation of existing water quality that would cause substantial adverse effects to one or more beneficial uses of a water body.

- Increase levels of any bioaccumulative pollutant in a water body by frequency and magnitude such that body burdens in populations of aquatic organisms would be expected to measurably increase, thereby substantially increasing the health risks to wildlife (including fish) or humans consuming these organisms.

4.2.5 Environmental Impacts

Impact WQ-1. Effects of Contaminant Discharges from Dredge Site Development and Use (Less than Significant)

Persons conducting suction dredging may develop encampments near the locations where they are mining for short to extended periods of time. Development of camps on undeveloped lands, certain camping activities, and mining activities that occur within the camps have the potential to result in the additional discharges of wastes to water bodies, relative to baseline conditions. Encampment activities considered to have the potential to cause adverse water quality effects include development of access roads/trails, campsite development, and travel to and from the site. Development of new campsites at previously undisturbed locations, or establishing undeveloped campsites each year on private or public lands, may include disturbance or clearing of native vegetation and soils that could result in additional runoff and soil erosion during rain events, thus contributing to turbidity and suspended solids levels in surface water bodies. Miscellaneous camping activities include cooking, cleaning, pets, sanitary practices, and garbage disposal that, if not properly managed or occurring too close to water, can result in direct discharges of wastes into water bodies. Contaminants associated with these miscellaneous activities include organic matter, pathogens from fecal wastes, oil and grease, or synthetic chemicals in cleaning products. Activities related to mining include ore processing with chemicals such as nitric acid and general equipment maintenance, fuel storage, and fueling operations. Accidental spills of fuel or chemicals pose the greatest risk of contaminant discharges to the soil and water bodies. The most likely contaminants that could enter water bodies from different waste discharges associated with dredger encampments include sediment from land disturbances, decomposable organic matter, trash, inorganic chemicals [e.g., salts, nitrogen, and phosphorus], or pathogens, which are all generally non-toxic and are not bioaccumulative in organisms. Wastes in accidental spills may include oils, solvents, or other household products which may contain priority pollutants regulated under CTR criteria such as trace metals (e.g., copper, zinc) or synthetic organic compounds, which are capable of causing toxic effects. In general, the beneficial uses of water most likely to be affected by the contaminants potentially discharged by camping activities are aquatic life from the potential toxicity posed by compounds, and contact recreation and drinking water from contaminants that cause adverse human health problems when ingested (e.g., pathogens).

In general, it is anticipated that the types of encampment activities used by dredgers would depend on the presence of nearby facilities (e.g., restrooms, showers), environmental conditions, personal requirements, access, and expected duration of stay. Larger public park areas and private mining clubs often offer campgrounds and lodging facilities. Mining clubs also may try to limit the quantity of fuels brought in to campsites and recommend clearing of trash prior to departure. The more heavily used camping areas typically also provide chemical toilets and basic shower facilities. And, in addition to RV's and campers equipped with restroom facilities, personal port-a-potties and storage tanks are commonly

used by those who do not have easy access to existing facilities. Camping activities in developed private or public campgrounds are considered to provide sufficient features such as waste disposal and sanitary sewage systems that water resources would generally be protected from contamination by wastes.

CDFG does not monitor or record the type or amount of camping activities of those that have obtained dredging permits in the past. The results of the Suction Dredger Survey conducted by CDFG for this EIR included questions requesting information on the locations of dredging activity, types and amount of camping activities, and amount of off-road vehicle travel that occurred in the 2008 dredging season, which may provide some indication of the typical level of remote camping activity that occurs relative to the amount that occurs in developed areas or not involving camping activities. The Suction Dredger Survey results of in-state permit holders indicate that camping was the preferred option when dredging involved an overnight stay with stays at hotels/motels or with friends/family being much less frequent. Approximately 54% of the in-state permit holders reported camping in undeveloped campgrounds at least once, and 44% used developed campsites at least once. Compared to resident permit holders, a higher percentage of out-of-state permit holders stay overnight when dredging but the percentage of use for undeveloped campsites (54%) and developed campsite use (51%) is similar to resident permit holders. In general, although not fully quantified, the survey data indicate that the number of new encampments in previously undeveloped areas each year by recreational dredging activities is likely to be small. This is because suction dredgers reoccupy campsites in undeveloped area, and use developed facilities or self-contained recreational vehicles when possible. Encampments at undeveloped sites are also likely to be relatively dispersed.

No studies were found that evaluated problematic waste discharges at campsites used by suction dredgers. However, Department wardens have observed camps strewn with household garbage, industrial waste, large gas barrels, dilapidated vehicles, and human waste in the past (CDFG, 1994; Sierra Fund, 1999).

The Program itself does not address encampments, since such encampments are outside of the statutory authority granted to CDFG under Fish and Game Code Section 5653. However, existing federal land use regulations of the USFS and BLM regarding waste disposal and road construction methods exist to prevent erosion and drainage problems. Fish and Game Code sections 5650-5652 prohibit the discharge of petroleum products and (any substance or material deleterious to fish, plant life, mammals, or birds) and trash to waters of the state. Similar requirements generally apply to camping activities on other public or private lands. In addition, tips on keeping sanitary camps and guidance on proper waste control and disposal will be included in the "Best Management Practices" pamphlet, described in Chapter 2. Thus, existing federal, state and local regulations provide enforceable conditions for which CDFG and other local, state, or federal law enforcement officers can act to stop activities that may result in waste discharges from encampments.

Suction dredging encampments have the potential to result in waste discharges not occurring under the existing conditions. However, based on the limited amount of information available, suction dredging encampments are not anticipated to cause substantial erosion, runoff, or discharges of wastes and contaminants.. In particular, undeveloped encampment activities for dredging are typically dispersed and along streams in primarily rural areas of the state, and conducted on a seasonal and temporary basis.

Thus, implementation of the Program would not be anticipated to result in contaminant discharges that would be of sufficient magnitude, frequency, or geographic extent to adversely affect beneficial uses. Additionally, because of the seasonal, temporary, and intermittent character of most dredging activity, any water quality degradation that may occur is expected to be infrequent and dispersed and thus would not cause substantial or long-term degradation of water quality. Finally, development and use of encampments for suction dredging activities could result in the discharge of bioaccumulative constituents but the levels or frequencies would be too small to increase body burdens in aquatic organisms, or increase the health risks to wildlife (including fish and aquatic organisms) or humans consuming these organisms. Therefore, this impact is considered to be less than significant.

Impact WQ-2: Effects of Contaminant Discharges of Oil or Gasoline Used in Suction Dredges (Less than Significant)

Suction dredging operations subject to the Program are generally powered with a dredge-mounted gasoline engine. The size of motors used for dredging machines typically ranges from about 2 to 50 horsepower, depending on the nozzle size, which controls the rate and volume of sediment that can be moved in a period of time. Depending on the duration of dredging activity during a day, engines must be refueled and engine oil may need to be added or changed. Refueling and servicing of dredge motors, if not conducted responsibly, has the potential to result in accidental spills and discharges of fuel and oil to water or soil, where it may remain to be transported offsite by rainfall and runoff, or directly into water bodies. Additionally, engine refueling is often done with the dredge at the dredging location, and dredge engines are not generally fitted with spill-catching equipment.

In general, the beneficial uses of water most likely to be affected by discharges of petroleum-based products are aquatic life and drinking water. Petroleum-based products contain numerous hydrocarbon compounds known to be toxic to aquatic life, and in particular the class of compounds identified as polycyclic aromatic hydrocarbons (PAHs) which can be toxic at low concentrations. Oil products discharged to water also can create thin sheens on the water surface which can restrict the passage of gases between the atmosphere and water (e.g., dissolved oxygen [DO], carbon dioxide), thereby potentially resulting in lower DO levels available to aquatic organisms. Oils also can foul stream bank sediments thereby adversely affecting the habitat of aquatic insects. Petroleum-based contaminants can also impart undesirable tastes and odors in drinking water supplies, negatively affect recreational/aesthetic uses, and pose health risks to humans if present in drinking water supplies for extended periods of time.

As noted above, CDFG does not have records of inspection or enforcement activities regarding the activities of past suction dredger permit holders. While many suction dredgers likely adhere to basic rules of responsible behavior, there have been observations by Department wardens of unkempt encampments containing gas barrels and dilapidated vehicles (CDFG, 1994; Sierra Fund, 2009). This could indicate that there may be incidences of petroleum-based product discharges and runoff from campsite activities. To address the encampment issue, the proposed Program's requirements and guidance for encampments will be provided in the "Best Management Practices" pamphlet. Additionally, the amount of fuel and oil spilled each year into surface water caused by recreational dredging activities would be anticipated to be relatively small based on the size of dredging motors, total

number of dredges anticipated to operate under the Program, and low probability that any individual dredger would cause substantial fuel or oil spills while refueling.

The regulations under the Proposed Program include the requirement to take appropriate precautions for fuel storage and dredge refueling operations, which are expected to limit the risk of accidental spills and discharges of contaminants to water bodies. Additionally, existing Fish and Game Section 5650 regulations restrict the allowable fuel handling procedures. CDFG will also provide guidance to permit holders related to appropriate spill control and response measures in the event of fuel or oil spills, or if leaks are detected. Such guidance will be incorporated into the "Best Management Practices" document. Thus, the Program and existing state regulations provide enforceable conditions for which CDFG and other local, state, or federal law enforcement officers can act to stop activities that may result in fuel/oil spills or discharges or that are inconsistent with the Program.

Based on this assessment, the Program would result in limited potential for substantial discharges of petroleum-based products. Based on the dispersed and temporary character of dredging activities, and restrictions under the Program included for the purpose of limiting accidental spills of petroleum products, it is anticipated that the potential for substantial quantities or frequent discharges of contaminants to water bodies would be limited. Thus, implementation of the Program would not be anticipated to result in contaminant discharges that would be of sufficient magnitude, frequency, and geographic extent to adversely affect beneficial uses. Because dredging activities are largely conducted on a seasonal, temporary, and intermittent basis in California, any near-term water quality degradation that may occur is expected to be dispersed.. Finally, while potential discharges of petroleum products in associated with dredging activities could result in the discharge of bioaccumulative constituents, the levels or frequency would be too small to measurably increase body burdens in aquatic organisms, or increase the health risks to wildlife (including fish and aquatic organisms) or humans consuming these organisms. Therefore, this impact is considered to be less than significant.

Impact WQ-3. Effects of Turbidity/TSS Discharges from Suction Dredging (Less than Significant)

Resuspension of coarse and fine sediments into the water column by suction dredging activity is a function of several factors, which primarily include: (a) sediment substrate characteristics; (b) dredge motor horsepower and capacity for intake of material, which is dictated by the diameter of the intake nozzle and hose; (c) specific methods, rate of dredging, and skill of the dredge operator; and, (d) river conditions and streamflow characteristics (i.e., depth, velocity, and hydraulic factors). Sediment resuspension from suction dredging activity can increase water turbidity and TSS levels immediately downstream of the dredging site (i.e., near-field effects) and increase the transport of fine, colloidal material extended distances downstream (i.e., far-field effects) or otherwise contribute to additional sediment transport via exposure of deposited dredge material to later transport by higher-energy streamflow events than were present at the time the dredge material was deposited.

As determined in the Literature Review (Appendix D), the available scientific studies of suction dredging suggest that the effects on turbidity and suspended sediment concentrations on aspects of water clarity and physical effects to aquatic organisms are

limited to the area immediately downstream of the dredging for the duration of active dredging. It should be noted that the far-field transport of finer suspended sediment for greater distances downstream of dredging activity is generally considered to be a small fraction of the mass of material disturbed in the near-field dredging plume, and is not associated with visible water clarity or physical effects to organisms. However, it also should be noted that the finer suspended sediment transported long distances downstream may provide a disproportionally higher amount of surface area and binding sites for other water quality contaminants (e.g., mercury, organic compounds) that also are important to beneficial uses. The effects of far-field transport of other contaminants associated with suspended sediment is addressed further below in the impact assessments for mercury, metals, and organic compounds.

Generally, suction dredging causes turbidities of between 15 and 50 NTUs immediately downstream of the operation, with background levels returning between 50 and 160 meters downstream, and in some cases in as short as 11 meters (Harvey, 1986; Somer and Hassler, 1992; Thomas, 1985; Griffith and Andrews, 1981; Stern, 1988; Prussian et al., 1999). Among the available studies, the maximum reported TSS concentrations were up to 300-340 milligrams per liter (mg/L) immediately downstream of the dredge, decreasing to background levels within 160 meters (Thomas, 1985). Turbidity and suspended sediment levels were measured at 2 to 3 times higher than background levels at 50 meters downstream from dredging operations (Stern, 1988). Studies of large suction dredges (i.e., 8-10 inch) in Alaska indicated that turbidity plumes could be detected up to 320 meters downstream (Prussian, et. al., 1999). In one case, a turbidity plume was said to extend "well over a mile," but turbidity levels from this plume were "within limits" (USFS, 1996). The extent of the turbidity plume is influenced by the composition of the streambed; dredging in streams with higher proportions of fine materials will generate a more extensive turbidity plume (Harvey et al., 1982; Harvey, 1986). Also, observations of large dredges and many dredges in a water course suggest that turbidity increases can be large.

The assessment of potential effects of dredging-related disturbance on in-water concentrations of turbidity/TSS is based on the results of previous studies described above and on the known rate and intensity of the activities that would be anticipated to occur in California under the Program. Based on historical experience under CDFG's previous suction dredging regulations, dredging activity generally occurs only during the warmer, non-winter months. Dredging activity also is widely dispersed across the gold-bearing regions and streams in the state. CDFG's 1993 survey of the dredger community found that in-water suction dredging effort on the part of dredge operators averaged about 5 hours per day and 225 hours per year. Based on CDFG's recent survey of the recreational dredging community, the rates of participation and time spent conducting dredging is similar to historical survey results at approximately 5.4 hours of dredging per day, with in-state and out-of-state permit holders averaging 169 hours and 181 hours per year, respectively.

The beneficial uses considered to potentially be most sensitive to the increased water column concentrations of turbidity/TSS associated with recreational suction dredging activity are aquatic organisms, drinking water supplies, and recreational resources. Drinking water supplies can be adversely affected by turbidity/TSS levels if aesthetic appeal of the water supply is substantially reduced or additional treatment is required. However, based on the limited duration of dredging activity on an annual basis, dispersal of dredging operators over a large geographic area, limited size of the mixing zone and magnitude of

turbidity/TSS levels resulting from suction dredging activity, the turbidity/TSS resuspension associated with suction dredging would not be expected to adversely affect domestic or municipal drinking water supplies, recreational uses, or other non-aquatic life uses. As noted above, while available studies of suction dredging activity may not represent every possible combination of variables that may lead to creation of substantial turbidity/TSS plume conditions, the potential for adverse conditions would be anticipated to be the exception rather than commonplace. In particular, the exposure of water supply diversions to dredging-related disturbance would be anticipated to be low in rural and remote locations (i.e., potential for turbidity plumes to directly affect diversions would be unlikely). Moreover, domestic and municipal drinking water intakes are typically designed and constructed to remove, or accommodate fluctuations in turbidity/TSS changes, and small changes caused by dredging would be unlikely to result in any measurable change in water supply operations or need for additional treatment. Recreation beneficial uses potentially could be affected by dredging-related turbidity/TSS plumes if physical interference or aesthetic qualities were to be substantial enough to cause nuisance conditions. A nuisance water quality condition, as it relates to compliance with water quality standards specified in the Basin Plans for the state, is defined for a waste discharge activity under the Porter-Cologne as an effect that meets all of the following requirements:

> (1) injurious to health, or indecent or offensive to the senses, or interfering with the comfortable enjoyment of life or property;
>
> (2) affects and entire community or neighborhood, or any considerable number of persons.

Based on the typical characteristics of dredging activity (i.e., seasonal activity, dispersed) and potential effects associated with dredging-related turbidity plumes (i.e., relatively low magnitude concentrations and limited extent of downstream plumes), a single dredge would not be expected to preclude or have significant adverse effects on recreational uses or result in community-wide or offensive changes that rise to the level of nuisance conditions. As noted above, additional information regarding the effects of turbidity/TSS plumes from recreational dredging are discussed in Chapter 4.6 *Aesthetics* (Impact AES-2), and in Chapter 4.8 *Recreation* (Impact REC-1), with both analyses supporting the conclusion herein that turbidity/TSS plumes would not substantially adversely affect aesthetic and recreational resources. Consequently, the remainder of this impact assessment is focused on the potential turbidity/TSS effects of suction dredging to fisheries and aquatic resources and beneficial uses.

Comments received on the NOP for this EIR identified a concern for the potential effects of turbidity produced by suction dredging activity on water temperatures. Available information indicates that high levels of turbidity can affect shallow water temperatures in calm water bodies (e.g., lakes, reservoirs, and ponds) (Wetzel, 1983; Reed et. al., 1983). However, the large majority of heat input to a water body is a result of absorption of infrared wavelengths in the light spectrum, which occurs in a very shallow portion of the water column (i.e., less than about 1 meter) and is not affected to a large degree by differences in particulate matter content (Wetzel, 1983). Based on the relatively small area of sediment resuspension caused by dredging, transitory nature of turbidity plumes downstream of dredging through settling, dilution and dispersion, and the fact that turbidity does not result in a major contribution to the heat input to water, it is anticipated that suction dredging activity under the Program would have negligible, if even measurable,

effects on water temperature. Thus, the potential temperature effects would not exceed applicable Basin Plan temperature objectives which limit the allowable increase from controllable factors to less than 5 °F above background conditions.

Fish (and benthic macroinvertebrates) are generally not directly affected by suspended solids and turbidity, unless they reach relatively high levels. Suspended solids, particularly when at high levels, directly affect fish and macroinvertebrates through physiological effects, whereas turbidity generally has indirect effects via water clarity, primary production, food availability, and risk of predation. Numerous scientific studies conducted over the past 50–60 years indicate that there is no sharply defined concentration of turbidity or TSS above which aquatic communities are harmed. Rather, the magnitude and type of effects on aquatic life are species-specific and determined by concentration and type of suspended solids and turbidity, as well as the duration of exposure.

Numerous studies have been conducted over the years on the acute lethality of suspended solids to fish and macroinvertebrates over short (acute) exposure periods and elevated turbidity/TSS levels. Griffin (1938) stated that Pacific salmon and trout fingerlings lived for 3-4 weeks at suspended solids levels of 300-750 mg/L with short daily increases to 2,300-6,500 mg/L caused by stirring up sediments. A study published in 1951 investigated the direct short-term effects of suspended montmorillonite clay on 14 species of warmwater fishes which demonstrated that the tolerance of various fish species can differ widely, as described below (data presented in McKee and Wolf [1963]). In this study, suspended solids levels were increased for a short time each day by stirring the sediment. The lowest concentration of suspended solids for which mortality was observed was with pumpkinseed sunfish exposed to 16,500 mg/L daily for an average of 13 days. Rock bass was the species for which the lowest reported suspended solids level (38,250 mg/L) consistently caused mortality due to daily exposures of less than one week. Some level of mortality was observed for all species tested when exposed daily to 100,000 to 175,000 mg/L suspensions over a 1- to 2-week period. At suspended solids levels causing mortality, the opercular cavities of test fish were matted with clay, and the gills were covered with a layer of clay. Harmful non-lethal effects were first observed when suspended solids levels approached 20,000 mg/L. Smith, Kramer, and McLeod (1965) found that walleye experienced mortality within 72 hours of exposure to 100 mg/L of various wood pulps, but that 20,000 mg/L did not kill fathead minnows exposed for 96 hours. Lethal concentrations of suspended sediment are probably not produced by suction dredging because suction dredging activities do not produce lethal levels of TSS and because fish can usually avoid the dredging plumes (Bernell et al., 2003; Harvey, 1986). Thomas (1985) and Harvey (1986) indicate that in some streams where dredges operate at low density, suspended sediment is not a significant concern because effects are moderate, highly localized, and readily avoided by mobile organisms.

When the levels of suspended solids (and thus turbidity) become extremely high, they can adversely impact fish and macroinvertebrates by making it difficult for sight feeders to locate prey, causing abrasive injuries, clogging gills and respiratory passages, and/or by blanketing the streambed, thereby killing incubating fish eggs/larvae and benthic macroinvertebrates (McKee and Wolf, 1963; EIFAC, 1965; NAS, 1972; Alabaster and Lloyd, 1980). Decreased visibility in waters having moderately high turbidities can benefit the early life stages of fish and other prey organisms by providing visual protection from predators. Feeding by sculpin in laboratory channels was not detectably affected by

suspended sediment levels of 1,250 mg/L (Brusven and Rose, 1981). Hassler et al. (1986) found that sculpin were not significantly impaired by increased turbidity from dredges, and turbidity does not appear to affect feeding abilities of many species. Moreover, fish can avoid plumes with high concentrations. Additionally, any reduction in feeding efficiency of fish may be offset by reduced risk of predation.

Based on the available scientific literature, suction dredging activities conducted by operators permitted under the Program have the potential to cause localized, temporary, and intermittent instream resuspension of sediments, resulting in plumes containing elevated levels of turbidity and TSS (e.g., up to 300-340 mg/L) that would extend relatively short distances downstream from the dredging sites. The turbidity plumes created by suction dredging likely may exceed the applicable Basin Plan objectives, particularly in streams that have low background turbidity levels. Nevertheless, the available literature indicates that turbidity and TSS concentrations within suction dredging plumes are unlikely to exceed 50 NTUs and 340 mg/L, respectively, and are, therefore, not expected to approach or exceed the levels discussed above that would cause lethal or other adverse physiological effects to fisheries or other aquatic resources. Moreover, these potential highest dredging-caused turbidity/TSS levels would be expected to rapidly return to near background levels downstream within a few hundred meters or less of the dredge operation. Thus, while potentially exceeding a Basin Plan turbidity objective within temporary plumes created during dredging operations, suction dredging activity permitted under the Program is not expected to adversely affect aquatic organisms, which is the most sensitive beneficial use that could be affected by elevated turbidity/TSS levels.

The Program includes additional prohibitions that will largely avoid and limit the potential disturbance of fine sediments that can result in higher levels of turbidity and TSS. Prohibited activities include mechanized winching, highbanking, removal of vegetation, dredging outside of the wetted channel, and diversion of flows. Additionally, the proposed regulations require dredgers to take reasonable care to avoid dredging silt and clay materials. Thus, the Program would provide enforceable conditions by which CDFG and other local, state, or federal law enforcement officers can act to stop activities that may result in turbidity/TSS conditions that are inconsistent with the Program. It should be noted that dredging related discharges of turbidity/TSS, as an activity that has the ability to exceed numerical and narrative regulatory water quality objectives established in Basin Plans, may additionally be regulated by separate permitting authority of the RWQCBs pursuant to the CWA and Porter-Cologne. While no such permitting processes have been established by the RWQCBs for the Program discharges or for CDFG's previously authorized suction dredging program, such authority, if exercised, would have the potential to provide additional assurance that sufficient regulatory controls exist to prevent adverse effects to beneficial uses. At their discretion, individual RWQCBs or the SWRCB could develop a complementary permitting program for suction dredging activity to further address compliance with water quality regulations.

Based on this assessment, suction dredging activities anticipated to be conducted under the Program are not expected to result in substantial discharges of turbidity/TSS. Thus, implementation of the Program would not be anticipated to result in turbidity/TSS discharges that would be of sufficient magnitude, frequency, and geographic extent to adversely affect beneficial uses. Requirements of the Program are designed to prohibit and/or limit specific channel disturbance activities and thus, limit the potential for

excessively high turbidity/TSS levels from dredging activities. Because dredging activities are largely conducted on a seasonal, temporary, and intermittent basis in California, water quality degradation is expected to be infrequent and dispersed and thus not cause substantial, long-term degradation of water quality. Turbidity and TSS are not bioaccumulative constituents and thus are not a concern for uptake in the food chain or health risk to wildlife or humans. Therefore, this impact is considered to be less than significant.

Impact WQ-4. Effects of Mercury Resuspension and Discharge from Suction Dredging (Significant and Unavoidable)

The following sections describe the results of the assessment of Hg discharge, transport, transformation and bioaccumulation projected to occur through the implementation of the Proposed Program. The assessment follows the conceptual model elements presented previously in Figure 4.2-3, which include: (1) the discharge of Hg from suction dredging which are usually seasonally out of phase with background Hg releases; (2) discharge of Hg from background watershed sources; (3) transport; and (4) transformation and bioaccumulation.

Discharge of Mercury from Suction Dredging

Characterization of Sediment Available to Discharge from Suction Dredging

Recent field and laboratory studies were conducted by the USGS near the confluence of Humbug Creek and the South Yuba River. The objectives of the studies were to: 1) characterize Hg concentration and speciation in sediment of various size fractions (Lab), 2) characterize Hg and MeHg concentrations in local biota (field), and 3) assess the practicality and potential impacts of using suction dredging for removing Hg from an area contaminated with Hg (field). The laboratory study determined levels of total Hg (THg) and reactive mercury ($Hg(II)_R$) in sediments collected from a mid channel bar (Pit #1), and bank sediments collected near the confluence of the South Yuba River and Humbug Creek (Pit #2). The Pit #2 location was chosen by an experienced dredger as a promising location for gold. Humbug Creek was used as a conduit for hydraulic mining debris from Malakoff Diggins and hydraulic mining debris continues to slough into the river from bench deposits at the confluence. Figure 4.2-4 shows the particle size distribution of the sediment from the two sites. Figure 4.2-5 shows the concentration of THg associated with different size fractions that could be mobilized by suction dredging. Figure 4.2-6 shows total mass of THg found in bulk sediment by particle size. Particles with diameter of < 63 micrometers (μm) are classified as silt and clay, those with diameter between 63 μm and 2 millimeters (mm) are classified as sand, and those greater than 2 mm as gravel, pebble, cobble, or boulder.

The figures indicate that Pit #2 Bedrock Contact (Pit #2:BC) has a higher percentage of fine particles and higher concentrations of mercury associated with each size fraction. Fine particles contained more mercury on a per-mass basis than coarser particles. In the bulk sediment, Pit #2:BC contains 2-3 orders of magnitude more mercury mass with each size fraction. It should also be noted that Pit #2:BC contained elevated levels of $Hg(II)_R$, which will be discussed in more detail later. Levels from the bedrock contact layer of Pit #2 (Pit #2:BC) are assumed to be worst-case from a mercury release standpoint because they are from a location known to be contaminated with historic gold-mining Hg and because they are among the highest levels measured in California.

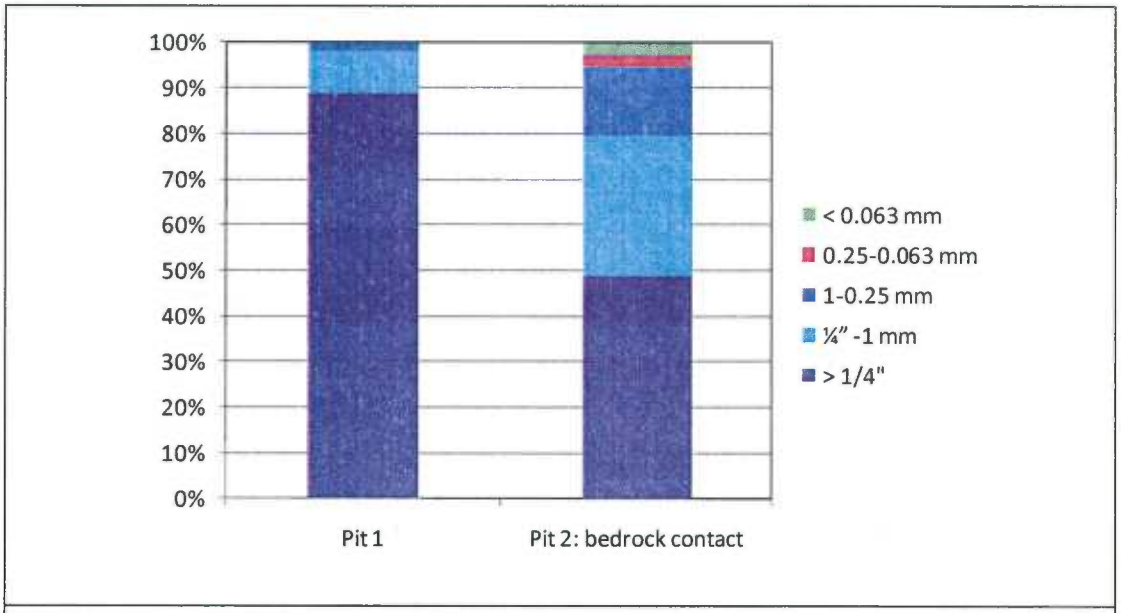


FIGURE 4.2-4. PARTICLE SIZE DISTRIBUTION OF SEDIMENTS COLLECTED IN THE SOUTH YUBA RIVER

(based on measurements in Fleck et al., 2011)

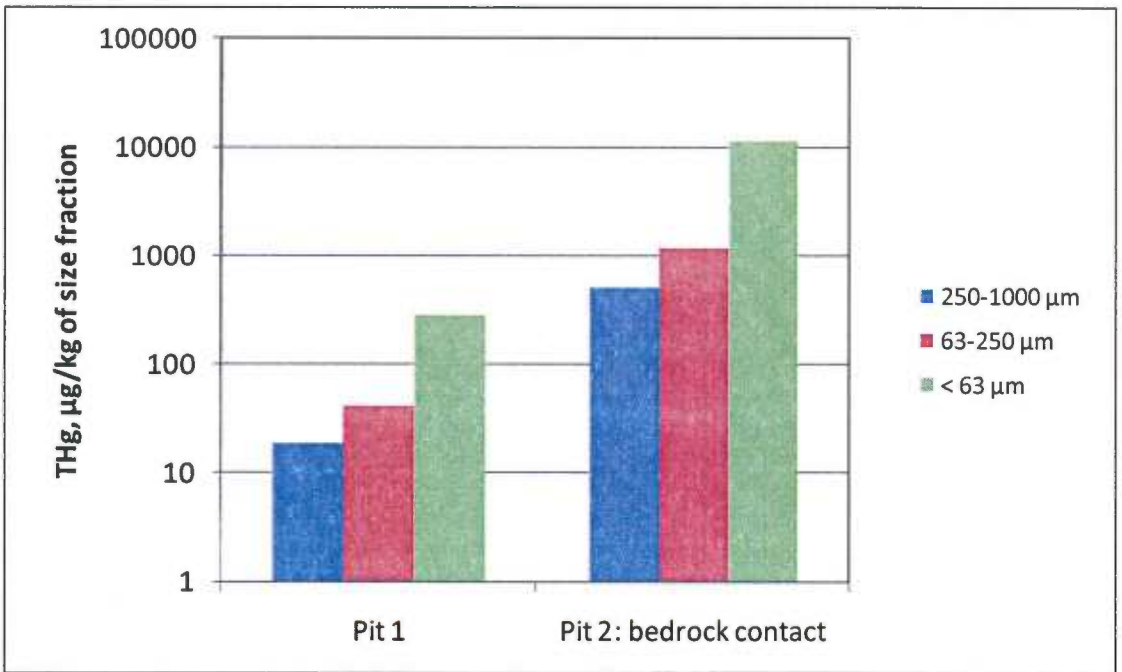


FIGURE 4.2-5. TOTAL MERCURY CONCENTRATIONS ASSOCIATED WITH DIFFERENT PARTICLE SIZES FOR SEDIMENTS COLLECTED IN THE SOUTH YUBA RIVER

(based on measurements in Fleck et al., 2011)

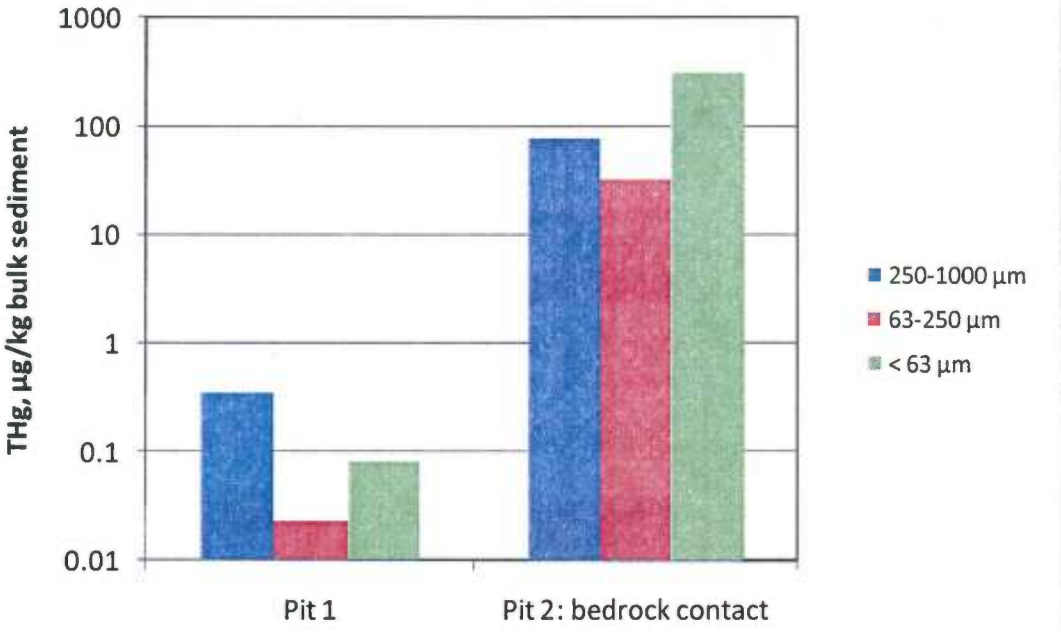


FIGURE 4.2-6. DISTRIBUTION OF MERCURY MASS IN BULK SEDIMENT COLLECTED IN THE SOUTH YUBA RIVER

(based on measurements in Fleck et al., 2011)

Characterization of Elemental Mercury Available to Discharge from Suction Dredging

However, it should be noted that few, if any, other sediments containing hydraulic mine debris in California have been characterized with respect to Hg, so it is possible that other similar sites would contain similarly high levels. Levels of Hg from Pit #1 are assumed to represent a typical site in the Sierra Nevada where mercury levels have been diluted by uncontaminated sediment from mass wasting in the watershed, because levels are comparable to those found in the Lower Yuba River and Lower Sacramento River (Domagalski, 2001), Sacramento-San Joaquin River Delta (Marvin-DiPasquale, 2003), and San Francisco Bay (San Francisco Estuary Institute, 2010; Fleck et al., 2011). Little to no publicly available sediment Hg data exist for the Klamath-Trinity or San Gabriel mountains, so it is unknown whether Pit #1 and Pit #2:BC Hg levels are representative of those locations. It is not known what the relative probability of encountering either case is for a suction dredger. However, it is expected that many dredging operations within the Sierra Foothills would occur at sites of THg levels between Pit #1 and Pit #2:BC levels characterized for this assessment. Because gold has a high grain density, it has a tendency to settle out of the water column in areas where less dense materials do not. Dredgers target these areas because concentrations of gold are expected. Because Hg also has a high density, these same areas tend to be places where Hg settles out, such as Pit #2:BC. Source assessment and sniping results suggested this location is not a unique hotspot within the South Yuba River watershed. Sniping is a method used by recreational gold miners to search for gold and other minerals of high grain density in bedrock fractures and other natural hydraulic traps on the river bottom. Since hydraulic mining was practiced throughout the

watershed, it is possible that Hg contaminated sediment layers are present throughout the lower region of the watershed (Fleck et al., 2011). The deeper sediments at these sites did not appear to be available to mobilization by storms. Indeed, Pit #2:BC sediment appears to be undisturbed since hydraulic mining days, over 100 years ago, but no attempt was made to quantitatively date the sediment. Although the extent to which these deep sediments that contain high concentrations of legacy mercury are targeted by suction dredgers is unknown, because they also contain high concentrations of legacy gold, it is reasonable to assume that these areas would be attractive to and targeted by suction dredgers.

Elemental mercury (i.e., liquid Hg(0)) has been visually documented at many locations throughout the Sierra Nevada, but generally has not been quantified. On the South Fork of the American River, near Lotus, Humphreys (2005) describes a location where elemental Hg was present and whose sediment Hg concentration (particle bound plus liquid Hg) was 1,170 mg/kg. In the Greenhorn Creek watershed, tributary to the Bear River, concentrations of elemental Hg were estimated via a field panning method at 14 locations and varied from 100 mg/kg (the estimated detection limit of the test) to 45,000 mg/kg, equivalent to 4.5% (Alpers et al., 2005). It is probable that elemental Hg is present at many additional locations throughout the California gold-country, but no systematic efforts have been made to locate these so-called "hot spots."

Where elemental Hg is present, suction dredging has been observed to result in the "flouring" of Hg droplets—that is, the breaking up of larger liquid droplets into many very small droplets (Humphreys, 2005; Silva, 1986). Flouring results in increased surface area contact with water of Hg droplets, which may affect transformation as described in the transformation section below. However, some have noted that the equipment used in this study is no longer in production, and suggested that modern equipment may result in less flouring (McCracken, 2007), although this has not been scientifically evaluated. Furthermore, it is not clear from the study whether Hg droplets were floured prior to being dredged or were floured as a result of the dredging. Nevertheless, floured Hg was present in the discharge from the suction dredge. Consequently, it unlikely that suction dredges would recover either floured mercury in sediment dredged, or mercury floured by the suction and turbulence of the dredge. Transport and transformation of elemental Hg is addressed below, but due to significant data gaps in our understanding of both, it is excluded from the initial quantitative assessment.

Impact of Dredging Operations Variables on Quantity of Mercury Discharged

Sediment characteristics discussed above were combined with estimates of sediment moved per hour for various nozzle sizes provided by a suction dredge manufacturer to estimate the quantity of Hg discharged per hour (See Table 3-2 in the Activity Description chapter). A 4 inch diameter nozzle size is the most typical size used by suction dredgers, based on the results of the Suction Dredger Survey. An 8 inch nozzle was chosen as it is the largest allowable nozzle in California (although analysis for a 10 inch nozzle was also conducted). This exercise was conducted for both the more typical background average Hg level sediment (Pit #1) and the worst-case hot-spot sediment (Pit #2:BC). Figure 4.2-7 shows the rate of discharge of THg in the <63 µm portion from different size suction dredges in the two sediments. Because Pit #2:BC has both a greater percentage of <63 µm particles and a much greater concentration of mercury associated with those particles, discharge rates from Pit #2:BC are more than 3 orders of magnitude greater than for Pit #1.

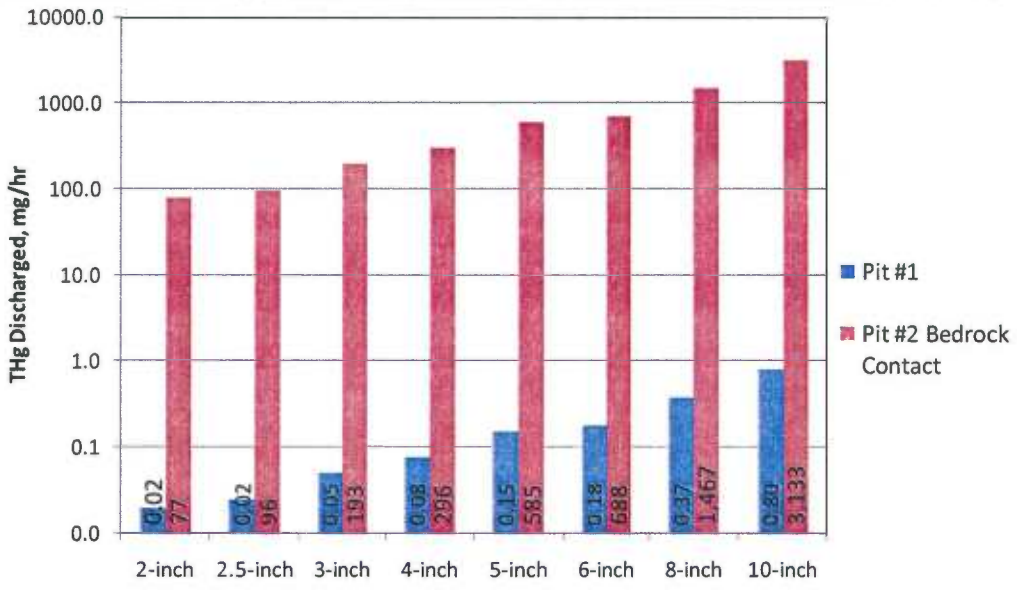


FIGURE 4.2-7. MERCURY DISCHARGE RATE FROM SUCTION DREDGING FOR DIFFERENT SUCTION DREDGE NOZZLE SIZES AND LOCATIONS WITHIN THE SOUTH YUBA RIVER

Existing Data of Total Recoverable Mercury in Suction Dredge Discharge

Very little direct data exists on the levels of THg found in suction dredge discharge. Existing data on TSS in suction dredge discharge or immediately downstream of the discharge was combined with sediment Hg levels to estimate total recoverable Hg in the discharge. Suspended sediment downstream of suction dredges has been reported as high as 340 mg/L (Thomas, 1985), but can also be as low as 1-2 mg/L (Stern, 1988). Based on the THg concentrations measured in Pit #1 and Pit #2:BC sediments, Table 4.2-4 shows estimated THg discharge that could occur from a suction dredging operation discharging suspended sediment at the 340 mg/L rate. The table shows that using a worst-case scenario of 340 mg/L TSS, total recoverable Hg is estimated to be 0.094 micrograms per liter (µg/L) with Pit #1 sediments. The same calculation at Pit #2:BC yields a total recoverable Hg concentration of 3.77 µg/L. Using a TSS of 3 mg/L, both locations yield total recoverable Hg levels below the CTR human health criterion of 0.05 µg/L. Humphreys (2005) measured suspended sediment THg concentration at 298 mg/kg but did not report the TSS concentration itself. In order for the THg concentration in this discharge to have been below 0.05 µg/L, TSS would have had to be < 1 mg/L, which is possible, but unlikely. Therefore, this discharge likely contained total recoverable Hg concentrations greater than the CTR criterion.

TABLE 4.2-4. ESTIMATED TOTAL RECOVERABLE MERCURY IN SUCTION DREDGE DISCHARGE AT PIT #1 AND PIT#2:BC SITES IN THE SOUTH YUBA RIVER

TSS (mg/L)	Pit #1 (µg/L) [a]	Pit #2:BC (µg/L) [b]
1	0.000276	0.0111
3	0.000828	0.0333
5	0.00138	**0.0555**
10	0.00276	**0.111**
50	0.0138	**0.555**
100	0.0276	**1.11**
200	**0.0552**	**2.22**
340 [c]	**0.0938**	**3.78**

Bold values indicate exceedances of CTR human health criterion of 0.05 µg/L total recoverable mercury.

[a] =Assumed only < 63 µm particles discharged from suction dredge; Pit #1 < 63 µm sediment concentration = 0.276 mg/kg.

[b] =Assumed only < 63 µm particles discharged from suction dredge; Pit #2:BC < 63 µm sediment concentration = 11.1 mg/kg.

[c] = Highest reported suction dredge discharge/plume TSS concentration found in the literature.

Discharge of Mercury from Background Watershed Sources

In contrast to Hg discharged from suction dredging, which occurs primarily during the summer, the majority of Hg from background watershed sources is discharged during the winter wet season, when runoff conditions contribute to high flows that scour sediments laden with Hg. Figure 4.2-8 shows measured Hg and discharge on the South Yuba River at Jones Bar for water years 2001-2004. This data was used to estimate annual Hg load of inflows to Englebright Lake for water years 2001-2004, which ranged from 3.4 to 7.2 kilograms per year (kg/yr) (Alpers et al., in prep). These years, overall, had below average rainfall and runoff. Water year 2001 loads were used as representative dry year loads, while water year 2003 loads were used as normal water year loads. Conditions for these years are shown in Table 4.2-5. Loads calculated for water year 2003 were based on measurements taken during the wet season only, a period when suction dredges typically are not operated. Therefore, values for water year 2003 are an estimated minimum overall load for that year. However, because the majority of background Hg transport occurs during the wet season, this is a good estimate of the true rainfall-induced watershed load for this water year. Loads calculated for water year 2001 were based on measurements during both the wet and dry season. It should be noted that these studies were not designed to detect suspended sediment pulses from operating dredges. Sampling frequency was biased towards winter when both flows and suspended sediment loads are high but variable. Less sampling was performed during the summer when flows are low and stable and ambient turbidity/TSS loads are low.

Sampling frequency for both cited studies was no more than once a month during the summer, almost always occurred on weekday mornings, and took about an hour to perform. Such sampling would not be expected to detect pulse flows from dredges that are frequently operated on weekends. However, given this, it is possible that suction dredges were contributing to the annual Hg load calculated, but Hg levels do not appear to reflect

unusually high concentrations during the dry season. Given this, there are inherent uncertainties to the Hg loading estimates.

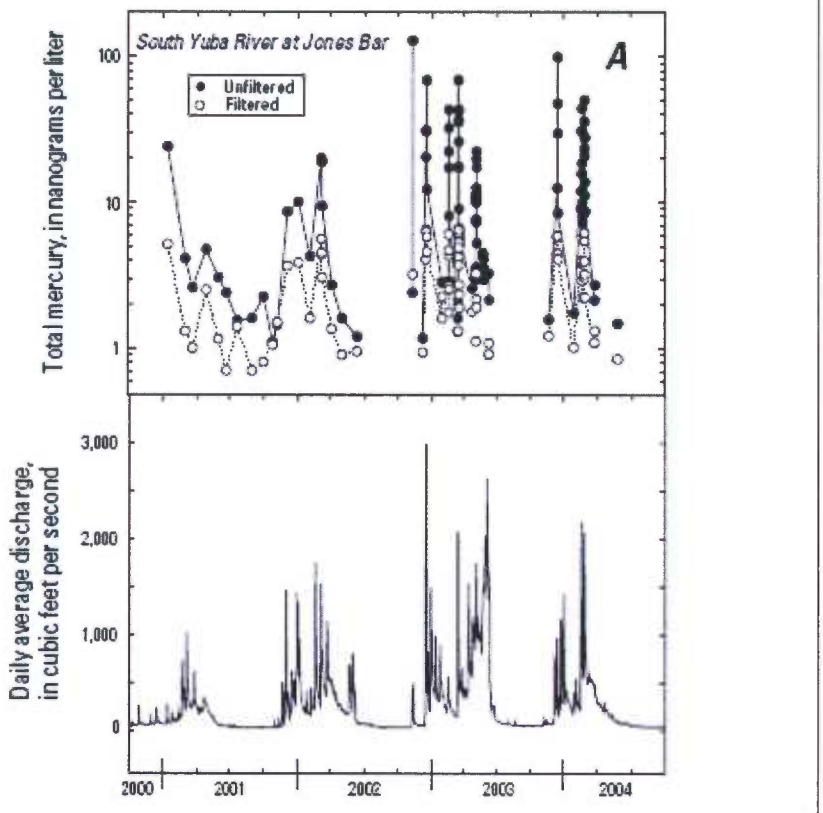


FIGURE 4.2-8. MEASURED MERCURY AND DISCHARGE IN THE SOUTH YUBA RIVER AT JONES BAR DURING WATER YEARS 2001-2004

(Alpers et al., in prep)

TABLE 4.2-5. BACKGROUND WATERSHED SEDIMENT CONTRIBUTION AND MERCURY DISCHARGE IN SOUTH YUBA RIVER AT JONES BAR

Water Year	Water Year Type	Percent of Average Precipitation	Sediment Discharge (tons)	THg Transported (kg)
2001	Dry	73%	730	0.53
2003	Normal	112%	7600	3.1

From Curtis et al., 2006; Alpers et al., in prep

Considering the background watershed loading of Hg to the Delta, the average annual input of total Hg ranges between 220 and 403 kg/yr, and the average annual input of MeHg to the Delta is approximately 5.2 kg/yr (Wood et al., 2008). Measurements of Hg and TSS that form the basis of these estimates may have been influenced by suction dredge discharge, so

there is uncertainty over whether these are truly background measurements or a combination of background and suction dredge Hg loadings.

Figure 4.2-9 and Figure 4.2-10 show the total amount of Hg discharged with selected nozzle sizes as a function of hours dredged and a comparison to watershed loads.

Transport of Mercury Discharged from Suction Dredging and Background Watershed Sources

When sediment is discharged from suction dredging, coarser particles will settle out at a lesser distance downstream than fine particles (see also Chapter 4.1, *Hydrology and Geomorphology*). Flow velocity (which is correlated to discharge for a given river) affects both what size particles are carried by the current and how far the particles travel before they settle out of the water column. For the South Yuba River, data from bed and suspended sediments under different flow regimes indicate that fine particles <63 µm remain mostly suspended, and thus are transported at least as far as Englebright Lake (Curtis et al., 2006). Particles >63 µm do not remain suspended during summer low flows, and are thus deposited back into the river. However, these particles may be transported downstream to Englebright Lake during higher winter flows, depending on their size, the flows, and the distance to the reservoir.

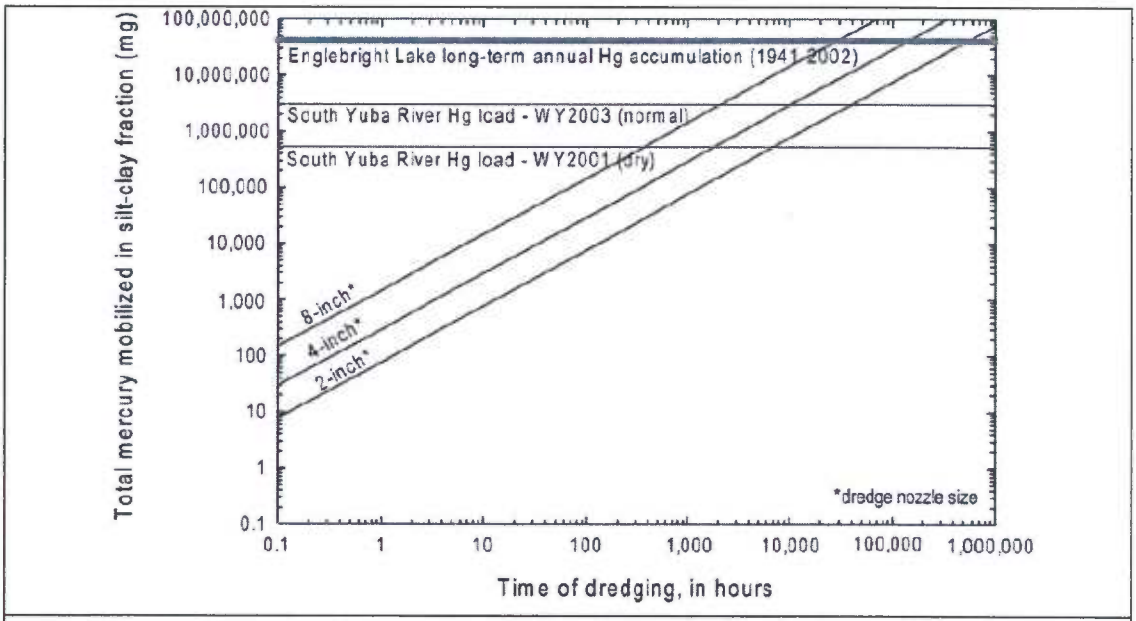


FIGURE 4.2-9. TOTAL MERCURY DISCHARGED IN <63 µM SIZE FRACTION VS. HOURS DREDGED IN PIT #2:BC SEDIMENT AND COMPARISON TO WATERSHED LOADS

(Fleck et al., 2011)

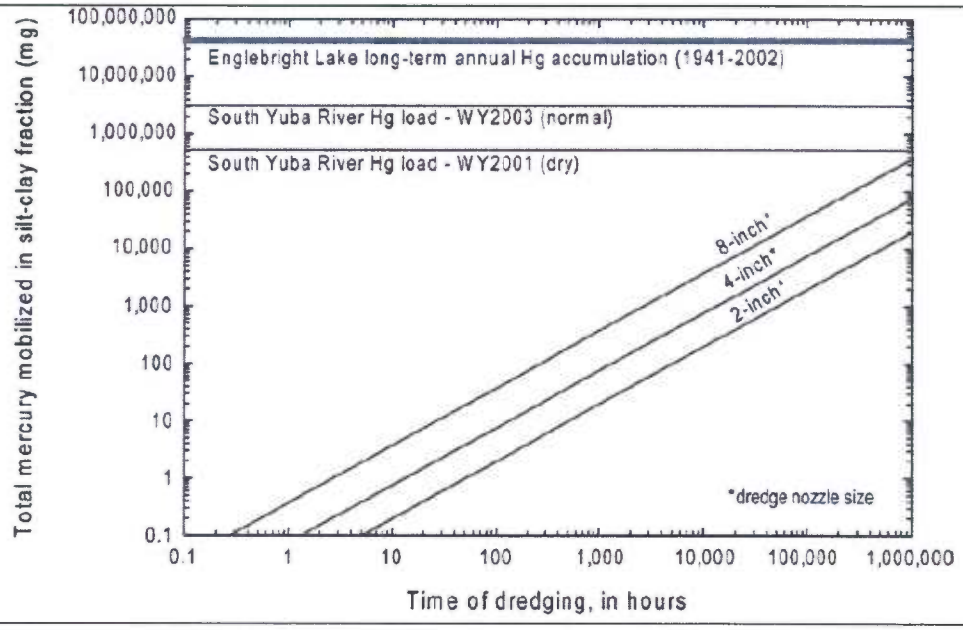


FIGURE 4.2-10. TOTAL MERCURY DISCHARGED IN <63 µM SIZE FRACTION VS. HOURS DREDGED IN PIT #1 AND COMPARISON TO WATERSHED LOADS

(Fleck et al., 2011)

For the purposes of this assessment, it is assumed that >63 µm particles are transported to other parts of the river, while <63 µm particles are delivered downstream to Englebright Lake or beyond, eventually being deposited in the Delta. During water years 2001-2004, it is estimated that only 40% of total Hg inputs to Englebright Lake were deposited, while the remaining 60% was transported downstream of Englebright Dam (Alpers et al., in prep).

Transport of elemental Hg that is floured and discharged from suction dredging is largely unknown. Floured Hg has been observed to float initially (Humphreys, 2005). Subsequently, these Hg droplets may sink (for example, after coagulating with other particles downstream), or may continue to float until they dissolve or volatilize.

The amounts of THg discharge shown in Figure 4.2-7 were used to estimate the number of dredgers required to discharge 10% of background watershed loads. The value 10% was selected based on a professional judgment of what would be a measurable increase in background loading. The analysis does not assume that this is a threshold of significance below which effects are insubstantial, but is used as a reasonable point of reference. The average number of hours dredged per year was based on the results of a survey of suction dredgers and was 160 hours (Suction Dredger Survey results, Appendix F). Results are shown in Figures 4.2-11 and 4.2-12. Due to the lower rate of Hg discharge from Pit #1 (see Figures 4.2-7 through 4.2-9), many more dredgers would be required to reach 10% of background watershed loading than for Pit #2:BC. However, experienced suction dredgers would likely not target Pit 1 type sediment because it contained little gold, or would only dredge the material as overburden—material that must be removed to get to more prospective layers below. During a dry year, a single dredger with a 4 inch dredge in Pit #2:BC or similar sediments (e.g., the layer of sediment overlying Pit #2:BC, referred to as

the Compact Sediment layer in Fleck, 2011, which also had elevated THg) would contribute almost 10% of the background watershed loading. More than the entire permitted population of suction dredgers (almost 4,400, versus the permitted population of approximately 3,650) would need to be operating within sediments with concentrations similar to Pit #1 to discharge 10% of the background Hg loading in a dry year using average size (4 inch) dredges. The results of the survey indicated that approximately 260 dredgers operated in the South Yuba watershed in 2008, resulting in approximately 25,000 dredging hours (Suction Dredger Survey results, Appendix F). However, there are concerns that suction dredger self survey data have been skewed by the survey respondents.

Assuming 50% of transported sediment is deposited in a reservoir between where suction dredging is occurring and downstream reaches where particle bound Hg may reach the Delta, the same calculations were conducted to determine the number of dredgers necessary to equal 10% of the existing Hg loading to the Delta, with results shown in Figures 4.2-13 and 4.2-14. Figure 4.2-13 indicates that no practical number of dredgers in Pit #1 could approach 10% of Delta Hg loading in a year, but that a realistic number of dredgers in Pit #2:BC could reach this level.

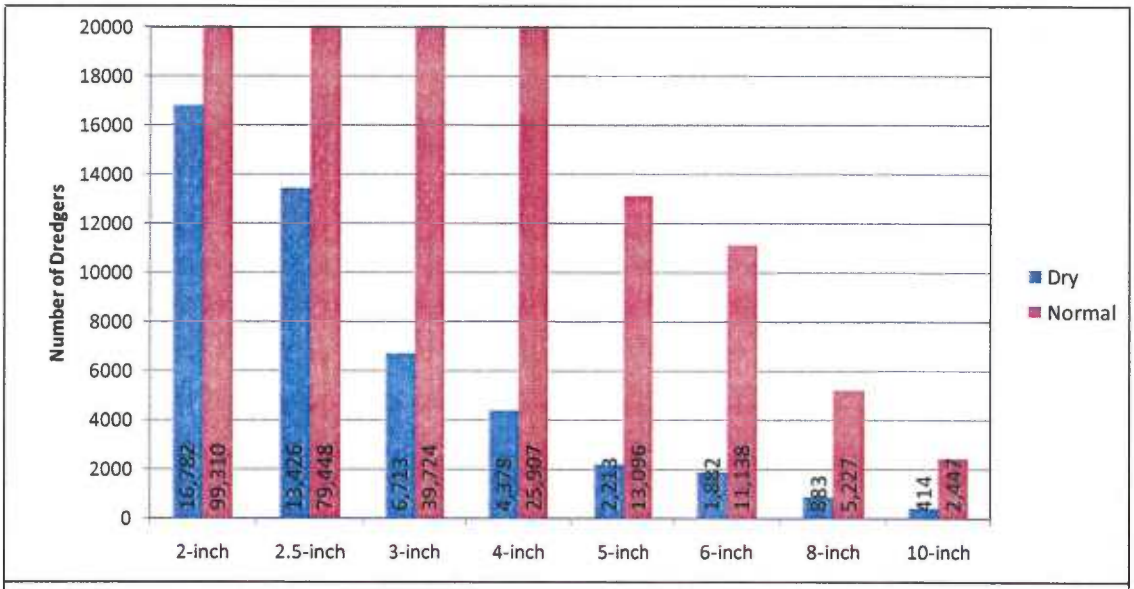


FIGURE 4.2-11. NUMBER OF DREDGERS REQUIRED TO DISCHARGE 10% OF ANNUAL BACKGROUND WATERSHED THg LOAD DURING DRY AND NORMAL WATER YEARS BASED ON PIT #1 SEDIMENT IN THE SOUTH YUBA RIVER.

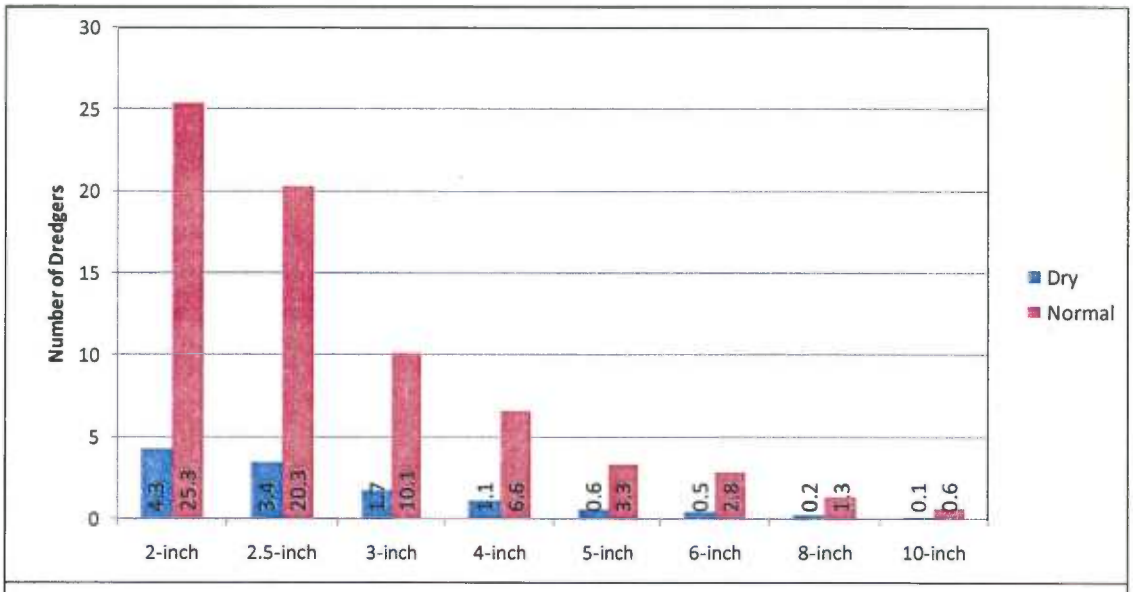


FIGURE 4.2-12. NUMBER OF DREDGERS REQUIRED TO DISCHARGE 10% OF ANNUAL BACKGROUND WATERSHED THg LOAD DURING DRY AND NORMAL WATER YEARS BASED ON PIT #2 BEDROCK CONTACT SEDIMENT IN THE SOUTH YUBA RIVER

1

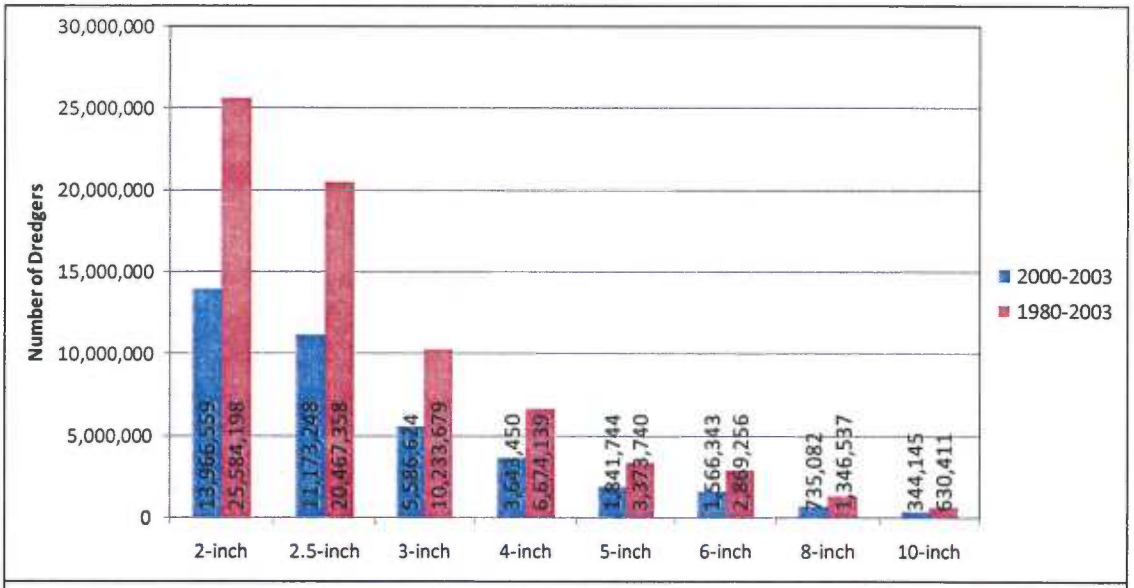


FIGURE 4.2-13. NUMBER OF DREDGERS REQUIRED TO DISCHARGE 10% OF ANNUAL DELTA THg LOAD BASED ON ESTIMATES FOR 2000-2003 AND FOR 1980-2003 DREDGING PIT #1 SEDIMENT MERCURY LEVELS *(Wood et al., 2008)*

It is assumed that 50% of the Hg is deposited in a rim reservoir (e.g., Englebright Lake) and 50% is transported to the Delta.

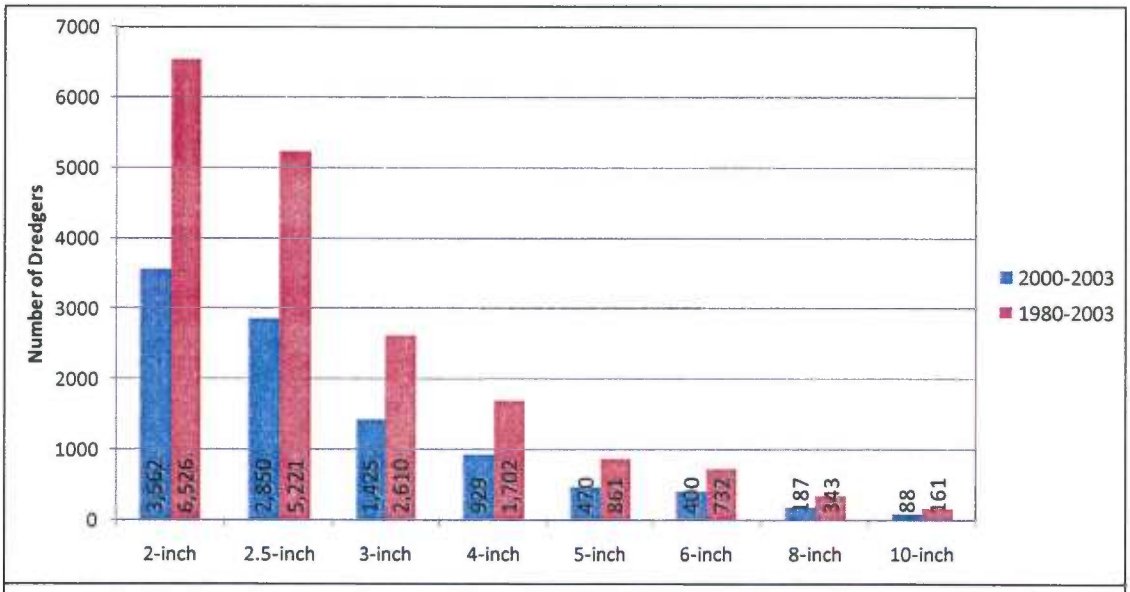


FIGURE 4.2-14. NUMBER OF DREDGERS REQUIRED TO DISCHARGE 10% OF ANNUAL DELTA THg LOAD BASED ON ESTIMATES FOR 2000-2003 AND FOR 1980-2003 DREDGING PIT #2:BC SEDIMENT MERCURY LEVELS *(Wood et al., 2008)*

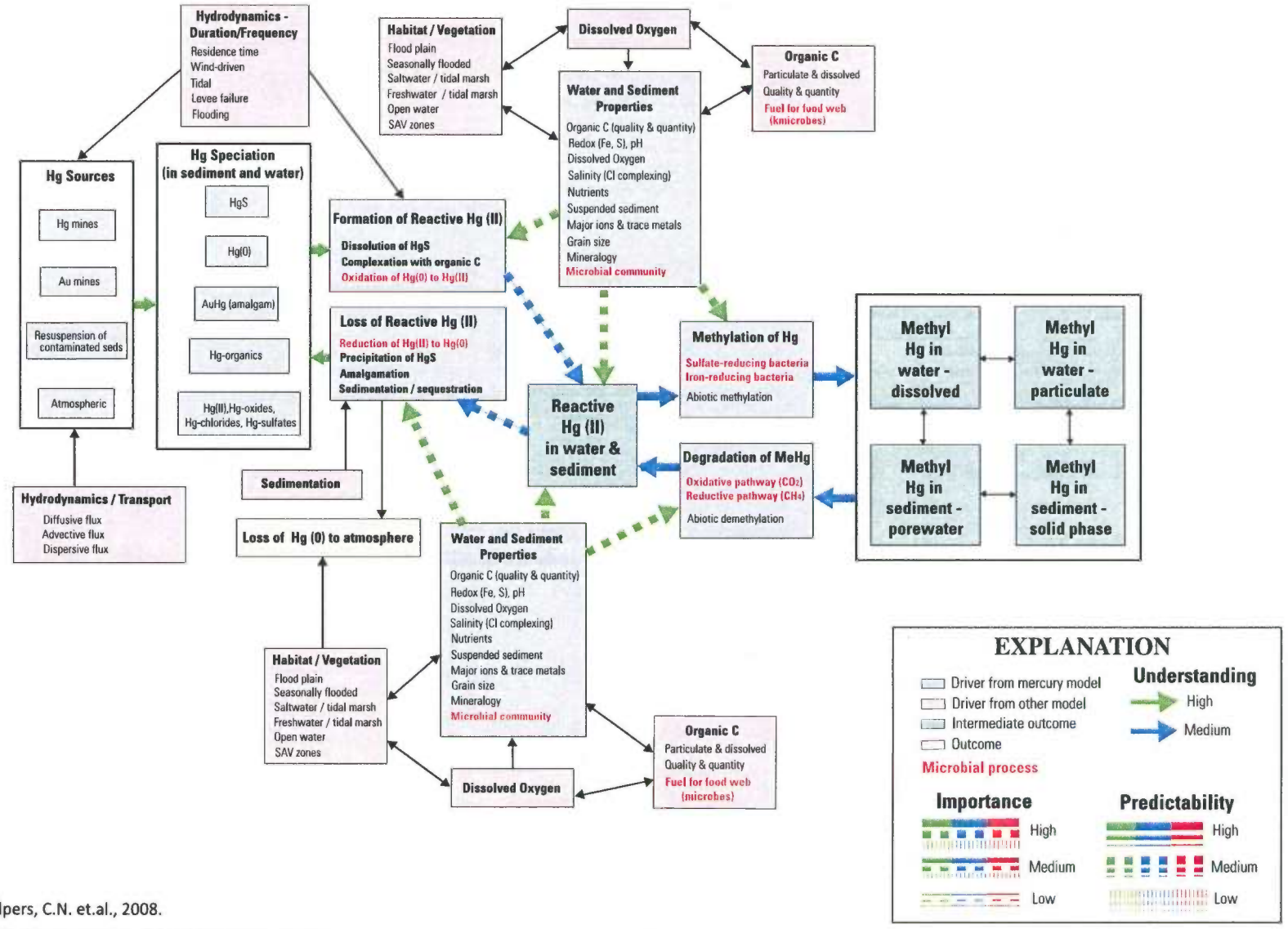
It is assumed that 50% of the Hg is deposited in a rim reservoir (e.g., Englebright Lake) and 50% is transported to the Delta.

Transformation and Bioaccumulation of Mercury Discharged from Suction Dredging and Background Watershed Sources

Elemental Hg (i.e., liquid Hg(0)) was used for gold recovery in placer and hard-rock mines. Experiments with Hg droplets in water have shown that they can either dissolve, forming dissolved Hg(0), or oxidize directly to Hg(II) (Afonso de Magalhaes and Tubino, 1995; Amyot et al., 2005). The latter is enhanced in the presence of chloride, oxygen, and light; however, dissolved Hg(0) would also be subsequently available to oxidation to Hg(II). Studies have shown that Hg(II) is the form most readily converted to MeHg by microbes (Keiu, 2004; Marvin-DiPasquale et al., 2009; Marvin-DiPasquale and Cox 2007). Reactive Hg(II) (i.e., $Hg(II)_R$) is "an operationally defined fraction that represents the result of a 15-minute digestion with $SnCl_2$, a strong reducing agent that converts Hg(II) to elemental Hg(0) so that the readily available Hg(II) fraction can be measured (Marvin-DiPasquale et al., 2009; Marvin-DiPasquale and Cox, 2007). Experiments with mercury in a variety of model compounds representing a wide range of mercury species indicate that solid phase $Hg(II)_R$ appears to be a good predictor of microbial MeHg production (Alpers et al., 2008).

Figure 4.2-15 shows a conceptual model for Hg transformation and bioaccumulation. Transformation refers to the conversion of various Hg species, including elemental Hg, into $Hg(II)_R$ and subsequently to MeHg, and the corresponding backwards transformations. MeHg is transferred between the water-column and bed sediment hydrodynamically and between dissolved and particle-bound phases via physical-chemical partitioning. Some fraction of MeHg is taken up into the base of the food web and is then biomagnified up the food web, resulting in the highest concentrations at the top of the food web, generally in piscivorous fish, reptiles, mammals, or birds (Scudder et al., 2009). Most studies indicate

DRERIP Submodel #1 -- Mercury Methylation in the Sacramento-San Joaquin Delta



Source: Alpers, C.N. et.al., 2008.

Horizon WATER and ENVIRONMENT

Figure 4.2-15
Conceptual Model for Transformation and Bioaccumulation of Mercury

that a majority of the Hg found in fish tissue is MeHg, in many cases the proportion is up to 95% (e.g., Bloom 1992). Numerous factors affect the multiple linkages contained within the model. Water and sediment properties that affect virtually all parts of the model include: oxidation-reduction conditions, salinity, nutrients, suspended sediment, major ions and especially levels of sulfate, trace metals, mineralogy, grain size, microbial community, organic carbon, and dissolved oxygen. Factors that affect uptake into the foodweb and subsequent bioaccumulation include: species composition, growth rate, density, food chain length, trophic transfer efficiency, exposure time, food availability and quality, predation, fecundity, habitat/vegetation, and hydrodynamics (Alpers et al., 2008).

Transformations of floured elemental Hg are essentially unknown. Increased surface area and chemical reactivity of floured Hg are likely important factors relevant to the overall environmental effects of Hg that is discharged from suction dredging activity. It is possible that floured Hg floating on the surface of water would volatilize, but if it remains a liquid droplet, either on the surface or having sunk, it would be subject to transformation. Transformation of liquid Hg(0) to dissolved Hg(II) has been shown to be proportional to surface area. The half-life of a 0.1 milliliter droplet of Hg in water subjected to dissolution alone is approximately 30 years (Amyot et al., 2005). Assuming droplets as spheres, dividing a single 0.1 mL droplet (approx. 6 mm diameter) into 10 equal smaller droplets (of approx. 2.7 mm) increases the surface area by approximately 2 times, while dividing it into 10,000 equal smaller droplets (of approx 0.27 mm) increases it by approximately 20 times. An extreme case would be the division into 10,000,000,000 equal droplets (of approx 2.7 μm), increasing the surface area by approximately 2000 times. This size droplet was observed on amalgam surfaces from the South Yuba River via a scanning electron microscope (Fleck et al., 2011). Regarding the impact of elemental mercury on uptake of MeHg, in microcosms containing sediment, zebrafish, and Hg droplets, rapid (i.e., within 7 days) increases in dissolved and fish tissue MeHg concentration have been observed after the start of the exposure (Dominique et al., 2007).

While fish tissue levels represent Hg accumulated over time, concentrations of Hg in water are variable and affected by season and hydrologic conditions, and are, therefore, an uncertain predictor of fish tissue levels (Brigham et al., 2009). However, several studies have found significant correlations between THg and MeHg in the water column (both filtered and unfiltered) and fish tissue levels (Chasar et al., 2009; Scudder et al., 2009). Scudder et al. (2009) found significant correlations between sediment MeHg levels normalized by loss on ignition (a measure of organic matter content) and fish tissue levels. The logarithm of the bioaccumulation factor (BAF) of filtered MeHg from fish to water is approximately 6.33, while the BAF of sediment MeHg to fish is approximately 3.42 (Scudder et al., 2009). This means that at equilibrium, there is > 2,000,000 times more MeHg in fish than in the surrounding water, and > 2,000 times more MeHg in fish than in the sediment in their vicinity.

Because Pit #2:BC sediments were relatively more elevated in $Hg(II)_R$ than THg compared to surface sediment layers, the potential environmental impact caused by mobilization of $Hg(II)_R$ may be even greater than is suggested by THg (Fleck et al., 2011). Additionally, resuspension of Pit #1 and Pit#2:BC sediments has been demonstrated to affect Hg speciation in the sediments. After resuspension for 7 days in oxygenated water under laboratory conditions, THg concentrations exhibited an apparent decrease, while $Hg(II)_R$ concentrations increased in both Pit #1 and Pit #2:BC sediments (Marvin-Dipasquale et al.,

2011). The authors of the study attributed decreasing THg concentrations to loss of fine particles in the supernatant following centrifugation. Because this is an artifact of the laboratory methodology, THg would not be expected to decrease after resuspension in the environment. Also possible, but deemed unlikely by the authors, was loss to volatilization and issues related to sampling bias.

Experiments at Camp Far West Reservoir, found that upstream sources of MeHg may be more significant under high-flow conditions, while sources internal to the reservoir may be more important during low-flow conditions (Kuwabara et al., 2003). Benthic fluxes of dissolved MeHg were generally negligible or positive, that is, from the sediment to the water-column, and were greater during April (when water was oxic) than November (when water was suboxic).

A fundamental difference between Hg discharged by suction dredging and that discharged from background watershed sources is that the majority of suction dredging discharge and transport occurs during the summer, while the majority of background Hg transport occurs during high winter flows. The impact of this difference is not obvious, and will likely vary from watershed to watershed. One important distinction is that higher temperatures in the summer contribute to higher methylation rates, assuming that the mercury is transported to a region where methylation could occur. However, California's water system is highly managed—factors such as increased reservoir storage during the winter have been correlated with increased food-web MeHg levels in Camp Far West Reservoir, (Stewart et al., 2008).

In-stream: As discussed above, coarse-particle (i.e., >63 µm) bound Hg in elevated concentrations discharged from suction dredging in the South Yuba River is transported to nearby other parts of the stream where it settles out and rests on the surface. Becauase concentrations and loads of Hg within the stream are not altered, assessment of the transformation and bioaccumulation of this Hg examines the impact of resuspension and movement of Hg at depth to Hg in the top-sediment. Recent studies indicate that following resuspension of South Yuba River sediments, both from Pit #1 and Pit #2:BC, increased methylation was not observed after deposition into South Yuba River receiving sediments, which were relatively low in organic content (Marvin-DiPasquale, 2011).

Nevertheless, invertebrate Hg data from the South Yuba River indicate that suction dredging may have been contributing to elevated tissue concentrations. Suction dredging on the South Yuba was prohibited by the Bureau of Land Management during 2008, but had been allowed in all years prior. Figures 4.2-16 through 4.2-18 show invertebrate MeHg levels analyzed at one site in Humbug Creek and several sites downstream of its confluence with the South Yuba River in 2007 and 2008. All taxa collected in 2007 had higher concentrations of MeHg than the same taxa from the same sites in 2008, with few exceptions for which concentrations were similar. Overall, levels in 2008 were statistically significantly higher than levels in 2007. Documented inter-annual variation in other watersheds is typically less than differences observed in the South Yuba River. Hydrologic conditions were very similar between these water years, and were not atypical for this region, except in April through June, when conditions were drier than normal for both years (Fleck et al., 2011). Although caution should be used in interpreting these results because only year of data is available for the no dredging condition, these are likely the only data available at this time that can be used to compare tissue Hg levels with and without the

influence of suction dredging. Fish tissue levels of Hg in the South Yuba River are relatively low (0.17 parts per million [ppm] average), owing in part to the fact that the figure is from rainbow trout, which tend to accumulate MeHg to a much lesser extent than piscivorous fish such as largemouth bass (the average Hg concentration in trout tissue from around the U.S. is about 0.11 ppm).

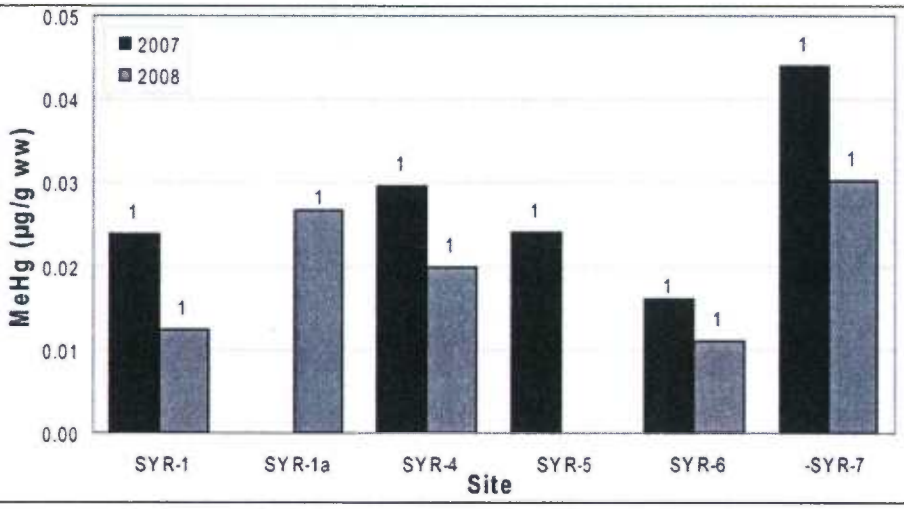


FIGURE 4.2-16. METHYLMERCURY (MeHg, µg/g, WW [WET WEIGHT]) CONCENTRATIONS IN INDIVIDUAL COMPOSITE SAMPLES OF LARVAL CADDISFLIES (ORDER TRICHOPTERA, FAMILY HYDROPSYCHIDAE) COLLECTED FROM THE HUMBUG CREEK/SOUTH YUBA STUDY AREA IN SEPTEMBER 2007 AND SEPTEMBER 2008

(Fleck et al., 2011)

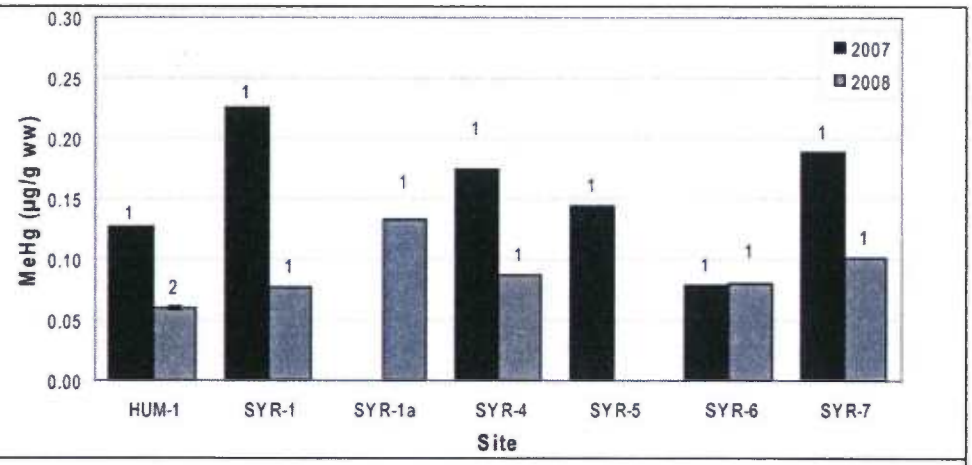


FIGURE4.2-17. METHYLMERCURY (MeHg, µg/g, WW) IN COMPOSITE SAMPLES OF WATER STRIDERS (ORDER HEMIPTERA, FAMILY GERRIDAE) (N = 1-2) COLLECTED FROM THE HUMBUG CREEK/SOUTH YUBA STUDY AREA IN SEPTEMBER 2007 AND SEPTEMBER 2008

(Fleck et al., 2011)

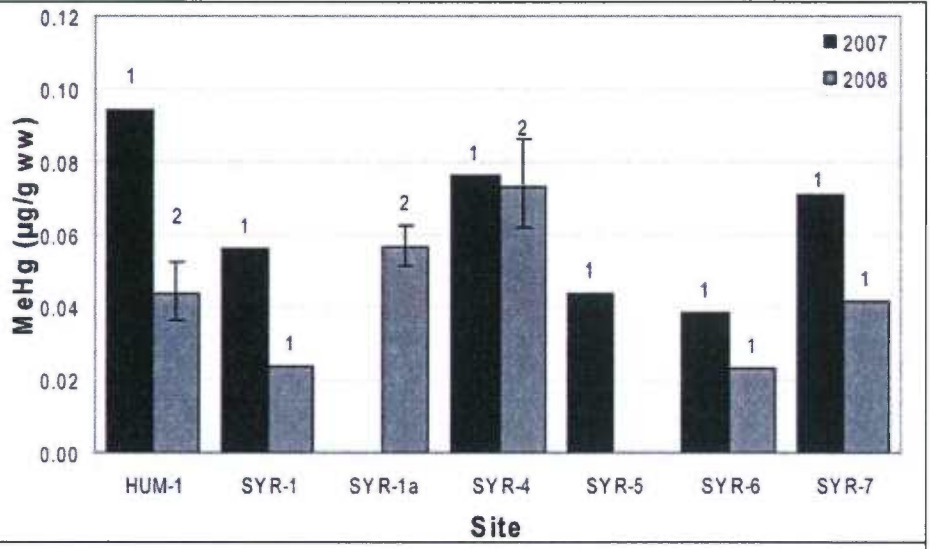


FIGURE 4.2-18. METHYLMERCURY (MeHg, µg/g, WW) IN COMPOSITE SAMPLES OF LARVAL STONEFLIES (ORDER PLECOPTERA, FAMILY PERLIDAE) (N = 1-2) COLLECTED FROM THE HUMBUG CREEK/SOUTH YUBA STUDY AREA IN SEPTEMBER 2007 AND SEPTEMBER 2008

(Fleck et al., 2011)

Englebright Lake: As discussed above, fine-particle bound Hg in elevated concentrations discharged from suction dredging in the South Yuba River may settle into bed-sediments of Englebright Lake. Mercury methylation potential is high (about 1% per day) in shallow sediments (4-12 centimeter) of Englebright Lake, and quite low (usually non-detectable) in deeper sediments (Alpers et al., 2006) and, therefore, increased concentrations of Hg in top-sediment of Englebright Lake would be expected to increase MeHg concentrations within the sediment. The sedimentation rate in Englebright Lake is quite high, on the order of 0.1 meters per year. Therefore, it is reasonable to conclude that much of the MeHg produced within the sediments of Englebright Lake is from Hg (whether from background sources or discharge from suction dredging) that has been deposited in the reservoir recently (i.e., within the previous few years). Therefore, it is expected that sediment-associated Hg discharged from suction dredging and transported downstream to Englebright Lake contributes to levels of MeHg found in surface sediments. Elevated fish tissue Hg concentrations in Englebright Lake (0.66 ppm in Smallmouth Bass) are driven by MeHg in the lake's sediment and water column, which in turn are affected by discharge and transport of Hg from suction dredging in addition to background watershed sources.

Recent experiments have shown that sediments from Pit #2:BC increased methylation relative to the control sediment when spiked into Englebright Lake receiving sediment. Being suspended for a period of 6 days, and then spiked into Englebright Lake receiving sediments at a ratio of 1:50, doubled MeHg production in the Englebright sediment when compared to the control, which was unspiked Englebright sediment (Figure 4.2-19; Marvin-DiPasquale, 2011). The same experiments using sediment from Pit #1 showed no impact on MeHg concentrations in Englebright Lake.

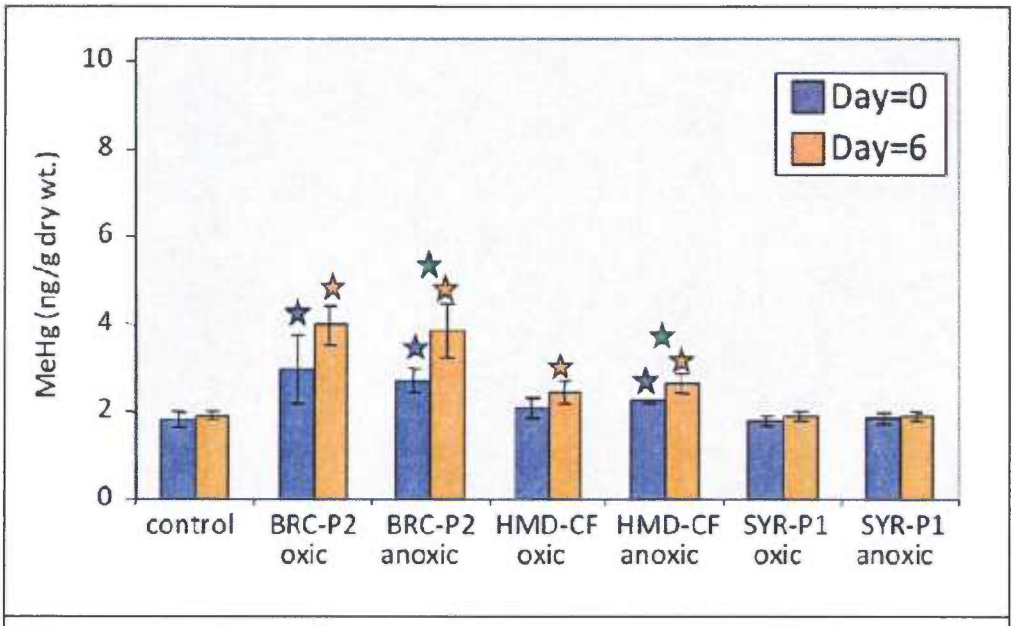


FIGURE 4.2-19. IMPACT OF PREVIOUSLY SUSPENDED SOUTH YUBA RIVER SEDIMENTS ON METHYLMERCURY PRODUCTION IN RECEIVING SEDIMENTS OF ENGLEBRIGHT LAKE

Day 0 indicates the sediment was non-suspended prior to spiking into the receiving sediment. Day 6 indicates the sediment was suspended for 6 days prior to spiking into the receiving sediment. "BRC-P2" refers to Pit #2:BC. Error bars represent ± 1 standard deviation (n=4). Significant differences ($P < 0.05$) are indicated by the following: Day 0 treatment vs Day 0 control (★), Day 6 treatment vs Day 6 control (☆), Day 0 vs Day 6 for a single grouping (★).

(Marvin-DiPasquale et al., 2011)

Delta: Several studies have documented a significant positive correlation in the Delta between THg and MeHg (Heim, 2003; Slotton, 2003). The relationships are stronger when only one type of habitat is considered. Experiments have shown that sediments from Pit #2:BC doubled methylation relative to the control sediment when spiked into Delta receiving sediments, and after being suspended for a period of 6 days and then spiked into Delta receiving sediments, tripled MeHg production within the sediment (Figure 4.2-20). It is widely known that wetlands (i.e., land with permanently saturated soil and shallow water and favorable redox conditions) are environments favorable to methylation, and the Delta was used in these experiments as a surrogate for wetland environments. The same experiments using sediment from Pit #1 showed no impact on MeHg concentrations in Delta sediments.

Of the fish tissue levels for the protection of human health shown in Table 4.2-2, values derived using the U.S. EPA 2001 methodology based on mean and 95th percentile consumption rates in California of 0.17 and 0.06 mg/kg, respectively, are the most appropriate values to use for this assessment. Consideration is also given to criteria for protection of fish-eating mammals and birds, which are 0.1 and 0.02 mg/kg, respectively.

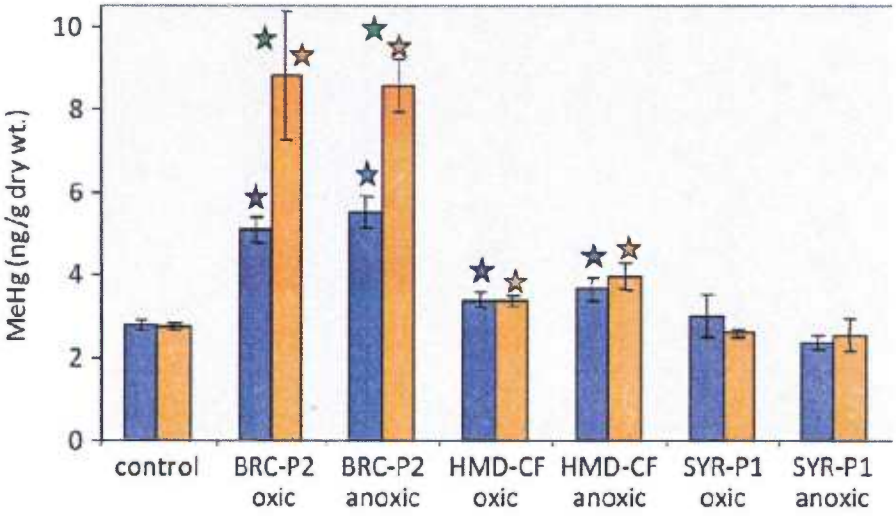


FIGURE 4.2-20. IMPACT OF PREVIOUSLY SUSPENDED SOUTH YUBA RIVER SEDIMENTS ON METHYLMERCURY PRODUCTION IN RECEIVING SEDIMENTS OF DELTA MEADOWS

Day 0 indicates the sediment was non-suspended prior to spiking into the receiving sediment. Day 6 indicates the sediment was suspended for 6 days prior to spiking into the receiving sediment. "BRC-P2" refers to Pit #2:BC. Error bars represent ± 1 standard deviation (n=4). Significant differences ($P < 0.05$) are indicated by the following: Day 0 treatment vs Day 0 control (★), Day 6 treatment vs Day 6 control (★), Day 0 vs Day 6 for a single grouping (★).

(Marvin-DiPasquale et al., 2011)

Evidence from laboratory experiments has shown that selenium may be able to moderate the toxic effects of Hg when present at a molar ratio greater than around 1:1 (Ganther, 1972), and that most fish in the United States contain high enough levels of selenium to make this a possibility (Peterson et al., 2009). However, epidemiological support for this phenomenon is lacking, and the limited evidence gives mixed results (Watanabe, 2002). It is, therefore, unclear how experimental evidence translates into low dose, chronic risk assessments which are conducted to derive criteria. Consequently, derived criteria do not incorporate the possibility of toxicity moderation via selenium.

Fish and other aquatic life may themselves be affected by Hg. The known acute and chronic LC50s for Hg exposure (inorganic or methyl) in water are much higher than environmental concentrations. Criteria have not been developed for the protection of aquatic life in the United States. The Canadian Water Quality Guideline (CWQG) to protect freshwater life is 26 nanograms per liter (ng/L) inorganic Hg. For MeHg, the interim CWQG is 4 ng/L (Environment Canada, 2005). Effects on fish that may occur at environmentally relevant concentrations include adverse effects on feeding behavior (0.27 mg/kg in tissue as eggs) (Fjeld et al. 1998), reduced egg survival/hatching success (exposure to 100 ng/L and 1.05 mg/kg sediment THg) (USFWS 2003), male mortality (dietary source resulting in 0.5 mg/kg MeHg in tissue) (Matta et al., 2001), impaired sexual development or immune function

(0.254 mg/kg MeHg in tissue) (Friedmann et al., 1996), and changes in gene expression associated with endocrine disruption (0.87 mg/kg MeHg in diet) (Klaper et al., 2006).

From Table 4.2-3, it is evident that numerous water bodies throughout the state contain fish with tissue mercury concentrations that exceed human health criteria (> 0.06-0.3 mg/kg; see Table 4.2-2), criteria for the protection of mammalian and avian wildlife (> 0.1 and 0.02 mg/kg, respectively; see Table 4.2-2), and thresholds at which adverse impacts to fish have been documented (> 0.254 mg/kg; see above paragraph).

Hg concentrations in water to be used for potable uses are usually well below the maximum contaminant level (MCL) of 2 µg/L, which reflects the allowable concentration over a long-term (i.e., liftetime) exposure of an individual who consumes water containing Hg. The assessment of potential Hg discharges from Pit #1 and Pit #2:BC from the South Yuba River could result in a dredging plume concentration exceeding the CTR human health criteria upon leaving the dredge. There has been no work done to determine how far CTR and human health criteria exceedences would extend down stream of a dredge dredging Pit #2 type sediment.. Given that the discharge of Hg would be associated with TSS, and TSS plumes would undergo substantial attenuation due to sediment settling and dilution downstream, Hg concentrations would decrease downstream of the dredging. Exposure of drinking water sources to Hg from dredging activity would be low because dredging activity is anticipated to be largely dispersed, intermittent, and temporary. Consequently, the potential exposure of drinking water supplies diverted downstream from dredging areas to Hg levels exceeding the state drinking water MCL of 2 µg/L would be expected to be infrequent and intermittent. Thus, the Program would not cause substantial, or likely even measurable, increased risk to human health through consumption of Hg in drinking water supplies.

Geographic Translation

Although the South Yuba River, Englebright Lake, and the Sacramento-San Joaquin Delta were assessed specifically due to the availability of data at these sites, findings can be translated to other watersheds and geographic regions based on characteristics common to these areas and assessed areas.

As shown in Figure 4.2-2, historic gold mines are located throughout California, and suction dredgers target areas where gold has been located. Elemental Hg was used in both placer and hard-rock gold mining, and, therefore, is found throughout historic gold-mining regions. This causes background sediment Hg concentrations to be high throughout gold-mining regions, as well causing an increased probability of Hg hot-spots. Although hydraulic mining was most extensively practiced in the South Yuba watershed, it also was practiced in other watersheds of the Yuba, as well as watersheds of the Feather, American, Bear, Cosumnes, and Tuolumne Rivers. Additional sediment characterization from areas most likely to be targeted by suction dredgers would further clarify risk of dredging actions exacerbating existing Hg problems. Fish tissue data suggest that Hg in tissue will be high throughout historic gold-mining regions, and most sites are on the CWA Section 303(d) listed for Hg already. Fish tissue concentrations are above thresholds of concern throughout historic gold-mining regions (see Table 4.2-3). Therefore, any impact of suction dredging on Hg loading and MeHg concentrations in downstream environments might further exacerbate the existing Hg impairments.

Assessing risk on a site-specific basis across the state would be possible following site-specific characterization of: 1) sediment Hg levels, 2) estimates of watershed load, 3) impact on methylation experiments, and 4) impact on reactivity of resuspension experiments. Suction dredging will likely not pose substantial risk at every location it is practiced, but substantially increased risk from dredging discharges and associated Hg resuspension will likely be common across the state.

Summary of Findings

Suction dredging operators may target deep sediments (i.e., those too deep to be available to scour under winter flows), and thus mobilize sediment that may not be mobilized by typical winter high-flow events. Sediments in the historic gold-bearing and gold-mining areas of California that would be targeted by suction dredgers also may be elevated in Hg compared to sediments in other non-mining areas. The discharge of sediment with high THg concentrations will result in increased THg concentrations in upper sediments of downstream water bodies, particularly in lower elevation zones of natural sediment deposition (e.g., low-gradient floodplains), including reservoirs where present. A substantial fraction of the fine sediment also may pass through lower elevation reservoirs and thus be transported to lower elevation locations, such as the Sacramento-San Joaquin Delta, where Hg methylation and uptake may occur.

The fate and transport assessment conducted herein, based on recent intensive field studies of sites in the Yuba River system conducted by USGS scientists, indicates that the discharge and transport of THg loads from suction dredging of areas containing sediments highly elevated in Hg and elemental Hg is substantial relative to background watershed loadings, especially in below average runoff water years. For example, within areas of highly elevated sediment Hg concentrations, a single suction dredge operator using an average size (4 inch) dredge could discharge approximately 10% of the entire watershed Hg loading during a dry year during an average suction dredging time of 160 hours. By inference, the analysis indicates that larger capacity dredges or multiple dredges operating in similar sediments with highly elevated sediment Hg concentrations could potentially contribute a much larger proportion of the watershed load than 10%. The value 10% was selected based on a professional judgment of what would be a measurable increase in background loading. The analysis does not assume that this is a threshold of significance below which effects are insubstantial, but is used as a reasonable point of reference. The relative proportion of THg loading from suction dredging activity, compared to background watershed loading, is directly dependent on the dredge size, duration of operations during the year, and sediment characteristics and concentrations. The loading assessment indicates that dredging in areas with average sediment Hg concentrations and no elemental Hg is unlikely to result in a substantial contribution to the overall watershed loading. For example, when dredging in sediments with average Hg concentrations, more than the entire permitted population of suction dredgers would need to be operating within the watershed to discharge 10% of the background Hg loading in a dry year using average size (4 inch) dredges. Additionally, suction dredging discharge and transport of THg occurs primarily in the summer rather than the winter, when most background Hg is transported to reservoirs. While the precise implications of this are not known, it is known that methylation is generally more pronounced at higher temperatures and lower oxygen environments, both of which are more likely under summer conditions than winter conditions.

Additionally, while many unknowns surround the flouring of elemental Hg, the increased surface area and increased potential for downstream transport will likely enhance reactivity and transport to areas favorable to methylation (i.e., downstream reservoirs and wetlands). Moreover, resuspension of sediments containing Hg in oxygenated environments has been shown to increase levels of $Hg(II)_R$, which has been shown to be directly related to methylation rate. The only available data comparing tissue Hg levels under the influence of suction dredging and when no suction dredging was occurring indicate a decrease in tissue Hg concentration under the no dredging condition that may not be attributable to inter-annual variability or hydrologic conditions alone. Overall, available data show that suction dredging of sediments with elevated THg concentrations and deposits of elemental Hg can be a principal source of concern for producing higher THg concentrations in downstream deposition zone sediments than would otherwise occur from discharges only of natural watershed loading events. Moreover, such mobilized sediment containing high THg and $Hg(II)_R$ concentrations results in increased MeHg production in reservoirs or the Delta where these Hg-laden sediments are deposited. On the contrary, mobilized sediment containing average sediment Hg concentrations has been shown to have no effect on measurable effect on MeHg production in a downstream reservoir or the Delta.

Finally, the Office of Environmental Health Hazard Assessment has documented and issued consumer fish consumption advisories due to elevated levels of Hg in fish tissue for numerous areas of California that were historically affected by Hg ore mining, and in some of the areas where gold mining occurred and elemental Hg was used extensively. Concentrations of Hg in fish tissue in these areas are also above criteria developed for the protection of mammalian and avian wildlife, and occasionally exceed levels that have been found to adversely affect fish health or reproduction. Fish tissue Hg levels have been correlated to MeHg levels in sediment, which in turn have been correlated with THg levels in sediment.

Based on the information discussed above, suction dredging has the potential to contribute substantially 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. Available evidence suggests that these processes associated with suction dredging in the Sierra foothills, for example, may increase Hg levels in reaches/water bodies downstream of suction dredging areas by frequency, magnitude, and geographic extent such that MeHg body burdens in aquatic organisms may be measurably increased, thereby substantially increasing the health risks to wildlife (including fish) or humans consuming these organisms. Therefore, this impact is considered a potentially significant impact.

Potential mitigation measures to reduce the impact would necessarily involve actions to avoid or limit THg discharge from areas containing elevated sediment Hg and/or elemental Hg from suction dredging activities under the Program. Such discharge limiting actions could include the following:

- Identify river watersheds or sub-watersheds where sediment Hg levels are elevated above regional background levels or where elemental Hg deposits exist and establish closure areas to avoid suction dredging within these areas. No such data currently exist to comprehensively identify Hg "hot-spots"; however, data, especially from Sierra Nevada watersheds impacted by mining, suggest

that sediment mercury levels at these sites are elevated above background levels. Hence, this action could involve a phased study to identify the presence of such areas based on intrinsic properties including proximity to mines, hydraulic and channel features, and other factors.

- Limit the allowable suction dredge nozzle size and/or allowable seasonal duration of dredging activity within water bodies known to contain sediment elevated in Hg or that contain elemental Hg deposits. Although smaller nozzle sizes would still cause mercury releases when dredging mercury enriched sediment, the amount of mercury discharged would be lower than with larger nozzle sizes.
- Implement a special individual permit system for suction dredge operators for areas where Hg "hot-spots" exist. The permit system would be designed to require assessment of the area prior to initiation of dredging activity and issuance of terms and conditions to ensure that Hg hot-spots are identified and avoided or other provisions are implemented to ensure that the dredging activity does not result in substantial discharge of Hg downstream from the site.

Implementation of such mitigation actions, implementation procedures, monitoring, and enforcement may reduce potential impacts. However, because not all locations of elemental mercury deposits are known, the feasibility with which sites containing elemental mercury could be identified at a level of certainty that is sufficient to develop appropriate closure areas or other restrictions for allowable dredging activities, is uncertain at this time. Moreover, at this time the Program allows for suction dredging activities to occur on a statewide basis within areas known to contain historic gold mining sites and sediments contaminated with elemental mercury. Thus, a comprehensive set of actions to mitigate the potential impact through avoidance or minimization of mercury discharges has not been determined at this time, nor is its likely effectiveness known. It should be noted that a program of feasible and adequate mitigation actions may be developed that includes the phased implementation of actions in combination with adaptive monitoring and evaluation measures. This impact would remain potentially significant until such time that a sufficient and feasible mitigation program is developed but there is no guarantee that this type of mitigation is practicable. This impact is considered significant and unavoidable.

Impact WQ-5. Effects of Resuspension and Discharge of Other Trace Metals from Suction Dredging (Significant and Unavoidable)

Implementation of suction dredging under the Program may result in dredging activity occurring in areas within California where the sediments could contain relatively elevated concentrations of trace metals other than Hg (e.g., copper, lead, zinc). Historic copper, lead, and silver mines are located throughout the Sierra Nevada, and copper, lead, silver, and zinc mines are located in the Klamath-Trinity Mountains. Trace metals levels in sediments in Sierra streams have not been thoroughly evaluated, with the exception that specific mining cleanup projects may have site-specific data (e.g., Iron Mountain Mine, located adjacent to Spring Creek and other tributaries to the Sacramento River near Redding). As identified in Table 4.2-1 above, the RWQCBs have identified numerous stream segments on the 303(d) list of impaired water bodies for various trace metals. Many 303(d) listed water bodies are lower elevation bays and enclosed estuaries where the historical industrial sources are the cause for listing. However, the upper Sacramento River watershed includes several 303(d) listed streams near well-known mining areas which are affected by acid mine drainage

producing substantial discharges primarily of cadmium, copper, and zinc. At such sites, metals levels tend to be elevated in sediments, sediment pore water, and the water column.

Aquatic life beneficial uses are the most sensitive beneficial uses to ambient water body concentrations of most trace metals. However, as evidenced by primary or secondary drinking water MCLs, the municipal and domestic water supply beneficial use may be more sensitive to some constituents (e.g., arsenic, iron, and manganese).

As noted in the discussion above for Impact WQ-3 (Turbidity/TSS), suction dredging: (a) is intermittent in nature, (b) is generally widely dispersed geographically across the state, typically occurs in undeveloped upper watershed areas, and (c) generally produces small discharge volumes, relative to the total discharge of the water body in which dredging occurs and relative to downstream larger order streams and rivers where drinking water diversions exist. Consequently, dissolved trace metals or that fraction of the total metal mobilized that is adsorbed to sediment particles <63 µm that stay suspended for long periods of time tend to be rapidly diluted, both within the immediate water body and are further diluted in downstream waters bodies. Moreover, the remainder of the total recoverable trace metal fraction that is mobilized by suction dredging (i.e., fraction adsorbed to larger sediment particles) generally settles out within a few hundred meters of the dredging site. The result is that trace metals concentrations that may be elevated in the dredging discharge tend to return to background levels within close proximity to the dredge.

Although relatively little study of trace metal (other than mercury) mobilization and transport related to suction dredging has occurred, a few studies have been identified. Johnson and Peterschmidt (2005) identified a maximum copper concentration of 9.3 µg/L in suction dredge effluent in a study on the Similkameen River in Washington State. Zinc and lead were both significantly below their respective acute criteria. In a study of dredging in the Fortymile River of Alaska, the maximum near-field copper concentration was 20 µg/L, and the maximum zinc concentration was 43 µg/L (Royer et al., 1999). In both studies, concentrations returned to ambient background levels within a short distance from the dredging site.

Based on the above discussion and studies cited, it is not expected that suction dredging under the Program would cause more frequent exceedance of CTR criteria for the protection of the municipal and domestic water supply use or state drinking water MCLs at frequency, magnitude, or geographic extent that would result in adverse effects on the municipal and domestic supply beneficial use, or any of the other non aquatic life beneficial uses. Therefore, the remainder of this assessment will focus on determining whether suction dredging under the Program would adversely affect aquatic life beneficial uses.

The bioavailability (i.e., the ability for a metal to be taken into the body of an aquatic organism) and thus toxicity of arsenic, cadmium, chromium, copper, lead, nickel, silver, and zinc are affected by the total hardness of the water and concentrations of other water quality parameters, such as dissolved organic carbon, specific cations and anions, and pH where exposure occurs. Consequently, the CTR criteria for these metals include either includes a "water-effect ratio," that is hardness based, or both. The water-effect ratio component of the CTR criteria equations for these metals accounts for the effect of all water quality characteristics other than hardness on the metal's bioavailability and thus toxicity.

This is important to consider in this assessment because metals that are bound to sediment particles are not bioavailable to fish and benthic macroinvertebrates and thus are not in a form that can cause toxicity to aquatic life. Moreover, the dissolved fraction of metals measured is not all bioavailable for uptake by organisms. The amount of the dissolved fraction that is bioavailable depends on the water chemistry characteristics identified above.

This assessment considered the potential discharge of trace metals from suction dredging using a fate and transport methodology similar to that used for the assessment of mercury. Sediment core data from Englebright Lake in the Yuba River watershed, and from the lower Sacramento River between Redding and Freeport, were used as assumed average stream sediment concentrations and coupled with actual TSS data from suction dredge discharges to estimate total recoverable concentrations of arsenic, copper, silver, zinc, lead, chromium, nickel, and cadmium in a dredge's discharge plume. These estimates assume that 100% of the metal concentration is adsorbed to sediment for the purpose of calculating the estimated discharge concentrations. In reality, it is expected that most of the discharged metals concentration would indeed be sediment bound, but some fraction would be in the dissolved form, and a portion of the dissolved fraction would actually be bioavailable for uptake by organisms. The estimated discharge total recoverable metal concentrations were then compared to CTR acute (criteria maximum concentration [CMC]) and chronic (criteria chronic concentration [CCC]) criteria, based on moderate Sierra stream hardness of 40 mg/L as $CaCO_3$, with results shown in Table 4.2-6.

TABLE 4.2-6. SEDIMENT CONCENTRATIONS OF TRACE METALS IN SIERRA NEVADA STREAMS AND ESTIMATED TOTAL RECOVERABLE CONCENTRATIONS IN SUCTION DREDGE DISCHARGE PLUMES UNDER ASSUMED MINIMUM AND MAXIMUM TOTAL SUSPENDED SOLIDS CONCENTRATIONS

Metal	Concentration [1] (mg/kg)	TEC [2] (mg/kg)	PEC [2] (mg/kg)	Total Recoverable Metal, µg/L; 3 mg/L TSS	Total Recoverable Metal, µg/L; 340 mg/L TSS	CTR CMC, µg/L [3]	CTR CCC, µg/L [4]
Arsenic	**20.0**	9.79	33	0.06	6.80	N/A	N/A
Copper	**78.3**	31.6	149	0.24	**26.63**	5.9	4.26
Silver	N/A	N/A	N/A	N/A	N/A	0.783	N/A
Zinc	**134.5**	121	459	0.40	45.73	55.1	55.1
Lead	17.4	35.8	128	0.052	**5.93**	25.43	0.99
Chromium	**177.2**	43.4	111	0.53	**60.26**	854	34.9
Nickel	**96.1**	22.7	48.6	0.29	**32.68**	220.4	24.0
Cadmium	0.6	0.99	4.98	0.0017	**0.19**	0.84	0.14

N/A = Not applicable; TSS = Total suspended solids; values in bold represent exceedances of TECs or CTR CMCs/CCCs.

[1] – Average of values measured in the Sacramento River (at Colusa, Verona, and Freeport [Alpers et al., 2000]), shallow cores in Englebright Lake (Sites 1, 4, and 7 [Alpers et al., 2006]), and fine grained sediments at Daguerre Point Dam (Alpers et al., 2006).

[2] – TEC = Threshold Effect Concentration (concentration below which harmful effects are unlikely to be observed); PEC = Probable Effect Concentration (concentration above which harmful effects are likely to be observed [MacDonald 2000]).

[3] – CTR CMC = California Toxics Rule Criteria Maximum Concentration; assumed hardness of 40 mg/L as $CaCO_3$.

[4] – CTR CCC = California Toxics Rule Criteria Continuous Concentration; assumed hardness of 40 mg/L as $CaCO_3$.

At the maximum anticipated TSS concentrations associated with suction dredging (i.e., 340 mg/L; Thomas, 1985), a number of CTR total recoverable criteria could potentially be

exceeded within the discharge plume. As stated above, settling of coarse suspended solids in combination with dilution from background streamflow would be expected to result in rapid attenuation of trace metal concentrations, which would be expected to return to background or near-background levels within a short distance downstream of the dredging site. Assuming that trace metals discharged from suction dredging are mostly associated with sediment, and that sediment levels in most areas dredged are relatively similar to areas elsewhere in the watershed (other than "hot-spot" areas), then the increased downstream loading of particulate-derived metals should not affect downstream sediment concentrations significantly.

In the scenario described above, most of the trace metal mobilized by the dredging activity, and measured as part of the total recoverable metals measurement, is expected to be bound to sediment particles. Sediment bound metal is not bioavailable to aquatic life and thus would not pose a risk of toxicity to fish or invertebrates passing through the discharge plume. In reality, one would expect some fraction of the total recoverable measurement of elevated metal concentration in the plume to be in a dissolved or ionic form that would be bioavailable to organisms. However, the concentration of metal in a bioavailable form is expected to be substantially lower than the full total recoverable concentrations shown in Table 4.2-6. At a typical dredging site (having sediment trace metal concentrations similar to those identified herein for the Yuba and Sacramento river sites and used in the Table 4.2-6 calculations), the dredging activity is not expected to increase the bioavailable concentration of any of the eight metals discussed to levels that would be toxic to aquatic life, on an acute or chronic basis. Moreover, the bioavailable fraction of metal, which could have been elevated by the dredging activity, will rapidly become diluted with increasing distance downstream from the dredging site, and is expected to rapidly return to background levels at most sites as shown in the studies cited above.

With regards to aquatic life exposure, because of the noise and activity around a site of active dredging, relatively few fish (within the river reach) would be expected to be exposed to the plume. Those invertebrates that may be disturbed and end up drifting through the plume would generally be exposed to elevated plume concentrations for only minutes before drifting beyond the plume itself. Likewise, fish feeding within the plume (on displaced and drifting invertebrates) or moving through the plume would be exposed to elevated metals levels for short periods of time, and would not be exposed to such conditions for four continuous days, which is the exposure period associated with the chronic (CCC) CTR criteria. Hence, based on the expected speciation (i.e., form) of total recoverable metal within the discharge plume and the exposure times of aquatic organisms to the plume itself, toxicity to aquatic organisms, even those temporarily feeding within or moving through the plume, is not expected to occur. This finding is consistent with the available scientific literature, which does not document toxicity to aquatic organisms associated with suction dredging.

Because there are specific sites in California where cadmium, copper, and zinc, for example, are highly elevated where historic mining activities occurred, it is reasonable to assume that localized hot-spots containing high sediment concentrations of metal ores exist. At such sites, sediment-bound metal concentrations and sediment pore water metal concentrations are likely to be substantially higher than at typical or "normal" sites assessed above. Such sites may also have problems associated with acid mine drainage. Such sites (e.g., Spring

Creek near the Iron Mountain Mine near Redding) tend to be identified on the state's 303(d) list due to their current, substantial impairments.

Consistent with the above discussion for typical (i.e., non-hot-spot) sites, suction dredging in metal hot-spot/acid mine drainage sites would tend to remobilize sediment-bound metals, which would rapidly re-settle to the creek bed within a short distance downstream of the site. However, hot-spot sites with known acid mine drainage issues (and associated low pH waters) would be expected to have very elevated levels of dissolved metals in both the water column and in the sediment pore water as well. Remobilization of highly elevated dissolved and bioavailable metal concentrations in low pH waters could have more far-reaching effects because once remobilized, the elevated concentrations of dissolved and bioavailable metals could move much farther downstream than the sediment-bound fraction. This would potentially discharge elevated concentrations of metals into downstream reaches or other downstream water bodies, thereby substantially elevating dissolved and bioavailable concentrations of various trace metals at distant downstream sites. At the example Spring Creek site, this could result in increased loading of dissolved and bioavailable trace metals to the Sacramento River, relative to the baseline condition of not dredging at this hot-spot site. Although adequate data are not available to perform a definitive, quantitative assessment of potential metal-related impacts to aquatic life and other beneficial uses within the hot-spot water body and at downstream locations due to suction dredging, this dredging scenario has the potential to adversely affect one or more beneficial uses within the hot-spot water body itself and at downstream water body locations.

Based on the information presented and discussed above, suction dredging under the Program at typical sites would not be expected to increase levels of trace metals assessed herein in any water body such that the water body would exceed state or federal water quality criteria by frequency, magnitude, or geographic extent that would result in adverse effects on one or more beneficial uses. In addition, suction dredging would not result in substantial, long-term degradation of trace metal conditions that would cause substantial adverse effects to one or more beneficial uses of a water body. Finally, 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.

Conversely, 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 the water body reach would exceed CTR metals criteria by frequency, magnitude, and geographic extent that could result in adverse effects to one or more beneficial uses, relative to baseline conditions. Therefore, this impact is considered to be potentially significant.

Potential mitigation measures to reduce the impact would necessarily involve identifying known trace metal hot-spots associated with past mining operations (e.g., problematic sites with acid mine drainage) and stating in the Regulations Program that these identified sites are closed to suction dredging.

Implementation of such mitigation actions may reduce potential impacts. However, because not all locations of such contamination are known, the feasibility with which contaminated sites could be identified at a level of certainty that is sufficient to develop appropriate closure areas or other restrictions for allowable dredging activities is uncertain at this time. Thus, a comprehensive set of actions to mitigate the potential impact through closures or minimization of discharges has not been determined at this time, nor is its likely effectiveness known. It should be noted that a program of feasible and adequate mitigation actions may be developed that includes the phased implementation of actions in combination with adaptive monitoring and evaluation measures. This impact would remain potentially significant until such time that a sufficient and feasible mitigation program is developed but there is no guarantee that this type of mitigation is practicable. This impact is considered significant and unavoidable.

Impact WQ-6. Effects of Trace Organic Compounds Discharged from Suction Dredging (Less than Significant)

Implementation of suction dredging under the Program may result in dredging activity occurring in sediments that could potentially contain elevated concentrations of trace organic compounds such as the now-banned and persistent legacy chlorinated hydrocarbon pesticides (e.g., DDT, dieldrin, and chlordane). Legacy pesticides can be transported to remote or high altitude waterways atmospherically. However, trace organic compounds have rarely been observed above public health thresholds in fish in upper elevation watersheds where suction dredging generally occurs (Davis et al., 2009). PCBs also are transported atmospherically, and are more commonly found above threshold values in fish (Davis et al., 2009; Ohyama et al., 2004). As noted in the Literature Review (Appendix D), characteristics of trace organic compounds in aquatic sediments have not been thoroughly evaluated throughout California. Moreover, no studies have been undertaken to determine whether suction dredging releases these chemicals, and, if so, what the fate, transport, and effects of the chemicals are downstream. The lowest applicable CTR criteria, either for aquatic life protection or human health protection, differs among the different chlorinated hydrocarbon pesticides. Regardless, where CTR criteria exist for the protection of human health via consumption of water and organisms and organisms only (i.e., municipal and domestic supply and recreation uses) and aquatic life beneficial uses, the criteria for protection of human health tend to be lower (e.g., see CTR criteria for 4,4'-DDT, Aldrin, Dieldrin, Heptachlor, PCBs). However, for some compounds (e.g., Endrin, alpha-Endosulfan, beta-Endosulfan), the CTR aquatic life criteria are lower than the human health criteria.

There are several characteristics of trace organic compounds that reduce the potential for there to be adverse effects to beneficial uses associated with their resuspension caused by suction dredging. First, legacy chlorinated hydrocarbon pesticides in particular have a high affinity for binding to sediment; thus, resuspension is unlikely to result in substantial release of bioavailable compound to the water column.

Second, these trace organic compounds were generally not widely used in the rural areas were suction dredging activity typically occurs; thus, there is unlikely to be "hot spot" areas for these compounds where dredging occurs. Based on these considerations, the vast majority of trace organic compounds mobilized by suction dredging would be adsorbed to sediments, most of which would rapidly re-settle to the stream bed within close proximity to the dredging site. Aquatic life exposed to the dredging plume would not experience

toxicity because the sediment-adsorbed compounds would not be bioavailable for uptake by organisms. Trace organics adsorbed to fine sediments (e.g., <63 µm) that are transported further downstream also would remain biologically unavailable to aquatic life and would eventually settle back to the substrate in downstream water bodies. Drinking water intakes that may divert such re-suspended fine sediments would remove the vast majority of it in the filtration process.

Third, suction dredging activities target areas with relatively active stream flow conditions. Consequently, to the degree that a portion of re-suspended trace organics would be present in the water column in bioavailable forms, their concentrations would not be expected to be at levels that would cause toxicity to aquatic life at the site or immediately downstream of the site. This is due to both expected levels of bioavailable concentrations of these compounds being relatively low and the limited duration of exposure to the dredging plume areas that organisms would experience. Invertebrates displaced by dredging or fish passing through the plume would generally be exposed to the plume for a matter of minutes. This is consistent with findings from the literature review, which did not produce any scientific literature that suction dredging results in toxic conditions for fish or other aquatic organisms. Moreover, concentrations of bioavailable organics would be rapidly attenuated by dilution with increasing distance downstream. Thus, dredging discharges would not be expected to cause measurable increases in the bioconcentration or biomagnifications of these compounds in populations of organisms in downstream reaches and downstream water bodies, relative to the baseline conditions where dredging was not occurring.

Finally, because sediment mobilization associated with suction dredging is not expected to re-mobilize high concentrations of trace organics (but rather mobilize sediments having "typical" levels of these compounds adsorbed to the sediments), its re-deposition downstream should not substantially alter downstream sediment concentrations of these compounds.

Based on the information presented and discussed above, suction dredging under the Program would not be expected to increase levels of trace organics in any water body such that the water body would exceed state or federal water quality criteria by frequency, magnitude, or geographic extent that would result in adverse effects on one or more beneficial uses. In addition, suction dredging would not result in substantial, long-term degradation of trace organic conditions that would cause substantial adverse effects to one or more beneficial uses of a water body. Finally, suction dredging is not expected to mobilize trace organics in a manner or to an extent that would increase levels of any bioaccumulative trace organic in a water body by frequency and magnitude such that body burdens in populations of aquatic organisms would be expected to measurably increase, thereby substantially increasing the health risks to wildlife (including fish) or humans consuming these organisms. Therefore, this impact is considered to be less than significant.

Activities Requiring Fish and Game Code Section 1602 Notification

Activities requiring notification under Fish and Game Code section 1602 are likely to result in additional site disturbances, increasing the potential to cause additional adverse water quality effects. Larger nozzle sizes and power winching would increase the amount of substrate movement capability, while dredging in lakes would potential affect sediment substrates with properties (e.g., percent fine-grained materials, organic matter content,

chemical composition, etc.) that may substantially differ than the predominant mineral and dense riverine sediments assessed herein. Suction dredging in lakes also would potentially increase the available area and amount of dredging within the state beyond those anticipated under the proposed regulations. Diverting stream flows at suction dredging sites would have the potential to increase channel sediment disturbance and alter the dilution and assimilative capacity of discharge plumes associated with dredging-related activity.

Activities subject to Fish and Game Code section 1602 notification have the potential to increase the discharge of sediment and magnitude and duration of turbidity/TSS plumes downstream of the dredging activity than the conditions assessed for the proposed regulations. Additionally, turbidity/TSS plumes and effects to aquatic organisms in calm lake or reservoir water bodies could differ substantially compared to the conditions assessed herein. Consequently, additional environmental assessment of turbidity/TSS discharges may be necessary to determine if the activity would result in a significant impact requiring implementation of mitigation. The extent of the necessary analyses would be determined by the CDFG on a case-by-case basis, and the detailed assessment would be evaluated in a CEQA analysis.

The additional activities that would be subject to Fish and Game Code section 1602 notification would not be anticipated to result in additional or substantially changed effects associated with encampment activities (Impact WQ-1), discharges of oil and gasoline (Impact WQ-2), or discharges of organic compounds (Impact WQ-6), which were all determined to be less-than-significant impacts under the proposed regulations not requiring Fish and Game Code section 1602 notification. Additional sediment disturbance associated with increased dredging nozzle size, diversion of streamflow, and allowance of dredging in lakes/reservoirs could increase the discharge of mercury (Impact WQ-4) and other trace metals (Impact WQ-5), as assessed above. Though the impacts of discharges of mercury and other trace metals have been found to be significant and unavoidable, activities requiring notification under Fish and Game Code section 1602 may contribute to additional adverse effects; the extent of which, would be evaluated in a CEQA analysis.

Chapter 4.3
BIOLOGICAL RESOURCES

4.3.1 Introduction

This chapter discusses the potential for the Proposed Program to affect biological resources. Specifically, this section: (1) discusses state and federal regulations relevant to the biological resources affected by the Proposed Program; (2) provides an overview of the existing environmental setting throughout the state; (3) identifies wildlife and plant species potentially affected by the Proposed Program; and (4) makes findings regarding the significance of the Proposed Program's impacts on biological resources.

The following appendices support this chapter:

- Appendix I: Descriptions of habitat types likely to occur in or adjacent to Proposed Program activities;
- Appendix J: Species lists generated from California Natural Diversity Database (CNDDB) query;
- Appendix K: Detailed life history descriptions for *Fish* action species
- Appendix L: Species-based restrictions on Proposed Program activities
- Appendix M. Management of Invasive Species

For the purposes of this chapter, the word "fish" when written as *Fish* refers to all wild fish, mollusks, crustaceans, invertebrates, or amphibians, including any part, spawn, or ova thereof, per the definition promulgated in Fish and Game Code section 45. References to fin fish are written without italics and in appropriate grammatical context.

Organization of the Discussion of Existing Conditions

This chapter addresses the following aspects of the existing conditions within the context of the Proposed Program.

- "Regulatory Setting" describes state and federal regulations relevant to the assessment of existing conditions and environmental consequences of the Proposed Program;
- "Environmental Setting" describes the various eco-regions of California where suction dredging may occur; and
- "Biological Resources" lists the organisms that potentially inhabit the Program Area. This section also identifies "special-status species" within the Program Area.

- Plant Species: Plant species for which CDFG does not have the authority to regulate under Fish and Game Code section 5653, but has considered in this SEIR:
  - **Aquatic and Wetland Species:** Species that are associated with aquatic and wetland habitats (See Table 4.3-5 at the end of this chapter); and
  - **Upland**: Species that are associated upland habitats (See Table 4.3-6 at the end of this chapter).

Methods of Assessing Impacts

The direct and indirect effects of suction dredging events are considered to be a function of the intensity, frequency, duration and location of the activity, as illustrated in the conceptual model shown in Figure 4.3-3. This conceptual model demonstrates how several governing (independent) variables influence the outcome of a dredging event. The regulations under the Proposed Program are an attempt to establish limits on the governing variables to ensure that suction dredging, consistent with the regulations, will not be deleterious to *Fish* (See Chapter 2, Section 2.2.2 for the definition of deleterious).

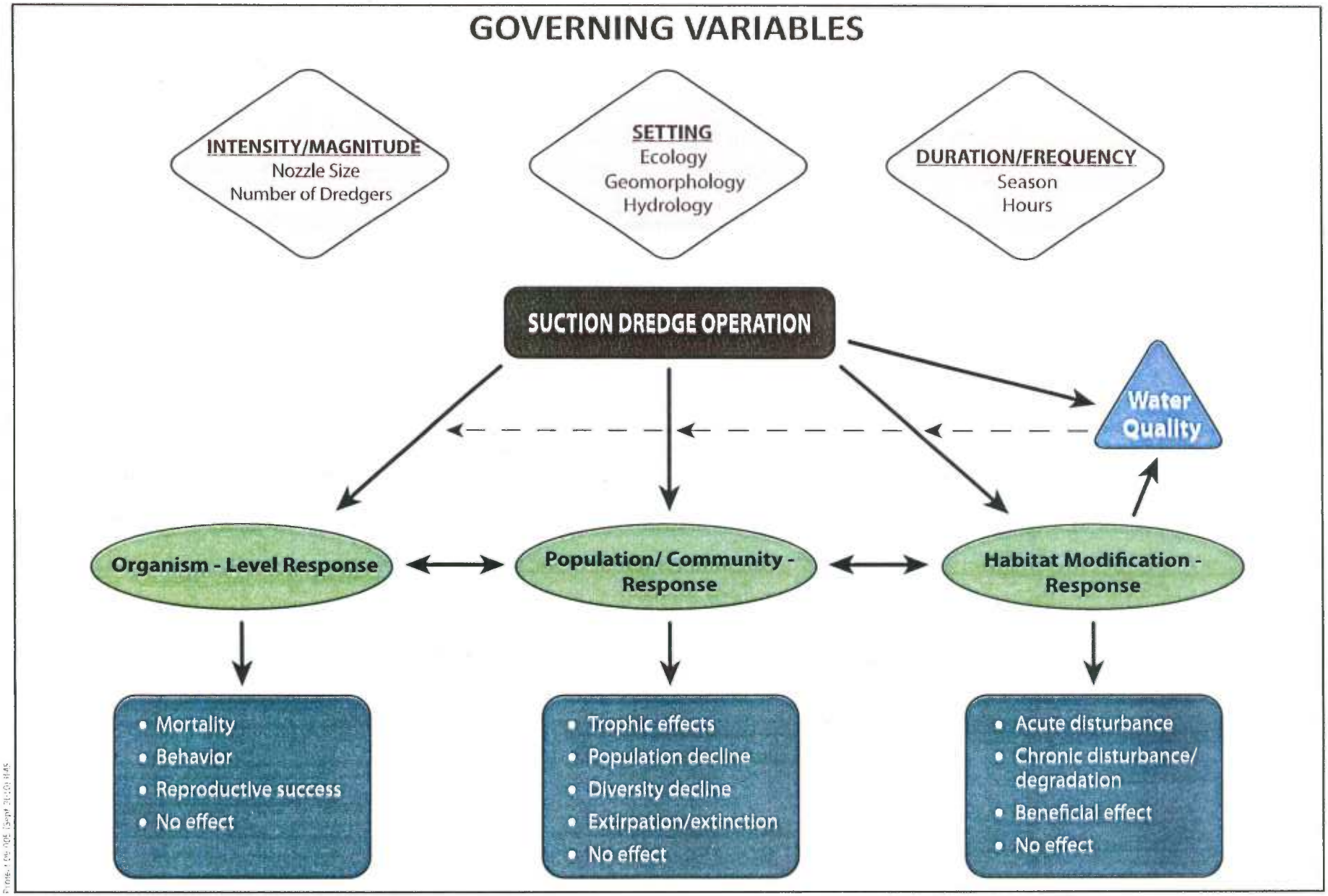
Another consideration in evaluating potential impacts of this program is the probability that gold will be present in a river, stream or lake. This is a function of the underlying geology. Figure 4.2-2 shows the locations of historic gold mines in California. In watersheds with historic gold mining, the probability of suction dredging is likely to be higher. Similarly, the Socioeconomic Report prepared for this Program provides information from suction dredgers on locations of suction dredge mining in 2008 (see Chapter 3 for further details). This information, while useful, is not conclusive since some rivers, streams and lakes were closed in 2008 – some of those previously closed waters would be available and utilized for suction dredging under the Proposed Program.

Further, the analysis of the Proposed Program's impact on biological resources is considered at multiple spatial scales. Site specific examples are provided, where appropriate, to demonstrate the range of potential outcomes and illustrate the complexity of determining the effects of one or many suction dredging events. CDFG believes that the level of detail and related analysis is appropriate to the scale of the Proposed Program (i.e., statewide), and is sufficient to ensure meaningful analysis and disclosure of the potential impacts of the Proposed Program.

Criteria for Determining Significance

For the purposes of this analysis, the Proposed Program would result in a significant impact to biological resources if it would meet one or more of the following criteria

- **Criterion A**: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFG, USFWS, or NMFS;



Horizon WATER and ENVIRONMENT

Figure 4.3-3
Conceptual Model of Suction Dredging Effects on Biological Resources

- **Criterion B**: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by CDFG, USFWS, or NMFS;
- **Criterion C**: Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means; or
- **Criterion D**: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

The analysis, in evaluating the potentially significant impacts of suction dredging activities to biological resources, considers both species and their habitats. These impacts are considered in the context of the Proposed Program, which incorporates spatial and temporal restrictions on suction dredging activities that are based on life history, distribution and abundance of action species. A determination is provided which evaluates if the regulations are sufficient to ensure that the impacts can be considered "less than significant." A *less than significant* impact generally refers to a situation where there is a measureable impact, but the impact is not likely to result in an adverse population-level effect on a particular species, or a wide-spread or long-lasting adverse effect on a natural community. For example, a suction dredge operation may disturb benthic habitat, an impact which can be measured, but this impact may not be substantial when considered in the overall context of the affected benthic species.

If an impact remains "potentially significant" following the evaluation, then mitigation strategies are discussed and considered. Any impact that remains significant even after mitigation is considered significant and unavoidable.

Note that in the context of the above, CDFG did not consider impacts to individual members of a population to be significant, unless the species was extremely rare. While a more conservative approach was contemplated, it was determined to be inappropriate because it would not be an effect that would be considered "substantial," especially given the statewide scope of the Proposed Program. For these reasons, the analysis focuses instead on population- and range-level effects.

Impacts related to turbidity, temperature, and toxicity/water quality contaminants are discussed in Chapter 4.2, *Water Quality and Toxicology.*

4.3.5 Environmental Impacts

Impact BIO-FISH-1: Direct Effects on Spawning Fish and their Habitat (Less than Significant)

Discussion

Among the possible effects of suction dredging is the potential impact on *Fish* (specifically, fin fish and amphibian) reproduction. Spawning is a stressful period, and *Fish* are highly vulnerable to disturbance during this period (Mazeaud et al., 1977). High levels of human activity, including swimming, wading, boating and equipment noise, have the ability to

and fall months due to seasonal restrictions for other species). Thus, the potential for substantial disturbance to fairy shrimp and their habitat would be minimized because when vernal pools are dry the organisms are in a life stage that is relatively resilient to disturbance (i.e., cyst form), and (2) the habitat would be less prone to disturbance/degradation that may be caused by ancillary suction dredge activities (e.g., encampments).

In the case of Trinity bristle snail and valley elderberry longhorn beetle, there would be a somewhat higher potential for impacts due to dredging because their life cycles are not timed such that they enjoy surrogate protection from disturbance by activities that are ancillary to dredging. Thus, it is likely that some level of disturbance to terrestrial/non-riverine aquatic invertebrates would occur. However, the level of impact associated with activities that are ancillary to dredging (e.g., camping, access and egress) is not likely to result in a substantial adverse effect to any special-status terrestrial/non-riverine aquatic invertebrate species. Thus, with respect to Significance Criteria A, B and C, the impact is considered less than significant.

Impact BIO-WILD-2: Effects on Special-Status Passerines Associated with Riparian Habitat (Significant and Unavoidable)

Discussion

Recreational activities, such as suction dredging, may impact special-status passerine[3] species by altering behavior, movements and distributions, which may lead to nesting failure and expenditure of critical energy reserves (Knight and Skagen, 1986). Human activity, including mechanical noise, can alter bird species composition associated with the activity area, causing nest abandonment, increased nest predation, and discouragement of late-nesting birds from settling in disturbed areas (Ellison and Cleary, 1978; LaGory et al., 2001).

Specific disturbance mechanisms include noise associated with dredge rigs, dredgers accessing streams, direct disturbance of riparian habitat, alteration of prey resource base, and suction dredging encampment activities at night (e.g., lights and noise). Suction dredging activities that occur during the passerine breeding season (typically March through August) may alter behavioral patterns of special-status passerines species such as Bank Swallow (*Riparia riparia*), Western Yellow-billed Cuckoo *(Coccyzus americanus occidentalis),* Least Bell's Vireo (*Vireo bellii pusillus*) and Willow Flycatcher (*Empidonax traillii*) (Table 4.3-3). In some cases this may prevent individuals from continued nesting in a section of their territory or result in nest abandonment (even temporary), causing mortality to eggs or nestlings.

Findings

Suction dredging and associated activities may cause impacts to special-status passerines species and their habitats that would be considered potentially significant with respect to Significance Criteria A, B and D. Table 4.3-3 list the special-status passerines species for

[3] Passerines are birds belonging to the order Passeriformes, a large subset of birds that have evolutionary traits adapted for perching.

which a potentially significant impact may occur in the absence of regulations. As discussed in Table 4.3-3, the Proposed Program regulations incorporate spatial and temporal restrictions based on *Fish* action species that would provide partial or full surrogate protection for nesting passerines within portions of these species' ranges. The following Proposed Program regulations, though not specifically intended to do so, would further minimize the potential for suction dredgers to impact nesting passerines species and their habitats:

- Section 228(k)(3): prohibits dredging within 3 feet of the lateral edge of the current water level. This will minimize potential disturbance to nesting habitat for a variety of passerines including Bank Swallow.
- Section 228(k)(4): prohibits the removal of streamside vegetation. This will minimize potential disturbance to nesting habitat for a variety of passerines including federally protected passerine species such as Willow Flycatcher and Least Bell's Vireo.

Potential for impacts to special-status passerine species would largely be minimized with incorporation of the Proposed Regulations, but not completely avoided. The potential for direct disturbance of nests or adverse behavior modifications due to human activity would remain. For several of these species (e.g., Least Bell's Vireo), even a small disturbance could be substantial considering the restricted population and/or range of the species in question. Thus, for those passerine species listed in Table 4.3-3, the level of impacts would remain potentially significant with respect to Significance Criterion A.

Mitigation measures are available to reduce impacts to a less-than-significant level for passerines that may be affected by a project. These mitigation measures include research using the CNDDB and other sources to identify potential locations of species, field surveys by qualified biologists to determine the location of sensitive passerines prior to dredging activities, and implementation of seasonal avoidance measures (e.g., buffers around known nests during the breeding season). Despite the advisory information that will be contained in the "Best Management Practices" packets to avoid such adverse effects, CDFG does not have the jurisdictional authority to adopt or enforce mitigation for impacts to non-*Fish* species under this program. Therefore, impacts to these passerine species are considered significant and unavoidable.

Impact BIO-WILD-3: Effects on Special-Status Raptors Associated with Riparian Habitat (Less than Significant)

Discussion

Recreational activities, such as suction dredging, may impact raptor species by altering behavior, movements and distributions, which may lead to nesting failure and expenditure of critical energy reserves (Knight and Skagen, 1986). Human activity and associated noise can increase nest desertion by adults and reduce success in fledging young (White and Thurow, 1985). Specific disturbance mechanisms include noise associated with dredge rigs, dredgers accessing streams, and direct disturbance of suitable riparian habitat. Suction dredging activities that occur during the raptor breeding season (typically March through August) may alter behavioral patterns of individual birds and potentially prevent special-

TABLE 4.3-3. NON-*FISH* ANIMAL SPECIES WITH POTENTIALLY SIGNIFICANT IMPACTS

Common name	Scientific name	Federal listing status*	State listing status*	General Habitat	Micro Habitat	Potential for Significant Impact prior to Program Regulations	Level of Significance with Proposed Regulations
Invertebrates							
valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	FT	None	Occurs only in the central valley of California, in association with blue elderberry (*Sambucus mexicana*).	Prefers to lay eggs in elderberries 2-8 inches in diameter; some preference shown for "stressed" elderberries.	**Potentially Significant.** If left unrestricted, suction dredging would have the potential to disturb/destroy host plants (i.e., blue elderberry) by dredging into streambanks. This would cause loss of suitable or occupied habitat which may be potentially significant.	**Less than Significant.** Compliance with proposed regulations which restrict dredging within 3 feet of a streambank, and prohibit the damage or removal of streamside vegetation, would minimize the potential for disturbance/destruction of host plants. Ancillary activities such as access/egress to and from streams and camping are not likely to cause significant impacts to species or host plants.
Birds							
southwestern willow flycatcher	*Empidonax traillii extimus*	FE	SE	Riparian woodlands in Southern California.		**Potentially Significant.** Species breeding activity generally extends from May through August (USFWS, 2002)[1]. If left unrestricted, suction dredging or ancillary activities would have the potential to disturb breeding and potentially cause nesting failure (See Impact BIO-WILD-2). If disturbance caused by	**Potentially Significant.** The Proposed Regulations, which include spatial and temporal restrictions on suction dredging, would provide surrogate protection for the vast majority of the USFWS designated critical habitat. Of the 17,212 acres of critical habitat in California, approximately 75% (nearly 13,000 acres) would be closed to dredging (Class A or E) during the nesting season, thereby limiting the potential

TABLE 4.3-3. NON-*FISH* ANIMAL SPECIES WITH POTENTIALLY SIGNIFICANT IMPACTS

Common name	Scientific name	Federal listing status*	State listing status*	General Habitat	Micro Habitat	Potential for Significant Impact prior to Program Regulations	Level of Significance with Proposed Regulations
						suction dredging or ancillary activities resulted in nest abandonment and/or failure of the species to successfully reproduce, this would be considered a significant impact.	for impacts during the nesting season. However, dredging that may occur in unrestricted areas of the species range has the potential to disrupt nesting of the species. Therefore, the impact remains potentially significant.
least Bell's vireo	*Vireo bellii pusillus*	FE	SE	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft. elevation.	Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.	**Potentially Significant.** Species breeding activity generally extends from April through July (Wellik et al., 2009)[2]. If left unrestricted, suction dredging or ancillary activities would have the potential to disturb breeding and potentially cause nesting failure (See Impact BIO-WILD-2). If disturbance caused by suction dredging or ancillary activities resulted in nest abandonment and/or failure of the species to successfully reproduce, this would be	**Potentially Significant.** The Proposed Regulations, which include spatial and temporal restrictions on suction dredging, would provide surrogate protection for the majority of the USFWS designated critical habitat. Of the 36,988 acres of critical habitat in California, approximately 58% (more than 20,000 acres) would be closed to dredging (Class A or E) during the nesting season, thereby limiting the potential for impacts during the nesting season. However, dredging that may occur in unrestricted areas of the species range has the potential to disrupt nesting of the species. Therefore, the impact remains potentially significant.

TABLE 4.3-3. NON-*FISH* ANIMAL SPECIES WITH POTENTIALLY SIGNIFICANT IMPACTS

Common name	Scientific name	Federal listing status*	State listing status*	General Habitat	Micro Habitat	Potential for Significant Impact prior to Program Regulations	Level of Significance with Proposed Regulations
						considered a significant impact.	
western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FC	SE	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems.	Nests in riparian jungles of willow, often mixed with cottonwoods, w/ lower story of blackberry, nettles, or wild grape.	**Potentially Significant.** In California, stable breeding populations (i.e., greater than five pairs which persist every year) are currently limited to the Sacramento River from Red Bluff to Colusa, and the South Fork Kern River from Isabella Reservoir to Canebrake Ecological Reserve (Layman, 1998)[3]. Species breeding activity generally extends from June through mid-September; peak nesting activity on the South Fork Kern River occurs in the first half of July (Layman, 1998)[3]. If left unrestricted, suction dredging or ancillary activities would have the potential to disturb breeding and	**Potentially Significant.** The Proposed Regulations include spatial and temporal restrictions on suction dredging. Much of the known breeding habitat for species along the Sacramento and South Fork Kern River would be open to dredging from July 1 through September 30 (Class F). This restriction would not limit potential impacts during the species' nesting season. The level of activity anticipated to occur in breeding habitat on the Sacramento River is not anticipated to result in a significant impact. The level of activity anticipated to occur in breeding habitat on the South Fork Kern River is not known. Therefore, the impact remains potentially significant.

TABLE 4.3-3. NON-*FISH* ANIMAL SPECIES WITH POTENTIALLY SIGNIFICANT IMPACTS

Common name	Scientific name	Federal listing status*	State listing status*	General Habitat	Micro Habitat	Potential for Significant Impact prior to Program Regulations	Level of Significance with Proposed Regulations
						potentially cause nesting failure (See Impact BIO-WILD-2). If disturbance caused by suction dredging or ancillary activities resulted in nest abandonment and/or failure of the species to successfully reproduce, this would be considered a significant impact.	
little willow flycatcher	*Empidonax traillii brewsteri*	FSC	SE	Mountain meadows and riparian habitats in the Sierra Nevada and Cascades.	Nests near the edges of vegetation clumps and near streams.	**Potentially Significant.** Species' breeding activity in the Sierra Nevada generally extends from late May through August. If left unrestricted, suction dredging or ancillary activities would have the potential to disturb breeding and potentially cause nesting failure (See Impact BIO-WILD-2). If disturbance caused by suction dredging or ancillary activities resulted in nest abandonment and/or	**Potentially Significant.** Under the Proposed Regulations significant portions of the species range would be open to suction dredging during the nesting season. Suction dredging activity may occur in occupied breeding habitat. Therefore, the impact remains potentially significant.
willow flycatcher	*Empidonax traillii*	None	SE	Inhabits extensive thickets of low, dense willows on edge of wet meadows, ponds, or backwaters; 2000-8000 ft elevation.	Requires dense willow thickets for nesting/roosting. Low, exposed branches are used for singing posts/hunting perches.		

TABLE 4.3-3. NON-*FISH* ANIMAL SPECIES WITH POTENTIALLY SIGNIFICANT IMPACTS

Common name	Scientific name	Federal listing status*	State listing status*	General Habitat	Micro Habitat	Potential for Significant Impact prior to Program Regulations	Level of Significance with Proposed Regulations
						failure of the species to successfully reproduce, this would be considered a significant impact.	
Swainson's hawk	*Buteo swainsoni*	None	ST	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, & agricultural or ranch lands with groves or lines of trees.	Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	**Potentially Significant.** Species breeding activity generally extends from April through July. If left unrestricted, suction dredging or ancillary activities would have the potential to disturb breeding and potentially cause nesting failure (See Impact BIO-WILD-3). If disturbance caused by suction dredging or ancillary activities resulted in nest abandonment and/or failure of the species to successfully reproduce, this would be considered a significant impact.	**Less than Significant.** In California 95% of Swainson's Hawks are in the Central Valley (CDFG, 2005)[4] and about 85% of Swainson's Hawks nests in the Central Valley are within riparian forest or remnant riparian trees (Woodbridge, 1998)[5]. The vast majority of nesting occurs from Tehama County south to Tulare and Kings Counties. The greatest density of nests occur in Contra Costa, Colusa, Sacramento, San Joaquin, Solano, Sutter, Yolo counties and portions of northeastern Siskiyou county (CDFG, 2005)[4]. Nearly all nesting habitat would be closed to suction dredging through June or July (Class C or F). In the Central Valley, young have fledged by mid-June and are relatively safe without parental protection (CDFG, 2000)[6]; nest failure would be unlikely. Furthermore, dredging activity

TABLE 4.3-3. NON-*FISH* ANIMAL SPECIES WITH POTENTIALLY SIGNIFICANT IMPACTS

Common name	Scientific name	Federal listing status*	State listing status*	General Habitat	Micro Habitat	Potential for Significant Impact prior to Program Regulations	Level of Significance with Proposed Regulations
							in the Central Valley and other portions of the species breeding range is not anticipated to be common or widespread. Therefore, impacts are likely to be less than significant.
bank swallow	*Riparia riparia*	None	ST	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert.	Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.	**Potentially Significant.** Species nests in streambanks. Breeds from early May through July, with peak activity from mid-May to mid-June (Garrison, 1999)[7]. If left unrestricted, suction dredging would have the potential to disturb/destroy nests by dredging into streambanks. This would cause loss of suitable or occupied habitat which may be potentially significant. If disturbance caused by suction dredging or ancillary activities resulted in nest abandonment and/or failure of the species to successfully reproduce, this would be	**Less than Significant.** Major breeding is confined to the Sacramento and Feather rivers and their major tributaries north of their confluence. Other relatively large breeding populations of several colonies occur in: (1) Scott River, Siskiyou County; (2) Cache Creek, Yolo County; (3) Pit River, Shasta and Lassen counties; (4) American River, Sacramento County; (5) Cosumnes River, Sacramento County; (6) Salinas River, Monterey County; (7) Fall River, Shasta County; (8) Hat Creek and Lake Briton area, Shasta County; (9) Susan River and Baxter Creek, Lassen County; (10) Tule and Lower Klamath Lake area, Siskiyou and Modoc counties; (11) Clear Lake Reservoir, Modoc County; (12) Indian Creek, Plumas County; (13) Long Valley Creek, Lassen

TABLE 4.3-3. NON-*FISH* ANIMAL SPECIES WITH POTENTIALLY SIGNIFICANT IMPACTS

Common name	Scientific name	Federal listing status*	State listing status*	General Habitat	Micro Habitat	Potential for Significant Impact prior to Program Regulations	Level of Significance with Proposed Regulations
						considered a significant impact.	County; and (14) Bishop area, Inyo County (Garrison, 1998)[8]. Much of the species nesting habitat, including the mainstem Sacramento and Feather Rivers, would be closed to dredging during the peak nesting season. Proposed regulations which prohibit dredging within 3 feet of a streambank would further minimize the potential for disturbance/destruction of nests. Residual impacts from ancillary activities such as access/egress to and from streams and camping are not likely to cause significant impacts to species.

** List of Abbreviations for Federal and State Species Status follow below:*

FC	*Federal candidate for listing*
FE	*Federal endangered*
FP	*State fully protected species*
FPT	*Federal proposed: threatened*
SSC	*State species of special concern*
FSC	*Federal species of concern (per NOAA or USFWS website)*
SCE	*State candidate: endangered*
SE	*State endangered*
SSC	*State species of special concern*
ST	*State threatened*

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Chapter 4.5
CULTURAL RESOURCES

4.5.1 Introduction

Cultural resources include prehistoric archaeological resources, historic-era archaeological resources, historic architectural resources, as well as paleontological resources (i.e., fossils). The Initial Study found that the Proposed Program would have no significant impacts to historic architectural resources or paleontological resources (see Appendix B). As such, this section focuses solely on the potential impacts of suction dredge mining on historical resources, including shipwrecks and Traditional Cultural Properties, prehistoric and historic-era archaeological resources, and human remains.

4.5.2 Regulatory Setting

The State of California implements the National Historic Preservation Act of 1966, as amended, through its statewide comprehensive cultural resource surveys and preservation programs. The California Office of Historic Preservation (OHP) is an office of the California Department of Parks and Recreation, and implements the policies of the National Historic Preservation Act (NHPA) on a statewide level. The OHP also maintains the California Historic Resources Inventory. The State Historic Preservation Officer is an appointed official who implements historic preservation programs within the state's jurisdictions.

California Environmental Quality Act

CEQA, as codified in the California Public Resources Code (PRC) section 21000 et seq., is the principal statute governing the environmental review of projects in the state. CEQA requires lead agencies to determine if a proposed project would have a significant effect on historical resources, including archaeological resources. The CEQA Guidelines define a historical resource as: (1) a resource listed in or eligible for listing in the California Register of Historical Resources (CRHR); (2) a resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC section 5024.1(g); or (3) any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

If a lead agency determines that an archaeological site is a historical resource, the provisions of PRC section 21084.1 and CEQA Guidelines section 15064.5 would apply. If an archaeological site does not meet the CEQA Guidelines criteria for a historical resource, then the site may meet the threshold of PRC section 21083 regarding unique archaeological resources. A unique archaeological resource is "an archaeological artifact, object, or site

about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person (PRC § 21083.2 [g])."

The CEQA Guidelines note that if a resource is neither a unique archaeological resource nor a historical resource, the effects of the project on that resource shall not be considered a significant effect on the environment (CEQA Guidelines S§ 15064[c][4]).

California Public Resources Code

Several sections of the California Public Resources Code (PRC) protect paleontological resources. Section 5097.5 prohibits "knowing and willful" excavation, removal, destruction, injury, and defacement of any paleontological feature on public lands (lands under state, county, city, district, or public authority jurisdiction, or the jurisdiction of a public corporation), except where the agency with jurisdiction has granted permission.

Section 7050.5 of the Health and Safety Code protects human remains by prohibiting the disinterring, disturbing, or removing human remains from any location other than a dedicated cemetery. Section 5097.98 of the PRC (and reiterated in CEQA Section 15064.59 [e]) also states that in the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery, the following steps should be taken:

(1) There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:

(A) The coroner of the county in which the remains are discovered must be contacted to determine that no investigation of the cause of death is required, and

(B) If the coroner determines the remains to be Native American:

1. The coroner shall contact the Native American Heritage Commission within 24 hours.

2. The Native American Heritage Commission shall identify the person or persons it believes to be the most likely descended from the deceased Native American.

3. The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98, or

(2) Where the following conditions occur, the landowner or his authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance.

(A) The Native American Heritage Commission is unable to identify a most likely descendent or the most likely descendent failed to make a recommendation within 48 hours after being notified by the commission.

(B) The descendant identified fails to make a recommendation; or

(C) The landowner or his authorized representative rejects the recommendation of the descendant, and the mediation by the Native American Heritage Commission fails to provide measures acceptable to the landowner.

California Register of Historical Resources

The California Register of Historical Resources (CRHR) is "an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC § 5024.1[a]). The criteria for eligibility to the CRHR are based on National Register of Historic Places (NRHP) criteria (PRC § 5024.1[b]). Certain resources are determined by the statute to be automatically included in the CRHR, including California properties listed in or formally determined eligible for listing in the NRHP.

To be eligible for listing in the CRHR, a prehistoric or historic-era resource must be significant at the local, state, and/or federal level under one or more of the following criteria:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Is associated with the lives of persons important in our past;
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or,
- Has yielded, or may be likely to yield, information important in prehistory or history (CEQA §15064.5 [a][3]).

For a resource to be eligible for the CRHR, it must also retain enough integrity to be recognizable as a historical resource and to convey its significance. A resource that does not retain sufficient integrity to meet the NRHP criteria may still be eligible for listing in the CRHR.

4.5.3 Environmental Setting

Prehistoric Setting

Introduction

The following prehistoric setting of California is approached by describing archaeological data, ethnographic/linguistic studies, and modern traditions which illustrate the settlement patterns, lifeways, languages, cultures, and beliefs of California's Native peoples. Each of these topical areas is described briefly below, followed by a discussion of prehistoric property types that are commonly found along California's waterways.

Archaeological Data

Current archaeological evidence indicates that human occupation in California began at least 15,000 years ago; earlier occupation dates have been debated though not firmly established (Erlandson et al., 2007:62). Perceptions of human colonization of the Americas have shifted in the past 20 years. The theory of terrestrial migration, where big-game hunters crossed over the ice bridge from northeastern Asia and traveled down the ice-free corridor into the central plains, has recently been remodeled. Archaeologists now understand that coastal migrations as well as multiple periods of migration should be included in a viable discussion about California's first human settlement (Erlandson et al., 2007).

Categorizing prehistoric human occupation into broad environmental regions and cultural stages allows researchers to describe a wide number of archaeological sites with similar cultural patterns and components in a particular location, during a given period of time, thereby creating a regional chronology. Numerous and varying cultural chronologies have been developed for California's regions (generally referred to as the Northwest, Northeast, San Francisco Bay Area, Central Valley, Sierra Nevada, Central Coast, Northern Bight, Southern Bight, Mojave Desert, and Colorado Desert); however, interregional diversity cannot be simplified. The variation of environments in California has created differences in both the cultural behavior of the prehistoric inhabitants as well as in the approach of archaeological methods and research, thereby creating a complex and ever expanding understanding of California prehistory (Moratto and Chartkoff, 2007).

While the names and dates of California's prehistoric periods vary by region, time has generally been divided into broad periods that reflect major changes in material culture and settlement patterns (i.e. the Paleoindian Period, the Early Period, the Middle Period, and the Late Period). Economic and technological types, socio-politics, trade networks, population density, and variations of artifact types further delineate cultural periods.

The Paleoindian Period (ca. 15,000 to 8000 B.C.) was characterized by big-game hunters occupying broad geographic areas. During the Early Period (ca. 8000 to 500 B.C.) geographic mobility continued and is characterized by the millingslab and handstone as well as large wide-stemmed and leaf-shaped projectile points. Cut shell beads and the mortar and pestle are first documented in burials during this period, indicating the beginnings of a shift to more sedentary ways. During the Middle Period (ca. 500 B.C. to A.D. 1200) geographic mobility may have continued, although groups began to establish longer-term base camps in localities from which a more diverse range of resources could be

exploited. The occurrence of sites in a wider range of environments suggests that the economic base was more diverse and mobility was slowly replaced by the development of small villages. During the Late Period (ca. A.D. 1200 to 1550), social complexity developed toward lifeways of large, central villages with resident political leaders and specialized activity sites. Artifacts associated with the Late Period include the bow and arrow, small corner-notched points, and a diversity of beads and ornaments.

Ethnographies

Beginning in the early 16th century, but primarily during the late 19th and early 20th centuries, Native American lifeways and languages (i.e., ethnographic data) were documented throughout California. Whether by professional ethnographers/archaeologists, field personnel from government agencies such as the Bureau of Indian Affairs, soldiers, merchants, settlers, or travelers, ethnographic accounts partly illuminate the traditions, beliefs, and cultures of Native American groups during specific points in time. Synthesized narratives such as the *Handbook of North American Indians, California: Volume 8* (Heizer, 1978) categorize Native traditions and practices; however, the complexity of regional diversity should not be overlooked.

There are at least six primary language families in California, with perhaps over 300 different dialects of approximately 100 languages. The "geolingistic mosaic of the ethnographic period, with a startling diversity of languages and language families" indicates numerous major population shifts and migrations (Golla, 2007:71). Ethnographers have also quantified at least 60 greater Indian cultures with as many as 250 specific tribes.

Similarities between California's native populations crossed geographic, climatic, and cultural boundaries. Acorns, where available, were a staple throughout California. Deer, elk, small mammals, birds, and fish were relied upon. Resources were used to their fullest extent, with little to no waste product. Ethnographically-documented communities were generally focused on a central tribe with smaller satellite tribelets, however, this varied from region to region. Shamanism and ceremonialism played important roles in the lives of most California Native Americans. Basketry was well-practiced, although some southeastern tribes manufactured pottery. Hunting, trapping, and fishing technologies were shared across tribal and cultural boundaries, yet varied depending on environmental conditions.

Native American fishing techniques along inland waterways included the construction of fish weirs or dams across rivers to trap anadromous fish during upstream migration. Weirs were constructed of wood poles, logs, and small stakes to completely obstruct fish passage up a waterway. While some fish weirs were built and used by small groups, mainly individual families, communal constructions were also common (Gould, 1975). Cooperation to construct a communal fish weir included organized labor teams from many surrounding villages who would collect logs for the construction of the dam, catch fish, gather firewood, and process the catch. The dam would be in place for approximately ten days before the group would tear it down (Chartkoff, 2004). Other methods of fishing included net traps, harpoons, spears, platforms, and clubs. Tule balsa canoes and dugout canoes were also used in fishing (Wilson and Towne, 1978). Other important riverine subsistence species included steelhead, candlefish, lamprey, eel, and trout among others.

Trade was well developed in California. Shell beads as currency began as early as the later part of the Middle Period. Food, ornaments, household items, clothing, industrial materials such as obsidian, finished items including canoes, pottery, and basketry, and tobacco were used for trade items. Trade networks were well established, and although it appears that there were not professional traders, central villages served as focal points for trading (Heizer, 1978).

While regional differences are significant among Native American beliefs, there is a common identity and relationship with the environment. California Native peoples believe that nature is interrelated and immersed with sacred power. Creation myths are told in most California tribes, often explaining the origins of the earth, human existence, and individual cultural attributes. Stories often pointed morality or defined the establishment of elements. Modern Native American beliefs vary, but are rooted in their ancestral land and traditions.

Modern Native Americans

The 2000 U.S. Census recorded 220,657 American Indians in California, for those designating only one race, excluding Alaska Natives and Native Hawaiians. Of that number, some come from tribes outside the modern boundaries of California. Currently there are 107 federally-recognized Tribes in California and approximately 40 groups seeking to gain recognition. While the devastation brought about by the introduction of disease and displacement following European contact was overwhelming, Native American individuals and communities have continued to protect their cultural heritage and identity and maintain their languages and traditions.

Prehistoric Property-Types along California Waterways

Water—whether springs, creeks, rivers, lakes, bays, or the ocean—is one of the most important resources necessary for human use and settlement. Water, and access to water, gives sustenance, provides corridors for travel and trade, and establishes traditional boundaries. Both archaeological sites and Traditional Cultural Properties are located along waterways throughout California. Each of these types of properties is described below.

Archaeological Sites

Prehistoric archaeological sites generally found along California's waterways include permanent or semi-permanent habitation sites, temporary camps or food processing localities, and isolated artifacts. Archaeological materials that could be found at sites along waterways include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or tool making debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Native American human remains can also be found at prehistoric archaeological sites. Although it is less likely that these types of resources are located within the riverbed, there is a high potential that prehistoric resources are located on the adjacent riverbanks and surrounding vicinity (Foster, Dillon, and Sandelin, 2005).

While the construction of fish weirs and platforms is well documented ethnographically and traditionally, no archaeological evidence has been found in California related to these structures. However, evidence of semi-permanent wood-stake fish weirs have been identified on the Oregon Coast along tidal flats (Tveskov and Erlandson, 2003).

Traditional Cultural Properties

Places of importance to Native Americans can be considered historical resources as "areas" or "places" determined to be significant in the "social" and "cultural annals of California" (CEQA § 15064.5[a][3]). Defined as Traditional Cultural Properties (TCP) in the federal nomenclature, a TCP is generally significant because of its association with the "cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker, et. al., 1998). According to NRHP Bulletin 38, there are two integrity issues that should be considered in determining the eligibility of a TCP: (1) integrity of relationship and (2) integrity of condition. Assessing integrity of relationship includes developing "some understanding about how the group that holds the beliefs or carries out the practices is likely to view the property" (Parker, et. al., 1998). The condition of the TCP is determined by whether the property maintains that relationship. One defined TCP is a "Riverscape," or "a river and its environs, including their natural and cultural resources, wildlife, and domestic animals, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values" (King, 2004). Riverscape analysis requires that the entire river system be holistically considered for the cultural values that it conveys for Native peoples, and includes contributing elements such as spatial organization, topography, vegetation, wildlife (including fish), water features, and sites, structures, and objects (Gates, 2003).

Salmon is not only a source of subsistence for Native peoples, but also has ceremonial value in places where this resource is available. Most tribes consider the first salmon catch of the season an important ceremonial occasion; in some cases a shaman is required to spear the first fish that is then eaten communally. Only then can the salmon fishing season begin (Riddell, 1978:374). Other annual traditions include honoring the location where salmon was created (Bright, 1978:188). Ceremonial sites are potential Traditional Cultural Properties.

Historic Setting

Spanish Discovery

The earliest European presence in California came with the Spanish discovery and exploration of the California coast in the mid-sixteenth century. Alta California had been claimed for Spain in 1542 by the Portuguese Juan Cabrillo, who sailed up the Pacific Coast as far as Fort Ross. Due to the prosperity of its more southern colonies and the great distances required to travel so far north, Spain largely ceased overland and maritime exploration of Alta California (i.e., the area encompassing modern-day California) until the eighteenth century. Spain had originally focused its energy and attention on its southern colonies in New Spain; however, in the eighteenth century the increased presence of Russian settlements along the northwest coast and the British acquisition of Canada in 1763 encouraged Spain to explore and occupy Alta California in order to prevent Russian and British encroachment from the north.

Mission Period

European expansion into Alta California began when Spanish Mexico instigated the establishment of a string of Franciscan missions throughout the region. The California mission system had two goals: to Christianize and civilize the native population of California and to gain political and social control of the area for the Spanish government in Mexico.

Mission San Diego de Alcalá, the first of 21 California missions, was founded in July 1769. Over the next 50 years the mission system was extended further north. Alongside the missions came a network of military establishments or *presidios* and civilian settlements or *pueblos*. Exploration of the California hinterland focused predominantly on the identification of rancho sites to support the mission network as well as the recapture of runaway Natives.

Mexican Ranchos

Although the original Spanish plan for the mission system included secularization, the process did not begin until Mexican independence from Spain. Fueled by reports of Franciscans padres degrading the Native peoples and failing to provide food and services to the military, the Mexican government began secularization in mid-1834. During the process, the mission lands were to be divided among the Native American neophytes, although rarely did this actually happen. More often the mission lands were granted to high-ranking Mexican Californian soldiers, politicians, and socialites.

Mexican Californians, or *Californios*, were well known for their hospitality and easygoing lifeways. Early accounts describe ranchos with large households, operated by a large Native American labor force. Most ranchos were intensively involved in the hide-and-tallow trade, supporting huge herds of cattle on their vast landholdings. The cattle were driven to *matanzas*, or slaughter sites, that were usually as near to water transportation as possible for easy transport onto foreign trade vessels. The relationship between the *Californios* and the foreign ships had been active since the early 1820s. The ships imported all manner of trade goods, since little refined manufacturing occurred in Mexican California.

Beginning in the 1830s, Americans began to migrate to California. Many became Mexican citizens, married into prominent *Californio* families, and were granted lands from the governor. These first immigrants became acculturated into Mexican society and politics, while many were prominent businessmen and landowners.

Gold Rush

The discovery of gold in California in 1848 instigated one of the largest migrations in history. Thousands came by land and sea in search of their fortunes. Most came to dig for the gold, but many came with the foresight that miners needed supplies. Earlier residents of California, including many *Californios* and previous Euroamerican immigrants, capitalized on the new immigrant population. Many *Californios* also struggled to hold on to their vast landholdings. Although the Treaty of Guadalupe Hidalgo promised that property belonging to the Mexicans be "inviolably respected," the new Americans generally believed that the lands in California should be public property as a privilege of military victory. The vague land-grant maps, or *diseños*, that marked the boundaries of each rancho territory were protested and ignored by the land-hungry immigrants. "Squatters" settled on land officially owned by Mexicans and violence often erupted. Many *Californios* lost substantial amounts of land, despite legal efforts to hold on to it. Although many claims were confirmed, the Mexican landowners were often bankrupt by the end of the long and costly proceedings.

Settlers

Mining camps and towns were established almost immediately throughout the California's gold-bearing regions, which are generally located along the western foothills of the Sierra Nevada mountain range and along the Klamath and Trinity river basins. At the outset, the mining population was made up almost exclusively of single men. But miners needed food and supplies, and people who could provide those goods followed. Ultimately women and children also relocated to mining communities. The influx also brought an extreme diversity of cultures and nationalities. California gold mining was very successful; in 1852 California produced more than $81,000,000 worth of gold—60 percent of the world production for that year (Clark, 1957:223). Almost immediately after the discovery of gold, investors began talking about the construction of a transcontinental railroad that would connect eastern goods, money, and services to the new western enterprises. Prior to construction of the railroad however, the extensive inland waterway network of California was crucial for travel to the interior.

Suction Dredge Mining

Successful dredge mining operations began in California in the late 1890s (Caltrans, 2008). Dredging equipment included buckets or draglines attached to floating boats or barges that would scoop up gold-bearing gravel for processing. Dredging operations were generally located in rivers at lower elevations and created expansive tailing piles along the water banks. Large-scale dredge mining reached a peak during the 1930s. In the 1950s small-scale suction-dredge equipment was developed for the individual miner. The first machines were hand-constructed; however, manufactured suction dredges were soon available. Suction-dredge mining, for both recreational and financial opportunities, expanded in areas of California wherever placer gold deposits can be found.

Many other minerals were mined in California; however, gold deposits dominated the initial rush and continue to be a productive enterprise. Two types of gold deposits (placer and lode) involve four basic types of extraction (placer, hydraulic, underground, and dredging). All mining activities have left their mark on the landscape, including river diversions, waste rock and tailing piles, dredge tailings, cut banks, prospect pits, shafts, adits, and water conveyance systems such as dams, reservoirs, ditches, and flumes.

Historic-Era Property Types along California Waterways

Submerged Vessels

Potential historic-era resources that are located within California's river system are submerged vessels. The California State Lands Commission maintains a Shipwreck Database that currently identifies approximately 1,550 recorded shipwrecks in California, of which about 70 are recorded in California's river system (California State Lands Commission, 2009). The vast majority of these resources are wood-hulled, Gold Rush-era vessels submerged within the Sacramento, American, Feather, Yuba, and San Joaquin rivers in Central California. The title to all abandoned shipwrecks is under the jurisdiction of the California State Lands Commission. Any submerged vessel remaining in state waters for more than 50 years is considered a potentially significant historical resource.

Mining Sites and Features

Other historic-era resources that might be present in California's waterways are mining sites and features that are submerged within or adjacent to the state's river system. Property types include mining remains such as tailing piles and river diversions; water conveyance features such as ditches, flumes, and dams; and community remains including foundations, dugouts, and refuse deposits located along riverbanks and in the surrounding vicinity (Caltrans, 2008). Similar to submerged vessels, many of these other Gold Rush-era resources are concentrated within California's Sierra Nevada foothills, but may exist anywhere within the state's waterways.

Modern Development

California's waterways are a patchwork of both highly altered riverine systems and wild and scenic drainages that are undisturbed by modern development. The construction of dams, levees, canals, and reservoirs during modern times, whether for power generation, irrigation, flood control or transportation, have greatly altered the state's waterways, and with it, much of the surface evidence associated with the types of prehistoric and historic-era sites described above. Natural processes such as flooding and erosion/deposition have also altered or destroyed many of the cultural resources found along the state's waterways. Regardless of these natural and human-made disturbances, the state's waterways remain abundant with both recorded and unrecorded cultural resources, all of which provide a detailed record of California's rich cultural heritage.

4.5.4 Impact Analysis

The methodology described below accounts for activities conducted in accordance with the proposed regulations contained in Chapter 2. Additional or more extensive impacts related to cultural resources may result for those suction dredge activities requiring notification under Fish and Game Code section 1602. Notification is required for the following activities:

- Use of gas or electric powered winches for the movement of instream boulders or wood to facilitate suction dredge activities;
- Temporary or permanent flow diversions, impoundments, or dams constructed for the purposes of facilitating suction dredge activities;
- Suction dredging within lakes; and
- Use of a dredge with an intake nozzle greater than 4 inches in diameter.

A general description of how such activities requiring Fish and Game Code section 1602 notification would deviate from the impact findings are described at the end of the impact section below.

Findings of 1994 Environmental Impact Report

The 1994 EIR did not make findings for this environmental resource area.

Criteria for Determining Significance

For the purposes of this analysis, the Proposed Program would result in a significant impact if it would cause:

- A substantial adverse change, when considered statewide, in the significance of historical resources that are either listed or eligible for listing on the National Register of Historic Places, the California Register of Historical Resources, or a local register of historic resources;
- A substantial adverse change, when considered statewide, in the significance of unique archaeological resources; or
- Disturbance of any human remains, including those interred outside of formal cemeteries.

Historical Resources

CEQA Guidelines section 15064.5 requires the lead agency to consider the effects of a project on historical resources. A historical resource is defined as any building, structure, site, or object listed in or determined to be eligible for listing in the CRHR, or determined by a lead agency to be significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, or cultural annals of California. Types of historical resources potentially located in areas where suction dredge mining is conducted includes submerged vessels, TCPs, and historic-era mining sites and features. Archaeological resources that are potentially historical resources according to section 15064.5 are addressed in *Unique Archaeological Resources* below.

Archaeological Resources

The effects of a project on archaeological resources, both as historical resources according to section 15064.5, as well as unique archaeological resources as defined in section 21083.2 (g) must also be considered.

Human Remains

Human remains, including those buried outside formal cemeteries, are protected under a number of state laws including Public Resources Code section 5097.98 and Health and Safety Code section 7050.5.

4.5.5 Environmental Impacts

Impact CUL-1: Substantial Adverse Changes, When Considered Statewide, in the Significance of Historical Resources (Significant and Unavoidable)

Historical Resources

A significant impact could occur if suction dredge mining would cause a substantial adverse change, when considered statewide, in the significance of historical resources that are either listed or eligible for listing on the NRHP, the CRHR, or a local register of historic resources. Substantial adverse change is defined as the demolition, relocation, or alteration

of a resource to the extent that the character defining features which convey its significance would be lost.

Many cultural resources are known to exist in the rivers where suction dredge mining could occur. Some cultural resources may meet the criteria of significance defined in CEQA section 15064.5, and would be considered historical resources for CEQA purposes, while others may not meet the criteria, and therefore would not be considered historical resources under CEQA. The significance of cultural resources is derived from one or more factors including: associations with important historical events or persons; possession of high artistic value or distinctive characteristics; and the potential to yield important information. To be considered significant, a resource must also retain sufficient integrity, including integrity of location, design, setting, materials, workmanship, feeling, and association. Impacts to non-significant resources would not be a significant impact to historical resources under CEQA section 15064.5. However, suction dredge mining does have the potential to affect significant resources. Whether this impact would have a substantial adverse change in the significance of a resource when considered statewide is a function of the likelihood of disturbance to these resources and their individual and/or collective significance. It is unknown whether suction dredge mining would affect significant historical resources to a level that would be considered significant statewide. As described in Chapter 2, CDFG will distribute an informational packet to each suction dredge permit holder to provide "Best Management Practices" guidance. This information packet will include measures regarding the identification and avoidance of historic and cultural resources if they are encountered during dredging activities. However, such adverse impacts cannot be entirely discounted, even with the inclusion of avoidance measures contained within the "Best Management Practices" information packet. For this reason, impacts to historical resources are considered potentially significant.

For example, the numerous submerged vessels within California's river system might be located within areas of suction dredge mining. Submerged historic-era vessels, both recorded and unrecorded, which have the potential to yield information important to statewide history, would be considered historical resources for CEQA purposes. While many of these resources are concentrated within the rivers and tributaries of the Sacramento-San Joaquin Delta, they may exist anywhere within the state's waterways. Damage to, or destruction of, historically-significant submerged vessels would be a potentially significant impact. Although the potential damage to or destruction of such resources resulting from dredge mining operations is unknown and may be somewhat reduced by the information contained in the "Best Management Practices" packet, it cannot be entirely discounted. As both recorded and unrecorded submerged vessels may exist in locations where suction dredge mining may occur, potential damage to such resources is considered a significant impact.

Other potential historical resources that might be present in areas of suction dredge mining are historic-era mining sites and features that are submerged within or adjacent to waterways. Property types might include mining remains such as tailing piles and river diversions; water conveyance features such as ditches, flumes, and dams; and community remains including foundations, dugouts, and refuse deposits located along riverbanks and in the surrounding vicinity (Caltrans, 2008). Mining-related cultural resources are numerous in locations where modern suction dredge mining is conducted. Many of these Gold Rush-era resources are concentrated within California's Sierra Nevada foothills, or

'Gold Country,' but may exist anywhere within the state's waterways. A previous study conducted on the effects of suction dredge mining on cultural resources concluded that the activity has the potential to affect historic-era resources along the creek banks during access and camping activities (USFS, 2006).

While the potential impacts to specific historical resources may be reduced if certain river reaches are closed to suction dredge mining, the potential impact to historical resources that continue to be part of the Program Area would not diminish. And though the guidance provided in the "Best Management Practices" packets could reduce these effects, the potential for Program activities to result in a substantial adverse change in the significance of a historical resource due to possible demolition, relocation, or alteration would remain. For these reasons, impacts to historical resources resulting from suction dredge mining activities are considered potentially significant.

Mitigation measures designed to reduce impacts to a less-than-significant level are available for historical resources that may be affected by a project. These mitigation measure include archival research at the California Historical Resources Information System (CHRIS) or the State Lands Commission, field surveys by qualified archaeologists and/or architectural historians, to determine the location of recorded resources prior to dredging activities, and data recovery and other documentation efforts designed to collect or record the significant data associated with the resources. Despite the information contained in the "Best Management Practices" packets to avoid such adverse effects, CDFG does not have the jurisdictional authority to mitigate impacts to historical resources. Therefore impacts to historical resources are considered significant and unavoidable.

Traditional Cultural Properties

TCPs are known to exist in and around waterways where suction dredge mining could occur. The natural settings associated with "Riverscapes" are a recognized type of TCP (King 2004). Riverscape analysis requires that the entire river system be holistically considered for the cultural values that it conveys for Native peoples, and includes contributing elements such as spatial organization, topography, vegetation, wildlife (including fish), water features, and sites, structures, and objects (Gates, 2003).

Suction dredging activities could cause a substantial adverse change to TCPs through the introduction of increased human activity around the state's waterways. Implications of suction dredge mining could include elevated noise levels, intrusion by non-local or non-tribal persons, and the potential alteration of the physical environment associated with TCPs. Some of the TCPs that might be subject to impacts from suction dredge mining may meet the criteria of significance, as defined in CEQA section 15064.5, and would be considered historical resources for CEQA purposes. Other TCPs may not meet the criteria of significance as defined in CEQA section 15064.5, and would not be considered historical resources for CEQA purposes. Because TCPs are distinctive depending on location, setting, context, and association, substantial adverse changes to even one TCP may be considered a significant impact even in the statewide context of the Program. The informational packet distributed to each suction dredge permit holder will include guidelines to minimize and avoid adverse affects to TCPs. However, such guidance would only be advisory and would therefore not reduce adverse effects to a less-than-significant level.

Information about TCPs is generally gathered through the processes of consultation with Native American groups and local communities and ethnographic study. Due to the broad statewide nature of the Program, consultation and study were not feasible within the context of this SEIR. Without consultation and study, it is not possible to determine whether TCPs that qualify as historical resources under CEQA will also be subject to impacts from suction dredge mining activities. Conversely, without consultation and analysis of all locations where suction dredge mining occurs, it is not possible to determine the specific locations of all CEQA-significant TCPs in a statewide context. Furthermore, some TCPs would be required to be kept confidential, which would make regulation of those sites difficult. Mitigation measures, including documentation and interpretation, designed to reduce impacts to a less-than-significant level are available for significant TCPs that may be affected by a project. However, as CDFG does not have the jurisdictional authority to mitigate impacts to historical resources, impacts to TCPs are therefore considered significant and unavoidable.

Impact CUL-2: Substantial Adverse Changes, When Considered Statewide, in the Significance of Unique Archaeological Resources (Significant and Unavoidable)

Archaeological resources are usually eligible to be listed in the CRHR as historical resources under criterion d: a resource that has yielded, or may be likely to yield, information important in prehistory or history. In order to evaluate an archaeological site under criterion d, data requirements, research questions, and the historic context of that property must be identified and the integrity of the property must be addressed. If an archaeological resource does not qualify as a historical resource under CEQA, then the resource must be evaluated to determine whether it meets the criteria to qualify as a unique archaeological resource. Unique archaeological resources can include prehistoric and historic-era archaeological sites, individual artifacts, or objects. To be considered a unique archaeological resource, the resource must: (1) contain important scientific information of interest to the public; (2) retain a special quality, such as being the oldest or best example of its type and/or; (3) be associated with an important event of person. Alteration or destruction of a unique archaeological resource would be a significant impact.

Riverine settings are considered highly sensitive for the existence of significant archaeological resources. Prehistoric archaeological sites generally found along riverways include permanent or semi-permanent habitation sites, temporary camps or food processing localities, and isolated artifacts. Although it is less likely that these types of resources are located within the riverbed and the immediate area of impact of suction dredge mining, there is a high potential that prehistoric resources are located on the adjacent riverbanks and surrounding vicinity (Meyer and Rosenthal, 2008).

Suction dredge mining activities could cause a substantial adverse change to a unique archaeological resource through riverbed suctioning and screening activities that could disturb or destroy cultural materials which may be located just below the surface of the riverbed or along its banks. Impacts to unique archaeological resources resulting from suction dredge mining could also occur through increased human activity in the vicinity of the state's waterways. A significant impact could occur if suction dredge mining activities would cause a substantial adverse change, when considered statewide, in the significance of unique archaeological resource. Whether this impact would have a substantial adverse change in the significance of a unique archaeological resource when considered statewide is

a function of the likelihood of disturbance to such a resource and its individual and/or collective significance. It is unknown whether suction dredge mining would affect unique archaeological resources to a level that would be considered significant statewide. However, such adverse impacts cannot be entirely discounted even with the inclusion of avoidance measures contained within the "Best Management Practices" information packet. For this reason, impacts to unique archaeological resources are considered potentially significant.

Mitigation measures designed to reduce impacts to a less-than-significant level are available for unique archaeological resources that may be affected by a project. These mitigation measures include archival research at the California Historical Resources Information System (CHRIS) or the State Lands Commission, field surveys by qualified archaeologists and/or architectural historians, to determine the location of recorded resources prior to dredging activities, and data recovery and other documentation efforts designed to collect or record the significant data associated with the resources. Despite the advisory information contained in the "Best Management Practices" packets to avoid such adverse effects, CDFG does not have the jurisdictional authority to adopt or enforce mitigation for impacts to unique archaeological resources. Therefore, impacts to such resources are considered significant and unavoidable.

Impact CUL-3: Disturbance of Human Remains (Less than Significant)

A significant impact could occur if suction dredge mining would disturb, mutilate or remove human remains, including those which may be interred outside of a formal cemetery.

The potential for human remains to be located within or adjacent to areas of suction dredge mining activity is relatively low, but cannot be entirely discounted. Archaeological sites containing human remains may be located in areas subject to suction dredge mining. The suctioning and sorting activities of suction dredge mining could unearth, expose, disturb, and remove buried human remains, which would be considered a significant impact.

Potential impacts to human remains are significant; however California state law requires specific steps when human remains are discovered accidentally (section 7050.5 of the Health and Safety Code and section 5097.98 of the Public Resources Code). The specific steps to be taken in the event of discovery of human remains are described in the Regulatory Setting section above, and will be included in the information packet distributed to each suction dredge permit holder. Compliance with State law would ensure impacts are less than significant.

Activities Requiring Fish and Game Code Section 1602 Notification

Activities requiring notification under Fish and Game Code section 1602 are likely to result in additional site disturbances, increasing the potential to cause adverse changes in the significance of archeological and/or historic resources. Larger nozzle sizes and power winching increase the amount of substrate movement capability, while dredging in lakes would result in potential for disturbances in locations that would not otherwise be subject to dredging under the Proposed Program. Furthermore, dredging in lakes or diverting flows could increase physical intrusions on, or alterations to, TCPs. Though impacts on historical and significant archeological resources (Impacts CUL-1 and CUL-2) have been found to be significant and unavoidable, activities requiring notification under Fish and

Game Code section 1602 may contribute to additional adverse effects; the extent of which would need to be evaluated in a CEQA analysis.

The potential for additional site disturbance also increase the potential to encounter or disturb human remains. Though activities requiring notification under Fish and Game Code section 1602 may increase the potential for accidental discovery, compliance with State laws would ensure that impacts on this resource would remain less than significant.

Chapter 4.7
NOISE

4.7.1 Introduction

This chapter describes the setting and potential impacts of noise associated with the implementation of the Proposed Program. This section begins with a brief discussion of noise terminology.

Overview of Noise Concepts and Terminology

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient sound level. The decibel (dB) scale is used to quantify sound intensity. Because sound pressure can vary enormously within the range of human hearing, a logarithmic scale is used to keep sound intensity numbers at a convenient and manageable level. The human ear is not equally sensitive to all frequencies in the entire spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called "A-weighting," written "dBA."

Different types of measurements are used to characterize the time-varying nature of sound. Below are brief definitions of these measurements and other terminology used in this chapter.

- **Sound** is a vibratory disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, can be detected by a receiving mechanism, such as the human ear or a microphone.
- **Noise** is sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- **Decibel (dB)** is a unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.
- **A-weighted decibel (dBA)** is an overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- **Maximum sound level (L_{max})** is the maximum sound level measured during the measurement period.
- **Minimum sound level (L_{min})** is the minimum sound level measured during the measurement period.

- **Equivalent sound level (L_{eq})** is the equivalent steady-state sound level that, in a stated period of time, would contain the same acoustical energy as a time-varying sound level during that same period of time.
- **Percentile-exceeded sound level (L_{xx})** is the sound level exceeded *x*% of a specific time period. L_{10} is the sound level exceeded 10% of the time.
- **Day-night level (L_{dn})** is the energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels during the period from 10:00 p.m. to 7:00 a.m.
- **Community noise equivalent level (CNEL)** is the energy average of the A-weighted sound levels during a 24-hour period, with 5 dB added to the A-weighted sound levels between 7:00 p.m. and 10:00 p.m. and 10 dB added to the A-weighted sound levels between 10:00 p.m. and 7:00 a.m.

L_{dn} and CNEL values rarely differ by more than 1 dB. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such in this assessment. In general, human sound perception is such that a change in sound level of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level. Table 4.7-1 presents example noise levels for common noise sources; the levels are measured adjacent to the source.

TABLE 4.7-1. EXAMPLES OF COMMON NOISE LEVELS

Source	Noise Level (dBA)
Weakest sound heard by average ear	0
Whisper	30
Normal conversation	60
Ringing telephone	80
Power lawnmower	90
Tractor	96
Hand drill	98
Bulldozer	105
Chain saw	110
Ambulance siren	120
Jet engine at takeoff	140
12-gauge shot gun blast	165

Source: National Institute of Safety and Health, 2009

4.7.2 Regulatory Setting

Federal

No federal, plans, policies, regulations or ordinances related to noise are applicable to the Proposed Program.

State

The State of California General Plan Guidelines published by the Governor's Office of Planning and Research (2003) provides guidance for the acceptability of different land uses within specific L_{dn}/CNEL contours to assist local agencies in their preparation of general plan noise elements. This guidance is provided in Table 4.7-2. However, it is the responsibility of each local agency, county, or municipality to incorporate these or other noise standards.

Local

A general plan is a legal document required by state law which includes specific goals, policies, standards, and/or implementation programs that constitute the formal policy of the County or municipality for land use, development, and environmental quality. California Government Code Section 65302(f) requires that cities and counties include a noise element in their general plans. The purpose of the noise element is to provide a guide for establishing a pattern of land uses that minimizes the exposure of community residents to excessive noise.

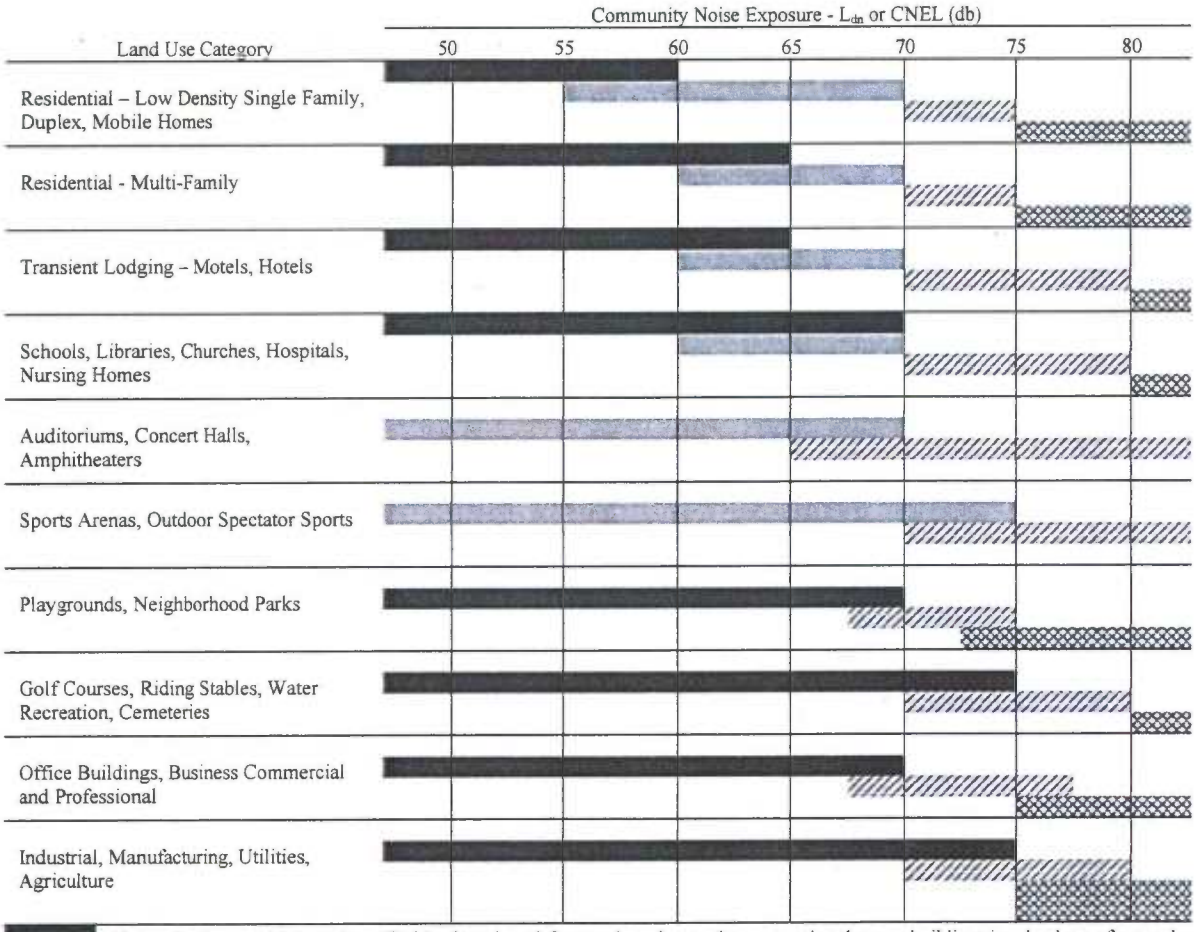
The general plan noise standards may vary throughout the state, depending on local conditions and adopted policies. As an example of such policies, Yuba County's General Plan noise objectives and standards are described in Tables 4.7-3 and 4.7-4.

Table 4.7-3 depicts the noise objectives contained within the Noise Element of Yuba County's General Plan. As shown, the ordinance provides recommended maximum ambient noise levels for several land use categories, including recreational areas. Recommendations are made for both day and night conditions.

Building upon the General Plan, the County adopted ordinance provisions to control unnecessary, excessive and annoying noise and vibration. Chapter 8.29 of the County's Ordinance Code describes noise policies. The ordinance provides definitions and thresholds for noise, and describes special provisions and enforcement of violations. Table 4.7-4 illustrates the County's established baselines and thresholds for noise. In addition, the Yuba County noise ordinance also contains specific regulations on machinery, equipment, fans, and air conditioning noise:

> ***Section 8.20.260 Machinery, Equipment, Fans, and Air Conditioning***
>
> *It shall be unlawful for any person to operate any machinery, equipment, pump, fan, air conditioning apparatus, or similar mechanical device in any manner as to create any noise which would cause the noise level at the property plane of any property to exceed the ambient noise level by more than five (5) decibels. (#1094)*

TABLE 4.7-2. STATE LAND USE COMPATIBILITY STANDARDS FOR COMMUNITY NOISE ENVIRONMENT



Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
Normally Unacceptable	New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Clearly Unacceptable	New construction or development generally should not be undertaken.

Source: California Governor's Office of Planning and Research, 2003

TABLE 4.7-3. RECOMMENDED AMBIENT ALLOWABLE NOISE LEVEL OBJECTIVES

Land Use Category	7 a.m. - 10 p.m. (day)	10 p.m.-7 a.m. (night)
Low-density residential	50	50
Multi-family residential	55	50
Schools	45	45
Retail/commercial	60	55
Passive recreation	45	45
Active recreation	70	70
Hospitals/mental health facilities	45	40
Agriculture	50	50
Neighborhood commercial	55	55
Professional office	55	55
Light manufacturing	70	65
Heavy manufacturing	75	70

Source: Yuba County, 1994

TABLE 4.7-4. YUBA COUNTY NOISE REGULATIONS

Zone	Time Period	Ambient Level	Maximum Permissible Noise Levels (dBA)
Single-family residential	10 p.m. - 7 a.m.	45	55
	7 p.m. - 10 p.m.	50	60
	7 a.m.- 7 p.m.	55	65
Multi-family residential	10 p.m. - 7 a.m.	50	60
	7 a.m. - 10 p.m.	55	65
Commercial- Business and Professional	10 p.m. - 7 a.m.	55	65
	7 a.m.- 10 p.m.	60	70
General Industrial (M-1)	anytime	65	75
Extractive Industrial (M-2)	anytime	70	80

Yuba County Ordinance 8.20.140 - Ambient Base Noise Level

4.7.3 Environmental Setting

This section discusses the existing noise conditions in the Program Area.

Noise Sensitive Land Uses

Sensitive receptors in the Program Area include areas where people reside and/or participate in recreational activities which can be disrupted by unwanted noise. Areas that are adjacent to rivers and waterways where suction dredging activities take place may contain potential sensitive receptors to noise generation.

Given the extent of the Program Area, it is not plausible to identify the specific characteristics of every location that may be affected by the Program; however, a brief generalization of existing noise sensitive areas is provided below.

Recreational Camping and Activity Sites

Public parks and campgrounds, and a number of privately owned and operated campgrounds, may be located adjacent to areas where Program activities could occur. There is a wide range of facility types that may be used by suction dredge miners or located within hearing distance of suction dredge activities.

One end of the spectrum for camp or recreation sites may include remote, undeveloped areas where the only means of access is non-motorized. In these locations, motorized activity of any type is minimal, as it is difficult to transport heavy equipment in these conditions. Facilities such as showers/restrooms and designated camp lots in these types of areas are generally non-existent. Often, one can go for long periods of time without seeing many other individuals recreating in this type of setting. Ambient noise levels are predominantly characterized by the sounds of the natural environment.

As the inverse, highly-developed campgrounds and recreation facilities are also located within the Program Area. These types of areas may be fully accessible with areas for motor-home type camping or include more sheltered cabin or dorm structures. In addition, designated trails, boat or water equipment launching sites, restroom/shower areas, dining facilities, and other amenities may be available. Crowded conditions may be commonplace and may reach extreme conditions during peak seasons. In these areas, ambient noise is influenced by human activities and may fluctuate seasonally.

The majority of recreation sites in the Program Area are comprised of components from both the highly-developed and highly-undeveloped facility characteristics described above. The level of accessibility and types of amenities provided often dictate ambient noise levels, and characteristics (i.e., sources).

Residential Areas

Land uses surrounding the areas where Program activity could take place might include adjacent residential neighborhoods and homes. Residents in less-developed areas are potentially the most sensitive noise receptors within the Program Area, as noise from adjacent waterway activities may be the only significant human activity noise sources affecting these properties. Unlike recreational land uses, which are made up of transient user groups, residences are permanent dwellings. Residents are thus unable or less able to avoid noise from adjacent land uses.

The degree to which sound reaches residents from adjacent areas depends on the type of activity being conducted, distance to residence, and the building materials of the home. Though many counties and cities impose a minimum building setback from waterways to protect life and property, residences may still be subject to loud or continuous noise from area users.

Sensitivity

An individual's reaction to noise is determined by both the noise itself as well as the environment in which the noise occurs. Individuals accustomed to noisy environments or uses of such equipment are less likely to consider engine noise to be intrusive than those who are not. Likewise, the use of suction dredging equipment in areas with low ambient noise levels is more likely to be considered disruptive than usage in areas where noise levels are normally high.

Existing Conditions

As previously mentioned, ambient noise near waterways and recreational areas vary greatly due to local conditions. Many variables, including degree of development (rural vs. urban), proximity and size of nearby transportation facilities (airports, highways, roadways), and the size and characteristics of the waterway itself, can all contribute to the ambient noise level of the area.

A monitoring study of river recreation areas for the El Dorado County River Management Plan Update Draft EIR (1998) is useful in describing typical noise conditions near rivers. To quantify typical noise levels along the South Fork of the American River, continuous hourly noise level measurements were conducted at four sites along the river; near a resort, at a boat launch area, across from a bed-and-breakfast facility, and at an adjacent residence. In addition, short-term noise measurements of local water activities (kayaking, rafting) were taken at a popular turnout.

As stated by El Dorado County, the South Fork of the American River is characterized as being a medium- to low-density developed area. Land uses include a mix of commercial, residential, industrial, agricultural, and recreational uses. Commercial rafting outfitters and small businesses are scattered among private residences and small mining and rock harvesting operations (El Dorado County, 1998). It is important to note that the report focused primarily on non-motorized water recreation. Recorded engine noise was associated with vehicle activity getting to and from the sites.

The noise survey indicated that typical hourly noise levels in the monitoring area was in the range of 50-65 dB L_{eq}. According to the data, noise due to water flow was generally in the range of 48-50 dB. While this is not meant to definitively characterize the entire Program Area, it does provide a general baseline for ambient noise levels where suction dredging would occur. (El Dorado County, 1998)

This information supports the noise thresholds identified in previous reports as discussed in the Literature Review (CDFG, 2009). A 1979 report (Harris, 1979) provided a reference for ambient noise levels associated with natural and wild land settings, which were cited as varying from 25 dB (quiet wetlands) to 75 dB (developed recreation areas). The upper threshold limit identified in the 1979 report is still plausible in recreation areas which experience motorized activity (boats, all-terrain vehicles [ATVs], etc).

4.7.4 Impact Analysis

The methodology described below accounts for activities conducted in accordance with the proposed regulations contained in Chapter 2. Additional or more extensive impacts related

to noise may result for those suction dredge activities requiring notification under Fish and Game Code section 1602. Notification is required for the following activities:

- Use of gas or electric powered winches for the movement of instream boulders or wood to facilitate suction dredge activities;
- Temporary or permanent flow diversions, impoundments, or dams constructed for the purposes of facilitating suction dredge activities;
- Suction dredging within lakes; and
- Use of a dredge with an intake nozzle greater than 4 inches in diameter.

A general description of how such activities requiring Fish and Game Code section 1602 notification would deviate from the impact findings are described at the end of the impact section below.

Findings of 1994 Environmental Impact Report

The 1994 EIR did not make specific findings in this environmental resource area. Instead, noise-related effects were generally discussed as a component of "*Impacts on Recreational Opportunities.*" Noise associated with suction dredge activities were generally found to detract from the enjoyment of other recreational users in the vicinity. Such conflicts between recreational users were cited as being outside of the jurisdiction of CDFG and were only discussed in the report for informational purposes. Furthermore, the report concluded that suction dredging is a legitimate recreational activity and is afforded equal rights to use public lands to participate in the activity, so long as it is done in a legal manner.

Methodology

To assess potential noise effects, activities associated with the Program that have a potential to generate noise have been identified as shown below.

Program Noise Sources

Noise associated with Program activities is primarily associated with the use of engines to power the dredge equipment. Noise levels generated by individual suction dredging operations would be dependent on the size and power of the engine and equipment being used. Little information is available on the noise emissions from suction dredge equipment; however the U.S. EPA (1971) identified the following noise levels associated with the operation of small horsepower engines:

TABLE 4.7-5. GENERAL NOISE LEVELS OF SMALL HP ENGINES

Engine HP	Decibel Level at 50 feet
20	76
15	75
10	73
8	72
6	71
5	70

U.S. EPA, 1971

When evaluating the noise effects of multiple sources, typically the loudest source dominates. For two sources that are very close in noise level, they can combine to produce a slightly higher noise level. However, for the purposes of this analysis, it is assumed that the loudest noise source is generally what is heard and has the greatest impact on the noise environment.

Other noise sources could include equipment use at encampments, such as electrical generators. However, these noise emitting devices are not required to conduct suction dredge activity. Instead, they are optional components of recreation and are common to many other types of recreational activities. Therefore, the noise levels associated with the use of such equipment were not quantified, but are anticipated to be similar to the noise levels outlined above.

Due to the overall size of the Program Area and the diverse range of ambient noise levels, potential noise effects are discussed qualitatively at a program level of detail.

Criteria for Determining Significance

- For the purposes of this analysis, the Proposed Program would result in a significant impact if it would: expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; or

- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

Other noise impacts were eliminated from further consideration in the Initial Study and are not discussed further here.

4.7.5 Environmental Impacts

Impact NZ-1: Exposure of the Public to Noise Levels in Excess of City or County Standards (Significant and Unavoidable)

Suction dredging activities typically require the use of noise-generating equipment. The level of noise emissions is related to the size, type, and number of equipment being used, though the potential for exceeding noise standards depends on the local ordinances applicable to the particular site. The smallest engine shown in Table 4.7-5 (5 HP), generate 70 db at 50 feet, which would be in excess of many local noise standards, which typically have limits ranging between 60-70 db. That said, numerous other activities may occur in similar settings which also use powered-equipment (i.e. use of a motor boat, ATVs, etc.) and have potential to violate these standards. Even equipment regularly used in residential areas, (eg. ringing telephones and lawn mowers) violates these standards.

Suction dredging activities have potential to generate noise in excess of local noise standards, which would be a significant impact. However, the Program does not authorize permittees to use their equipment in a manner which violates any existing laws, including the creation of noise in excess of existing standards. As such, all recreationists using noise-generating equipment, including suction dredge miners, are equally required to abide by

local noise ordinances. Violations can be reported at any time to the local authorities who have the jurisdiction to enforce applicable regulations as appropriate.

Even though local noise standards are outside of the scope of the Program to enforce, the impact cannot be discounted. Therefore, this impact is considered to be significant and unavoidable.

Impact NZ-2: Result in a Temporary Increase in Noise Above Ambient Levels (Less than Significant)

As previously noted, gasoline-powered engines are a primary component of suction dredge equipment. The operation of such noise-generating equipment in the existing environments of the surrounding recreational areas could result in a perceptible increase in noise. Although noise generated from these engines does not differ from those used in motorized boats or other motorized recreational equipment, the manner in which it is operated may distinguish suction dredging from other activities. As described in Chapter 3, suction dredge activities are generally stationary and equipment is often operated for extended periods throughout the day (just over 5 hours per day on average for both California resident and non-California resident permit holders [Suction Dredger Survey results, Appendix F]).

The extent to which the noise from suction dredging is perceptible is variable based on the ambient noise environment, which is affected by the other uses in the vicinity and the noise generated by the river itself. As previously shown in Table 4.7-5, noise levels of small horsepower engines are typically within the range of 70 dBA at close proximity (50 ft). Table 4.7-6 below further illustrates the estimated noise level associated with a 5 and 20 HP engine and distance from the source. Smaller engines generate somewhat lower noise levels (see Table 4.7-5).

TABLE 4.7-6. ESTIMATED NOISE LEVELS AND DISTANCE USING A 5 AND 20 HP ENGINE

Distance between Source and Receiver (ft)	Estimated Sound Level, Leq (dBA) with 5 HP Engine	Estimated Sound Level, Leq (dBA) with 20 HP Engine
50	70.0	76.0
100	68.3	74.3
200	64.9	70.9
300	61.6	67.6
400	58.2	64.2
500	54.8	60.8
600	51.5	57.5
700	48.1	54.1
800	44.7	50.7
900	41.4	47.4
1,000	38.0	44.0

U.S. EPA, 1971

Given that the general baseline of noise associated with water flow is within the range of 48-50 dB L_{eq} (El Dorado County, 1998), at close range and without any other noise

contributors, suction dredge activities would be highly evident above the river noise. That said, the degree to which noise from suction dredging operations are perceptible is highly dependent on the existing ambient noise levels.

As the distance between the receptor and the engine source becomes greater, the estimated sound level observed from the dredging equipment decreases. As a conservative example, the estimated sound level from a 20 HP engine at a distance of 100 ft is approximately 74 dBA, which generally decreases by 10 dBA for every additional 300 ft. Therefore, in highly developed recreation areas where ambient noise levels can reach 75 dB (Harris, 1979), noise associated with the use of a 20 HP engine would not be highly noticeable beyond 100 ft of the suction dredge activity. This relationship is illustrated in the Figure 4.7-1, below.

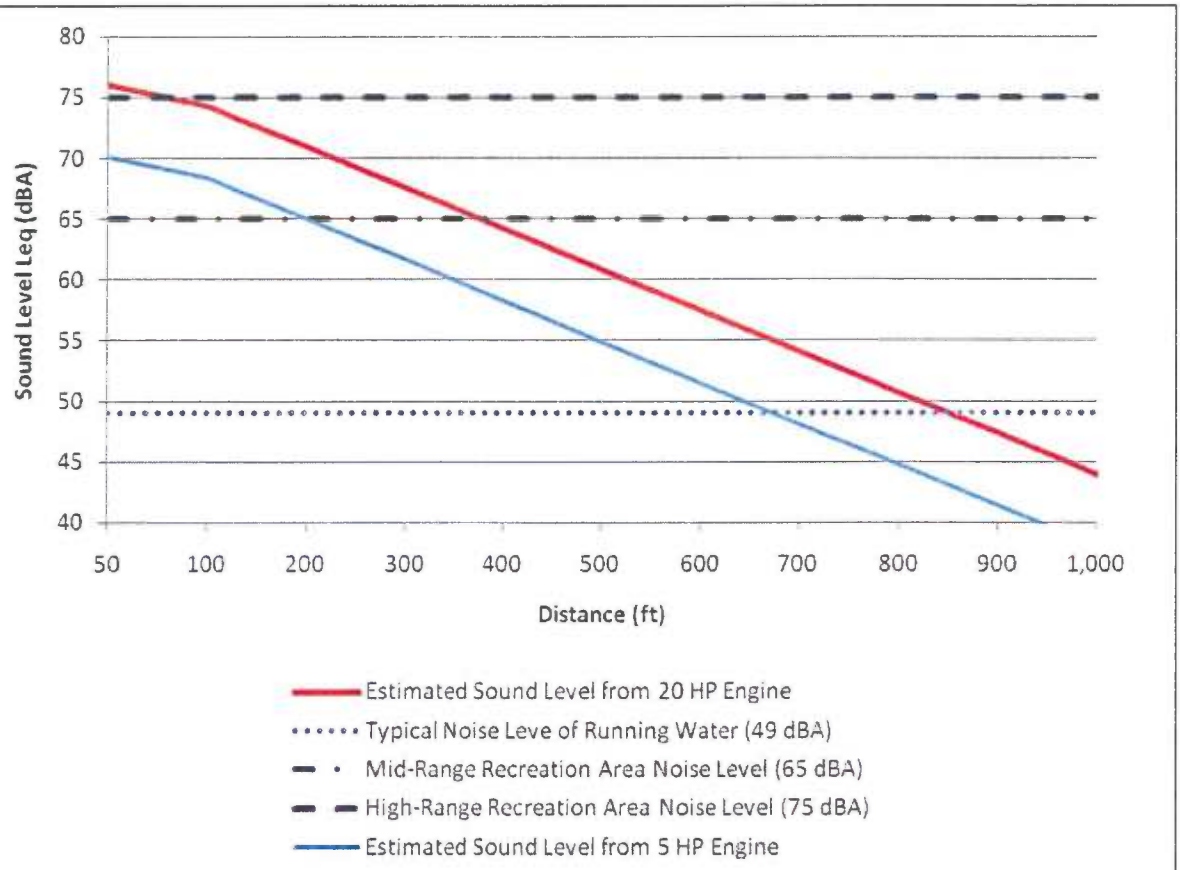


FIGURE 4.7-1. RELATIONSHIP BETWEEN NOISE LEVELS, DISTANCE, AND AMBIENT NOISE

Based on the assumption that typical ambient noise levels in recreation areas where suction dredging would occur are in the range of 50-65 dB L_{eq} (El Dorado County, 1998), noise associated with suction dredge equipment would remain within 3 dBA (just perceptible) within 300-700 ft of the activity location. Beyond 700 ft of the source, suction dredging noise would not be highly evident.

Therefore, 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 ambiance. For example, other Program participants may not notice one another while recreating in the same river location, though a hiker seeking a quiet nature experience may find the noise of an engine out in the distance (beyond 1,000 ft) extremely disruptive.

Another potential source of noise generation associated with suction dredge activities is the use of generators for power at remote camp locations. However, this type of equipment is 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.

In summary, suction dredging would cause temporary increases in noise above ambient levels. The degree of increase would be highly dependent upon the ambient noise environment and distance from the suction dredging activity. It is likely that in certain instances, this increase would have the potential to adversely affect receptors, particularly those sensitive to increases in noise (e.g., residents, those seeking a quiet nature experience). However, this impact is not considered substantial overall due to the relatively small number of instances where these impacts are anticipated to occur, given the relatively small number of dredgers statewide, and the numerous other sources of noise that can be found in the riverine environment. This impact is therefore considered to be less than significant.

Activities Requiring Fish and Game Code Section 1602 Notification

Activities requiring notification under Fish and Game Code section 1602 are likely to result in additional noise disturbances associated with the larger engine sizes used to power dredges equipped with nozzle sizes greater than 4 inches. However, the discussion above for Impact NZ-2 includes analysis of engines sizes up to 20 HP, which likely encompasses the entire range of engine sizes used to power the vast majority of dredge operations, including those requiring 1602 notification. As described in the impact section above, such effects are considered to be less than significant and no further discussion is required for operations using engines powered up to 20 HP. However, noise effects associated with the proposed use of engines above 20 HP may contribute to additional adverse effects. The extent to which they could be significant would need to be evaluated in a CEQA analysis.

Similarly, the use of engines associated with winching equipment could introduce additional noise emissions beyond the scope of the analysis provided in this SEIR. Even if the proposed activity employs engines with no greater than 20 HP, the use of multiple engines may increase noise emissions at the dredging location. Furthermore, dredging in lakes could result in greater effects on sensitive receptors as such areas generally exhibit lower ambient noise levels, whereby engine noise would be more readily apparent and disruptive. Therefore, such activities requiring notification under Fish and Game Code section 1602

may contribute to additional adverse effects. The extent to which they could be significant would need to be evaluated in a CEQA analysis.

Findings of Fact
of the
California Department of Fish and Game

as a

Lead Agency under the
California Environmental Quality Act
(Pub. Resources Code, § 21000 et seq.)

for the

Suction Dredge Permitting Program
(Fish & G. Code, § 5653 et seq.)

as analyzed in the

Suction Dredge Permitting Program
Subsequent Environmental Impact Report
(SCH No. 2009112005)

March 16, 2012

Findings of Fact

Suction Dredge Permitting Program
Subsequent Environmental Impact Report
(SCH No. 2009112005)

March 16, 2012

I. INTRODUCTION

The Department of Fish and Game (Department) has prepared these findings to comply with the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.). It does so as a "lead agency" for purposes of CEQA. (*Id.*, § 21067; CEQA Guidelines, § 15367.)[1] The Department is a lead agency in the present case because of its explicit permitting authority for suction dredge mining under the Fish and Game Code. (See Fish & G. Code, § 5653 et seq.) The Department adopts these findings specifically as set forth below as part of its discretionary decision to promulgate and adopt updated regulations to administer its suction dredge permitting program under the Fish and Game Code. (*Id.*, § 5653.9.) The Department last updated its regulations in 1994. (See Cal. Code Regs., tit. 14, § 228 et seq.)

In terms of required environmental review under CEQA, the Department prepared a draft subsequent environmental impact report (DSEIR) (State Clearinghouse No. 2009112005). (CEQA Guidelines, § 15162; see also Pub. Resources Code, § 21166.) The Department released the DSEIR for public review on February 28, 2011, holding six public hearings throughout the state to receive related comments before the close of the public review period as extended to May 10, 2011. The Department released its final subsequent environmental impact report (FSEIR) to the public on March 8, 2012, although it was under no legal obligation to do so under CEQA. For purposes of these findings and related certification requirements, both the DSEIR and FSEIR constitute the Department's "2012 EIR" for purposes of CEQA. Where the distinction between the DSEIR and FSEIR is important, these findings refer to the individual documents, respectively. Also of note, the 2012 EIR is a first "tier" environmental impact report under CEQA that the Department may rely on in the future for further related environmental review. (See generally Pub. Resources Code, §§ 21093, subd. (b), 21094; CEQA Guidelines, §§ 15152, 15153.)

The Department's decision to adopt updated regulations and certify the 2012 EIR marks an important milestone. Although currently prohibited by statute through June 30, 2016, the use of vacuum and suction dredge equipment for instream suction dredge mining is rooted in California history. So is related controversy, certainly over the past few decades. The Department's final actions here, including related environmental review under CEQA and rulemaking under the Administrative Procedure Act (APA) (Gov. Code, § 11340 et seq.), are both a product - and a current focus - of that controversy.

The Department is the only California state agency with explicit statutory authority to regulate suction dredge mining. (Fish & G. Code, § 5653 et seq.) Although the Fish and Game Code includes a general prohibition on the use of vacuum or suction dredge equipment in any river, stream, or lake, the same provision directs the Department to issue related permits in mandatory terms if suction dredging consistent with regulations

[1] The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

adopted by the Department will not be *deleterious to fish*. (*Id.*, §§ 5653, subds. (a)-(b), 5653.9.) The Department's explicit substantive legal authority for purposes of its suction dredge implementing regulations is limited, in this respect, to deleterious effects to fish. (*Id.*, § 45 (fish defined).) The effects of suction dredging on fish, however, are only a subset of the potentially significant environmental impacts caused by the activity. In the Department's opinion, that its regulatory authority is limited in the present context and likely misunderstood, is a factor contributing to ongoing controversy. Absent comprehensive regulatory reform governing suction dredge mining in California generally, and as discussed more fully below, the Department is still charged by statute and, in the present case, by court order to complete the underlying environmental review and rulemaking effort against the backdrop of existing law.

The Department's overarching interest in fulfilling its current legal obligations is the conservation of California's fish and wildlife resources. Established by statute, the Department serves by the same authority as the state's trustee agency for California fish and wildlife. (*Id.*, §§ 700, 711.7, subd. (a), 1802; Pub. Resources Code, § 21070; CEQA Guidelines, § 15386, subd. (a).) Consistent with its trustee mandate, the Department's mission is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public.

The trust status of California's fish and wildlife resources is rooted in the common law Public Trust Doctrine. As a state agency created by statute proposing to adopt updated regulations governing suction dredging, however, the Department must do so consistent with and subject to the controlling legal authority set forth in Fish and Game Code section 5653, subdivision (b). As explained in detail below, that charge and the related legal parameters governing the regulations puts the Department in the position of proposed final action having determined that the underlying regulated activity will result in significant and unavoidable environmental effects, including impacts to biological trust resources unrelated to fish. Those significant impacts run afoul of the Department's trustee mandate and, lacking the substantive authority to address those effects in this context, they are not acceptable.

In its capacity as a trustee agency the Department is often challenged to manage complex natural resource conflicts. Indeed, those conflicts typically highlight some of California's biggest challenges and, in many cases, the state's greatest achievements. Charged by existing law to effectuate a specific statutory mandate in the present case, the Department emphasizes its relevant substantive authority only goes so far. To the extent other potentially significant environmental effects occur beyond the Department's substantive reach, some of those effects are subject under current law to the jurisdiction and expertise of other federal, state, and local public agencies. As to the remaining significant impacts on biological trust resources, the Department has addressed those effects to the extent feasible consistent with its available substantive authority. (See, e.g., Pub. Resources Code, § 21004.)

The Department takes its final action in the present case and adopts these findings as set forth below consistent with its existing obligations under court order, CEQA, the APA, and the Fish and Game Code. It does so at the same time with a strong sense that existing state law governing suction dredge mining is ripe for comprehensive reform. In fulfilling its legal obligations, and doing so with the generous support and assistance of the California State Water Resources Control Board, the Department has made its best effort to find out and disclose all that it reasonably can about the environmental effects associated with suction dredging. The 2012 EIR, in fact, is the most comprehensive scientific analysis of suction dredging's impacts prepared in California to date. The Department anticipates its effort and related analysis will advance the related conversations among the myriad stakeholder groups involved in the issues.

The Department's lead agency analysis and disclosure obligations under CEQA are different, however, than its substantive legal authority to address related impacts. As to the former, the Department takes great pride noting the 2012 EIR is the most up to date technical analysis of suction dredging and its related effects in California. Recognizing related controversy will likely persist in the near term, the Department hopes nonetheless that its effort and the 2012 EIR will inform further policy, technical, and legal discussion regarding appropriate state regulation of suction dredge mining.

A. Project Description

This section describes the project for purposes of CEQA that is the subject of the Department's final action and these findings. That project consists of the proposed regulations as originally noticed by the Department in February and March 2011, as revised in February 2012 to include various environmentally superior elements. The revised regulations at issue here also include changes to address a small number of typographical and grammatical issues, and other nonsubstantial issues identified by the Department since February 17, 2012. The "revised regulations" for purposes of these findings and the Department's final action under CEQA, the APA, and the Fish and Game Code accompany these findings as a separate document.

In terms of general context, the DSEIR describes the proposed project for purposes of CEQA in the Program Description in Chapter 2. The Department's effort to develop proposed amendments to the existing regulations is described in the DSEIR in section 2.2.3, and the proposed regulations, highlighting the proposed changes to the 1994 regulations specifically, are described in DSEIR section 2.2.4, beginning at page 2-7. Importantly, the differences between the proposed regulations as originally noticed by the Department in February and March 2011, and the existing 1994 regulations currently found in Title 14 of the California Code of Regulations is highlighted in DSEIR Table ES-1. The proposed regulations as originally noticed, just like the existing regulations in Title 14, include a wide range of general provisions governing suction dredging under the Fish and Game Code, and specific restrictions by individual county and waterbody throughout California. The Department provided formal notice of the proposed regulations for purposes of the APA on March 18, 2011. (Cal. Reg. Notice Register 2011, No. 11-Z, p. 374.)

As noted elsewhere in these findings, the Department received, as expected, tremendous response to the DSEIR and the proposed regulations. The Department determined in response that various revisions to the proposed regulations were appropriate under both CEQA and the Fish and Game Code. Although the Department had signaled for some time following the close of the formal public comment period in May 2011 that revisions to the proposed regulations may be appropriate, it noted publicly its specific intention to issued revised regulations in early February 2011, providing formal notice of the *sufficiently related* changes under the APA on February 17, 2012. (See, e.g., Cal. Reg. Notice Register 2012, No. 7-Z, p. 174.) Those changes are also highlighted in the FSEIR as forwarded to public agencies that commented on the DSEIR on March 5, 2012, and as released to the public three days later. (FSEIR, Chapter 5, pp. 5.1 to 61.) The FSEIR discusses the revisions to the proposed regulations specifically, among other places, in sections 3.1 and 3.2.

Some of the revisions noticed in February 2012 and detailed in the FSEIR were simply prompted by the need to address typographical and grammatical issues. Others are intended to improve the overall efficiency of and the practicalities of administering and enforcing the proposed permitting program. The Department also revised the proposed regulations as originally noticed in response to factual and other technical information it received during the related public review period that ran from February to May 2011. Finally, the Department determined additional revisions were necessary to effectuate its obligations under CEQA's *substantive mandate* to reduce related significant effects to the extent feasible and, as directed by the Fish and Game Code, to ensure that authorized suction dredging would not be deleterious to fish. (Pub. Resources Code, §§ 21002, 21002.1, subd. (b); Fish & G. Code, §§ 5653, subd. (b), 5653.9.)

In addition to water body-specific revisions, the revised regulations include changes to the more general time, place, and manner restrictions as originally proposed. Of note, the revised regulations compared to the regulations as originally proposed: (1) reduce the total number of permits that will be issued by the Department during any calendar year from 4,000 to 1,500; (2) no longer require prospective permittees to identify the locations they intend to suction dredge in their permit applications, requiring instead that permittees keep an up-to-date report card regarding their operations, requiring permittees to submit that report card to the Department in January of the following calendar year; (3) include a density restriction prohibiting the operation of any vacuum or suction dredge equipment within 500' of another operating suction dredge; and (4) reduce the permissible hours to operate vacuum or suction dredge equipment from one half hour before sunrise to sunset, to 10:00 a.m. through 4:00 p.m.

As noted above, the Department has also identified a few additional typographical and grammatical, and *nonsubstantial* changes to the proposed regulations since public release of the revisions on February 17, 2012. All of these changes are necessary to address minor errors or typographical issues, and all are nonsubstantial. One such change reflected in the

revised regulations at issue here addresses an inadvertent error in the FSEIR.[2] The following table highlights the other grammatical and typographical, and other nonsubstantial changes between the revised regulations noticed on February 17, 2012, and the final revised regulations that are the subject of these findings and the Department's related final action:

COUNTY	WATER	DESCRIPTION	CHANGE MADE	REASON
Placer	American River, Middle Fork	Mainstem and all tributaries from American River North Fork upstream, unless otherwise noted	Added	Inadvertently left out. This was added to conform to the same reach of river in El Dorado so that there would be no confusion about the regulation. Change has no effect on fish.
Placer	American River, Middle Fork	Mainstem upstream from Oxbox Reservoir to Anderson Dam	Corrected to indicate only the reach upstream from Oxbow Reservoir.	Avoids having two different conflicting dredge seasons on the same river reach. Change has no effect on fish.
Riverside	Multiple Waterbodies	All shoreline pools and irrigation drains within one mile of the Salton Sea	Change Waterbodies to Waters.	Consistent use of term. Change has no effect on fish.
San Diego	Christianitos Creek	Mainstem	Delete "h" in Cristianitos. Delete reference to Gabino Creek upstream.	Correct spelling of Cristianitoes Creek. Gabino Creek is not in San Diego County. Change has no effect on fish.
San Diego	San Felipe Creek	Mainstem	Delete remainder of description	Avoids confusion because there are two SR-78 crossings. Change has no effect on fish.
Ventura	Hopper Creek	Mainstem	Delete entry	Redundant. No effect on fish.

[2] Specifically, the existing regulations currently found in Title 14 of the California Code of Regulations provided for the possibility of using a suction dredge with up to an 8-inch nozzle in the New River in Trinity County. The proposed regulations originally noticed by the Department in February and March 2011, removed this provision, thereby restricting maximum suction dredge nozzle size to 6 inches. The revised regulations released by the Department in February 2012, were consistent with that approach, as are the somewhat revised regulations at issue for purposes of final action here. The copy of the revised regulations included in the FSIER mistakenly indicate that an 8-inch suction dredge nozzle may be used, subject to other restrictions in the regulations, in the New River, Trinity County. That related description in the FSEIR is error, noted here simply to avoid confusion.

Again, all of the changes just highlighted, together with the revisions noticed to the public on February 17, 2012, constitute the "revised regulations" for purposes of these findings. These revised regulations also constitute the project that is the subject of and addressed in detail in these findings for purposes of the Department's final action under CEQA, the APA, and the Fish and Game Code.

Importantly, the Department has considered all the changes made to the proposed regulations as originally noticed in February and March 2011 in light of related obligations in CEQA and the CEQA Guidelines. (See, e.g., Pub. Resources Code, § 21092.1; CEQA Guidelines, § 15088.5.) In so doing, the Department finds the changes reflected by the revised regulations do not constitute significant new information added to the 2012 EIR, and that further revision and recirculation is not required under CEQA. The changes to the regulations as originally noticed are not attendant to, for example, nor do they give rise to or will they otherwise cause previously undisclosed new significant or substantially more severe environmental effects. In fact, the changes reflected in the revised regulations are both of product of and in response to the public review effort in the present case, with the revisions serving to reduce the severity specifically of various potentially significant effects first identified in the Department's Initial Study and later the DSEIR. The revised regulations in this respect as reflected for purposes of CEQA in the FSEIR, certainly compared to the Initial Study and DSEIR, merely clarify, amplify, or make insignificant modifications to the Department's environmental analysis, and the Department expects no new significant or more severe environmental effects with the revised regulations.

First, no new significant environmental impacts would result from the revised regulations. (CEQA Guidelines, § 15088.5, subd. (a)(1).) As discussed above, the revised regulations would lessen, not increase, the significant environmental impacts of the regulations as proposed in 2011, that were already identified in the DSEIR by, for example, reducing the total number of permits issued in a calendar year, including a related density restriction on operating suction dredges, and reducing the time in a given day when suction dredging is authorized.

Second, there would be no substantial increase in the severity of any previously identified environmental impact. (*Id.*, subd. (a)(2).) As discussed above, the revised regulations as approved by the Department lessen, not increase, the significant environmental impacts identified in the DSEIR. As an example, the DSEIR project description capped the total allowable annual number of permits at 4,000, while the revised regulations establish a cap of 1,500 annual permits, an almost sixty percent decrease. Fewer permits will result in less environmental effects and further reduce the prospect of deleterious effects to fish.

Third, there is no feasible alternative or any feasible mitigation measure considerably different from others previously analyzed that would clearly lessen the significant environmental impacts of suction dredging under CEQA or for purposes of the Fish and Game Code. (*Id.*, subd. (a)(3).) The potentially feasible alternatives evaluated in the DSEIR represent a reasonable range of alternatives, and the alternatives proposed by others in

comments on the DSEIR were infeasible. For further detail on this topic specifically, please see the Department's related discussion in the *Alternatives* section of these findings.

Fourth, the DSEIR was neither fundamentally and basically inadequate nor conclusory in nature so as to preclude meaningful public review. (*Id.*, subd. (a)(4).) The DSEIR contains a detailed, comprehensive review of all potentially significant environmental effects. By no measure is the 2012 EIR fundamentally and basically inadequate or conclusory.

In short, although the Department made changes to the proposed project since the release of the DSEIR, those changes lessen, not increase, the significant environmental impacts expected to occur with suction dredging authorized under the revised regulations.

B. Background and History

The background and history leading to the current environmental review and rulemaking effort, and of suction dredging in California generally are described in detail in a number of documents in the Department's administrative record of proceedings. The DSEIR, for example, describes the Program Background in section 1.1, discusses the history of suction dredging in section 3.1, and presents a detailed overview of the activity generally, along with a historical overview of the Department's permitting program in Chapter 3. The results of a survey conducted by the Department of 2008 permit holders also includes interesting background information as presented in Appendix F of the DSEIR. The same is true of a related socioeconomic report commissioned by the Department included in the DSEIR as Appendix H.

The FSEIR also includes important background information. Section 1.6, in particular, includes important information about the existing statutory moratorium on instream suction dredge mining, focusing on a related update following the enactment of Assembly Bill (AB) 120 in in July 2011. (See Stats. 2011, ch. 133, § 6, amending former Fish & G. Code, § 5653.1.) The section also discusses a December 2011 First District Court of Appeal decision in the *Hillman* litigation, one of three still pending lawsuits against the Department related to suction dredging.

In short, the background and history of suction dredging in California is marked, certainly since 2005, by considerable controversy. The current environmental review and rulemaking effort is itself a product of litigation. (*Karuk Tribe of California et al. v. California Dept. of Fish and Game*, Super. Ct. Alameda County, 2005, RG05211597; Order and Consent Judge entered December 20, 2006.) The December 2006 Order in the *Karuk* litigation directs the Department, specifically, to complete *further environmental review pursuant to CEQA* of its suction dredge permitting program and to promulgate, if necessary, updated regulations to protect special status fish species. Of note, the order also directs the Department to complete its environmental review and rulemaking effort by June 2008, which it was unable to do.

In that same vein, here is a list of the nine different suction dredge-related lawsuits filed against the Department since May 2005, highlighting those matters still pending:

Pending

- *Kimble et al. v. Schwarzenegger et al.*, Super. Ct. San Bernardino County, 2010, No. CIVDS1012922, filed September 15, 2010; hearing on demurrer, motion to stay, and motion for preliminary injunction scheduled on May 10, 2012.

- *Hillman et al. v. Department of Fish and Game et al.*, Super. Ct. Alameda County, 2009, No. RG09-434444, filed February 5, 2009; remittitur issued by First District Court of Appeal, Division 3 (A126402), on February 28, 2012.

- *Karuk Tribe et al. v. Department of Fish and Game et al.*, Super. Ct. Alameda County, 2005, No. RG05-211597, filed May 6, 2005; Order and Consent Judgment entered with Continuing Jurisdiction December 20, 2006; Case Management Conference scheduled on September 19, 2012.

Completed

- *Reynolds v. State of California et al.*, E.D. Cal. Case No. 2:11-CV-01381-MCE-CMK, filed June 7, 2011; Volunary Dismissal of Action filed by Plaintiff September 26, 2011.

- *Eddy v. Dept. of Fish and Game*, El Dorado County Small Claims Court No. PSC20100573, filed September 21, 2010; ruling in favor of Department issued November 16, 2010.

- *Public Lands for the People et al. v. State of California et al.*, U.S. District Court, Eastern Dist. of California, Case No. 2:09-CV-02566-MCE-EFB, filed September 14, 2009; Judgment Entered in favor of the State of California and the Department March 16, 2010.

- *Wegner v. Koch et al.*, Los Angeles County Sm. Claims Case No. LAV 09V06983; filed October 8, 2009; Judgment Entered against the Department February 3, 2010.

- *Eason v. Department of Fish and Game et al.*, Super. Ct. Sacramento County, 2006, No. 06CS00768, filed May 26, 2006; Judgment Entered in favor of the Department October 24, 2007.

- *Hobbs v. Department of Fish and Game et al.*, Super. Ct. Sacramento County, 2006, No. 06AS00028, filed January 6, 2006; Dismissed without Prejudice July 25, 2006.

Suction dredging has also been the subject of various legislative efforts during the same time frame.

- SB 87, 2011 Budget Bill, Stats. 2011, ch. 33, p. 4, Item 3600-001-00001, Provision 3.
- AB 120 (Committee on Budget), Stats. 2011, ch. 133, § 6, p. 9, amending Fish & G. Code, § 5653.1, effective July 26, 2011.
- SB 657 (Gaines), introduced February 18, 2011; fails to pass out of Senate Committee on Natural Resources and Water in April 2011.
- SB 670 (Wiggins), Stats. 2009, ch. 62, § 1, adding Fish & G. Code, § 5653.1, effective August 6, 2009.
- SB 889 (Aanestad), 2009/2010 Legislative Session; fails to pass out of the Assembly Committee on Water, Parks, and Wildlife in June 2010.
- AB 32 (Wolk), 2007/2008 Legislative Session; vetoed by Governor Schwarzenegger in October 2007.

C. CEQA Process

The Department's current environmental review effort begins in a legal sense with entry of the December 2006 Order in the *Karuk* litigation. Although it took the Department some time to obtain the public funding and related legal authority to expend the funds necessary to conduct the court-ordered review (see, e.g., Fish & G. Code, § 711, subd. (a)(1)), it moved the related ball down the field with notice published in the California Regulatory Notice Register in October 2007. (Cal. Reg. Notice Register 2007, No. 42-Z, p. 1783.) Having reviewed the information it received in response to that notice, the Department determined and informed the trial court in the *Karuk litigation* in DATE, that a subsequent environmental impact report, statewide in scope, was necessary for the Department to meet its related obligations under CEQA. (See Pub. Resources Code, § 21166; CEQA Guidelines, § 15162.) Building momentum, the Department executed a consulting contract with Horizon Water and Environment in DATE, turning then with the necessary resources, including the generous support of the State Water Resources Control Board, to the current effort.

Consistent with CEQA, the Department completed an Initial Study in November 2009, issuing a related Notice of Preparation (NOP) to begin formal scoping in October 2009. (See Pub. Resources Code, §§ 21080.1, 21080.4, 21104, and 21153; CEQA Guidelines, § 15063.) Following a series of public meetings throughout the state, and after convening a public advisory committee (PAC) that met on three occasions in February and March, 2011, the Department worked to develop and then release the DSEIR and the proposed regulations for public review in February 2011. (See Pub. Resources Code, § 21092; CEQA Guidelines, §§ 15087 and 15105.) With the extended public commented period closing in May 2011 after six public hearings across the state, the Department began its effort to review public comments and related material, and to prepare written responses as

required by CEQA. (See Pub. Resources Code, § 21091; CEQA Guidelines, §§ 15088 and 15132, subd. (b)-(d).)

On February 17, 2012, the Department released the revised regulations to the public under the APA. (See, e.g., Cal. Reg. Notice Register 2012, No. 7-Z, p. 174.) The Department also released the FSEIR to the public in early March 2012, which also addresses the revisions, having forwarded proposed written responses under CEQA to all the public agencies that commented on the DSEIR on March 5, 2012. (See Pub. Resources Code, § 21092.5.) These findings and related final action by the Department mark the end of the CEQA review effort at hand. (See CEQA Guidelines, §§ 15089-15092.)

The 2012 EIR includes a detailed overview of the Department's environmental review effort from a process standpoint. The DSEIR provides related details in Chapters 1 and 2, for example, including sections 1.2 through 1.5, and 1.9. DSEIR Appendices B, C, D, and G also include important details. The FSEIR, in turn, describes the effort further. (See, e.g., FSEIR, Chapter 1, §§ 1.2 through 1.5.)

II. SCOPE OF FINDINGS

Findings are required by each "public agency" that approves a "project for which an environmental impact report has been certified which identifies one or more significant effects on the environment[.]" (Pub. Resources Code, § 21081, subd. (a); CEQA Guidelines, § 15091, subd. (a); see also Pub. Resources Code, § 21068 (significant effect on the environment defined); CEQA Guidelines, § 15382 (same).) In the present case the 2012 EIR identifies various potentially significant effects the Department expects to occur with its approval of the revised regulations, and any such approval constitutes the approval of project for purposes of CEQA. The Department has prepared and adopts these findings as set forth below to comply with its related obligations under CEQA.

III. FINDINGS REQUIRED UNDER CEQA

As noted above, CEQA requires all public agencies to adopt findings before approving a project for which an EIR was prepared where the prospect of significant effects on the environment exists. These findings, as a result, are intended to comply with CEQA's mandate that no public agency shall approve or carry out a project for which an EIR has been certified which identifies one or more significant effects thereof unless the agency makes one or more of the following findings:

(1) Changes or alterations have been required in, or incorporated into, the project which mitigate or avoid the significant effects on the environment;

(2) Those changes or alterations are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency;

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

(Pub. Resources Code, § 21081, subd. (a); CEQA Guidelines, § 15091, subd. (a).)

These findings are also intended to comply with the requirement that each finding by the Department be supported by substantial evidence in the administrative record of proceedings, as well as accompanied by a brief explanation of the rationale for each finding. (*Id.*, § 15091, subds. (a), (b); see also Discussion following CEQA Guidelines, § 15091.) To that end, these findings provide the written, specific reasons supporting the Department's decision under CEQA to adopt the revised regulations and, if and when the existing statutory moratorium is lifted, to issue individual suction dredge permits consistent with the adopted regulations.

IV. LEGAL EFFECT OF FINDINGS

These findings are not merely informational. They constitute a binding set of obligations as adopted by the Department that will come into effect at the time the revised regulations take effect and, if and when, the existing statutory moratorium is lifted and the Department begins to issue individual permits consistent with the adopted regulations.

V. ADMINISTRATIVE RECORD OF PROCEEDINGS

For purposes of these findings, the administrative record of proceedings for the Department's discretionary issuance of the Suction Dredge Permitting Program consists, at a minimum, of the following documents:

- All Suction Dredge Permitting Program application materials submitted to the Department;
- All staff reports and related non-privileged documents prepared by the Department with respect to its compliance with CEQA and the CEQA Guidelines, and with respect to the Suction Dredge Permitting Program;
- All written testimony or documents submitted by any person to the Department relevant to these findings and the Department's discretionary actions with respect to the Suction Dredge Permitting Program;
- All notices issued to comply with CEQA or the CEQA Guidelines or with any other law relevant to and governing the processing and approval of the Suction Dredge Permitting Program by the Department;

- All written comments received in response to, or in connection with, environmental documents prepared for the Suction Dredge Permitting Program;

- All written evidence or correspondence submitted to, or transferred from, the Department with respect to compliance with CEQA or with respect to the Suction Dredge Permitting Program;

- Any proposed decisions or findings submitted to the Department by its staff, or the plan proponent, plan opponents, or other persons;

- The documentation of the final decision by the Department, including all documents cited or relied on in these findings adopted pursuant to CEQA and the CEQA Guidelines;

- Any other written materials relevant to the Department's compliance with CEQA and the CEQA Guidelines, or the Department's decision on the merits with respect to the Suction Dredge Permitting Program, including any draft environmental documents which were released for public review, and copies of studies or other documents relied upon in any environmental document prepared for the plan and either made available to the public during a public review period or included in the Department's files on the Suction Dredge Permitting Program, and all non-privileged internal agency communications, including staff notes and memoranda related to the Suction Dredge Permitting Program or to compliance with CEQA or the CEQA Guidelines;

- Matters of common knowledge to the Department, including but not limited to Federal, State, and local laws and regulations; and

- Any other materials required to be in the Department's administrative record of proceedings by Public Resources Code section 21167.6, subdivision (e).

The custodian of the documents comprising the administrative record of proceedings is the California Department of Fish and Game, located at 1416 Ninth Street, Sacramento, California 95814. All related inquiries should be directed to the Department's Office of the General Counsel at (916) 654-3821.

The Department has relied on all of the documents listed above in exercising its independent judgment and reaching its final decision with respect to the revised regulations and its Suction Dredge Permitting Program, even if not every document was formally presented to the Department or its staff as part of the Department's files generated in connection with the underlying environmental review and rulemaking effort. Without exception, any documents set forth above not found in the Department's files for the Suction Dredge Permitting Program fall into one of two categories. Certain documents reflect prior planning or legislative decisions of which the Department was aware in approving the Suction Dredge Permitting Program. (See *City of Santa Cruz v. Local Agency*

Formation Comm. (1978) 76 Cal.App.3d 381, 391-392; *Dominey v. Department of Personnel Administration* (1988) 205 Cal.App.3d 729, 738, fn. 6.) Other documents influenced the expert advice of Department staff, who then provided advice to the decision makers at the Department with respect to the Suction Dredge Permitting Program. For that reason, all such documents form part of the underlying factual basis for the Department's decision related to the Suction Dredge Permitting Program. (See Pub. Resources Code, 21167.6, subd. (e)(10); *Browning-Ferris Industries v. City Council of City of San Jose* (1986) 181 Cal.App.3d 852, 866; *Stanislaus Audubon Society, Inc. v. County of Stanislaus* (1995) 33 Cal.App.4th 144, 153, 155.)

VI. MITIGATION MONITORING AND REPORTING PROGRAM

CEQA and the CEQA Guidelines require the Department to adopt a mitigation monitoring and reporting program (MMRP) as part of its final action under CEQA to approve the revised regulations. (See Pub. Resources Code, § 21081.6, subd. (a)(1); CEQA Guidelines, § 15097.) According to CEQA, MMRPs help to ensure compliance with mitigation measures and changes incorporated into an underlying project avoid or substantially lessen significant environmental effects. Here, the Department is adopting updated regulations governing its suction dredge permitting program. The Department's revised regulations are not the typical project contemplated by CEQA in the MMRP context. The revised regulations themselves are designed to avoid or lessen significant environmental impacts related to suction dredging.

Pursuant to CEQA Guidelines Section 15097, subdivision (c), the Department may choose whether its MMRP will monitor mitigation, report on mitigation, or both. The revised regulations as adopted and implemented by the Department actually do both. The revised regulations, for example, provide more efficient permit management, account for further evaluation of species distributions and life histories, and make related adjustments to the Program to ensure that authorized suction dredging is not deleterious to fish. The revised regulations also specifically require permittees to keep and submit to the Department each January an up-to-date report card regarding their individual suction dredging operations during the past calendar year. This report card allows the Department to evaluate, on an ongoing basis, the significance of the environmental impacts related to suction dredging and to make changes, if needed, to ensure impacts remain less than significant. Additionally, upon adoption, the revised regulations will be enforceable as law, and therefore no additional document to ensure enforceability is necessary. Accordingly, the Department's action to adopt the revised regulations, viewing those regulations as its MMRP, is consistent with CEQA.

VII. SUMMARY OF FINDINGS

As noted above, the Department has prepared these findings to comply with CEQA. The relevant provisions of CEQA and the CEQA Guidelines require the Department against the backdrop of the 2012 EIR to address and adopt findings regarding all of the significant environmental effects expected with approval of the revised regulations. The Department

does just that in the sections that follow, focusing on the potentially significant effects that will be reduced to less than significant with the revised regulations followed by related discussion addressing the effects expected to remain significant and unavoidable. Although not required by CEQA, the Department begins its discussion focused on those effects determined to be less than significant as an initial matter.

VIII. LESS-THAN-SIGNIFICANT EFFECTS IDENTIFIED IN THE INITIAL STUDY NOT CONSIDERED FURTHER IN THE 2012 EIR

The Department prepared an "Initial Study" consistent with CEQA, issued an NOP, and conducted various public meetings through the state to solicit input about the scope of required analysis in the DSEIR. That effort and the related information are described in the 2012 EIR. (See, e.g., DSEIR, §§ 1.4.1, 1.4.2, and 1.5.1 through 1.5.3, pp. 1-7 through 1-11; and DSEIR Appendices B-D; see also Cal. Reg. Notice Register 2007, No. 42-Z, p. 1783.) An important purpose of the Initial Study and the Department's related scoping effort under CEQA was, among others, to focus the DSEIR on the effects determined as an initial matter to be significant or potentially significant, and to identify effects determined to not be significant. (See generally CEQA Guidelines, § 15063, subd. (c).) As part of that effort the Department determined in the Initial Study that the proposed permitting program would result in various less-than-significant effects that need not be addressed further in the DSEIR. The Department finds for the same reasons, and as discussed earlier, that the same impacts will also be less than significant with adoption of the revised regulations.

CEQA does not require findings for impacts deemed less than significant prior to mitigation. Yet, in the interest of comprehensive findings, the impacts the Department expects to be less-than-significant without mitigation as a result of suction dredging authorized under the revised regulations are identified below. Related discussion also appears, among other places, in the 2012 EIR. (DSEIR, § 4.0.3, pp. 4.0-2 through 4.0-5.) Nothing more is required for these findings or for CEQA generally. (See, e.g., Pub. Resources Code, §§ 21081, 21100, subd. (c), 21081; CEQA Guidelines, §§ 15091, 15126.2, 15128, 15143.)

To summarize, the Initial Study identified the following categories of impacts as less than significant that the Department also finds will occur with adoption of the revised regulations:

- Aesthetics: light and glare (Initial Study, p. 32);
- Air Quality: violation of air quality standards, exposure of sensitive receptors to substantial pollutant concentrations, and odors (*id.*, pp. 34-36);
- Cultural Resources: destruction of unique paleontological resources (*id.*, pp. 63-64);
- Geology and Soils: earthquakes and ground failure, unstable geologic units and expansive soils, and septic systems (*id.*, p. 66);

- Hazards and Hazardous Materials: location on a known hazardous materials site, and hazards to airports (*id.*, pp. 68-69);

- Hydrology and Water Quality: onsite or offsite flooding from drainage pattern alteration or flow contribution; placing housing or structures in a 100-year flood hazard area, or exposing people or structures to a significant risk involving flooding; contribute to inundation by seiche, tsunami, or mudflow (*id.*, pp. 73-75);

- Mineral Resources: loss of mineral resources (*id.*, p. 78);

- Public Services: police protection and parks (*id.*, p. 82-84);

- Recreation: recreational facilities and recreational conflicts between user groups (*id.*, pp. 85-86);

- Transportation and Traffic (*id.*, pp. 87-88); and

- Utilities and Service Systems: wastewater treatment and solid waste disposal (*id.*, pp. 89-90).

IX. PROJECT SPECIFIC LESS-THAN-SIGNIFICANT EFFECTS EXPECTED UNDER CEQA WITH APPROVAL OF THE REVISED REGULATIONS

This section discusses and sets forth the Department's findings with respect to the potentially significant impacts expected with approval of the revised regulations. The 2012 EIR, for example, examines in detail those impacts the Department deemed potentially significant as an initial matter for purposes of suction dredging authorized under the proposed regulations as originally noticed. (See generally DSEIR, Chapter 4, §§ 4.1 through 4.10.) The Department also explained in the 2012 EIR that, with the time, place, and manner restrictions in the proposed regulations, nearly all such impacts would be reduced to below a level of significance. As set forth below, the Department finds the same is true with respect to the potentially significant effects expected with the revised regulations.

A. Hydrology and Geomorphology (Draft SEIR Section 4.1)

1. Erosion, Transport, and Deposition of Alluvial Material in Rivers and Streams Resulting in Dredge Potholes, Tailings Piles, and Other Suspension/Depositional Features

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on existing geomorphic form and function, water quality, and aquatic habitat through the redistribution of alluvial material.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The revised regulations require suction dredge operators to level tailings piles generated from suction dredging operations. The Department also intends to provide related guidance generally as to how to restore dredge holes in a "Best Management Practices" handout given to permittees. Removing these irregular bed surfaces following dredging will reduce impacts to geomorphic form and function. Furthermore, in most streams and rivers throughout the state, natural sediment transport process will restore irregular bed surfaces caused by suction dredging. As such, the Department finds that sediment redistribution impacts (e.g., potholes, tailings piles and other suspension/deposition events) caused by suction dredging authorized by, and conducted in compliance with, the revised regulations will be less than significant for purposes of CEQA.

2. Destabilization of the Streambanks

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on the stabilization of streambanks.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The revised regulations prohibit the operation of vacuum and suction dredge equipment in proximity to or beneath a streambank, or the diversion of flow into a streambank. The revised regulations also require permit applicants to identify the locations of planned mining activities, providing additional oversight and enforcement capabilities. The Department believes these prohibitions and reporting obligations will serve as a deterrent to illegal suction dredging activities. The Department recognizes that, even with the prohibitions and reporting obligation, some illegal dredging will cause bank erosion and instability. However, due to the limited extent of potential bank erosion and instability caused by suction dredging, the Department finds that environmental effects under the revised regulations will be less than significant for purposes of CEQA.

3. Destabilization of Channel Bed Forms such as Riffle and Bars

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on channel bed forms such as riffles and gravel bars.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Suction dredging under the revised regulations may destabilize channel forms such as riffles and bars. In most cases, the geomorphic process for recovery would reset and reestablish these channel forms within 1 to 3 years following dredging. The effects of dredging are likely to be most evident in small channels and watersheds, downstream of dams, and in areas with a high concentration of dredging activity. The revised regulations include several provisions that will protect aquatic habitat and reduce related disturbance to riffles and bar features, including: (1) restrictions on nozzle size, (2) dredging being restricted to the wetted portion of the channel, (3) requirements to restore irregular bed surfaces and channel grades following excavation, (4) guidance to avoid areas of fine sediment, and (5) prohibitions on dredging in gravel bars at the tails of pools. Even so, the Department expects suction dredging under the revised regulations will destabilize channel riffles and bars to some degree. However, the Department expects these effects to be substantially reduced under the revised regulations even compared to the proposed regulations as originally noticed, especially considering the form and function of rivers and streams at the statewide scale. The Department finds, as a result, that environmental effects under the revised regulations associated with destabilizing instream channel bed forms will be less than significant for purposes of CEQA.

4. Destabilization of Channel Profile

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on channel profiles as a result of the movement of channel structural elements such as boulders and coarse woody debris (CWD), destabilization of riffles and gravel bars, and dredging excessively deep pits.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The revised regulations prohibit the movement of CWD and the use of power winches to move bed material. These restrictions will avoid and substantially lessen the potential for authorized suction dredging to destabilize channel profiles. Other restrictions and requirements in the revised regulations will further lessen such effects (e.g., knickpoints in channel profiles), including restrictions on nozzle size, and requirements that suction dredge operators restore channel grades and bed irregularities following dredging activities. The Department finds, as a result, that environmental effects under the revised regulations associated with channel profile destabilization will be less than significant for purposes of CEQA.

5. Streamflow Channelization, Diversion, or Obstruction

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on stream morphology and channel hydraulics as a result of obstructions and diversions of normal stream flows.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The revised regulations prohibit (1) constructing permanent or temporary dams, (2) concentrating flow in a way that reduces the total wetted area of the stream, and (3) diversion of a stream or lake into the bank. Additionally, the revised regulations require that permittee keep an up-to-date report card logging mining activities. This reporting aids Department oversight and enforcement capabilities, and creates a deterrent effect on illegal activity. Even if illegal dredging activities were to occur that led to instream channelization, diversions, or obstructions, in most cases geomorphic recovery processes would likely reset and reestablish the channel form within 1 to 3 years following dredging activities. The Department finds, as a result, that environmental effects under the revised regulations associated with flow obstructions and diversions associated with suction dredging will be less than significant for purposes of CEQA.

6. Alteration or Destabilization of Lake Bed or Shoreline

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on the morphology and shoreline of lakes.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The revised regulations require that a permittee submit notification to the Department (pursuant to Fish & G. Code, §1602) of any suction dredging activity proposed in a lake. If the Department concludes, after an on-site inspection required by the revised regulations, that the proposed dredging activity would not substantially alter the lake bed or shoreline and therefore does not require a Lake or Streambed Alteration Agreement, then the activity is deemed to have a less than significant impact to the geomorphic form of the lake. Alternatively, if the Department determines that the proposed dredging activity would substantially alter the lake bed or shoreline, and requires a Lake or Streambed Alteration Agreement, then the activity would be subject to additional CEQA review. The Department finds, as a result, that environmental effects under the revised regulations associated with alteration or destabilization of lake beds or shorelines will be less than significant for purposes of CEQA.

B. Water Quality and Toxicology (Draft SEIR Section 4.2)

1. Effects of Contaminant Discharges from Dredge Site Development and Use

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects as a result of discharges of wastes to water bodies from encampments near mining locations.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The revised regulations prohibit removal or damage to streamside vegetation and displacement of any material embedded on banks of rivers or streams during suction dredge operations. Because of these restrictions contained in the revised regulations, the Department does not anticipate suction dredging encampments to cause substantial erosion, runoff, or discharges of wastes and contaminants. In particular, undeveloped encampment activities for dredging are typically dispersed and along streams in primarily rural areas of the state, and conducted on a seasonal and temporary basis. Thus, implementation of the Program would not be anticipated to result in contaminant discharges that would be of sufficient magnitude, frequency, or geographic extent to adversely affect beneficial uses. Additionally, because of the seasonal, temporary, and intermittent character of most dredging activity, any water quality degradation that may occur is expected to be infrequent and dispersed and thus would not cause substantial or long-term degradation of water quality. Finally, development and use of encampments for suction dredging activities could result in the discharge of bioaccumulative constituents but the levels or frequencies would be too small to increase body burdens in aquatic organisms, or increase the health risks to wildlife (including fish and aquatic organisms) or humans consuming these organisms. The Department finds, as a result, that environmental effects under the revised regulations associated with discharges of wastes to water bodies from encampments near mining locations will be less than significant for purposes of CEQA.

2. Effects of Contaminant Discharges of Oil or Gasoline Used in Suction Dredges

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects as a result of accidental spills and discharges of fuel and oil used to power a dredge-mounted gasoline engine either directly into water bodies or indirectly to water or soil, where it may remain to be transported offsite by rainfall and runoff.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The revised regulations require that all fuel, lubricants, and chemicals be stored more than 100 feet away from the water, and that all fueling and servicing of dredging equipment must be done in a manner such that petroleum products and other substances are not leaked, spilled, or placed where they may pass into the waters of the state. These prohibitions in the revised regulations are expected to limit the risk of accidental spills and discharges of contaminants to water bodies. Additionally, existing Fish and Game Section 5650 regulations restrict the allowable fuel handling procedures.

The Department will also provide guidance to permit holders related to appropriate spill control and response measures in the event of fuel or oil spills, or if leaks are detected. Such guidance will be incorporated into the "Best Management Practices" document distributed at the time of permit issuance. Thus, the Program and existing state regulations provide enforcement authority empowering the Department and other local, state, or federal law enforcement officers to stop activities that may result in fuel/oil spills or discharges or that are inconsistent with the revised regulations.

Based on the dispersed and temporary character of dredging activities, and restrictions in the revised regulations designed to limit accidental spills of petroleum products, the Department anticipates that the potential for substantial quantities or frequent discharges of contaminants to water bodies will be limited. The Department therefore expects that implementation of the Program will not result in contaminant discharges of sufficient magnitude, frequency, and geographic extent to adversely affect beneficial uses. Because dredging activities are largely conducted on a seasonal, temporary, and intermittent basis in California, the Department expects any near-term water quality degradation that may occur to be dispersed. Finally, while potential discharges of petroleum products associated with dredging activities could result in the discharge of bioaccumulative constituents, the levels or frequency would be too small to measurably increase body burdens in aquatic organisms, or increase the health risks to wildlife (including fish and aquatic organisms) or humans consuming these organisms. The Department finds, as a result, that environmental effects under the revised regulations associated with contaminant discharges of oil or gasoline will be less than significant for purposes of CEQA.

3. Effects of Turbidity/TSS Discharges from Suction Dredging

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on the water column as a result of an increase in water turbidity and TSS levels from the resuspension of coarse and fine sediment.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The revised regulations prohibit activities that have the potential to disturb fine sediments and can result in higher levels of turbidity and TSS, such as mechanized winching, highbanking, removal of vegetation, dredging outside of the wetted channel, and diversion of flows. Additionally, the revised regulations require dredgers to take reasonable care to avoid dredging silt and clay materials. Thus, the Program provides enforcement authority under which the Department and other local, state, or federal law enforcement officers can act to stop activities that may result in turbidity/TSS conditions that are inconsistent with the revised regulations. It should be noted that dredging related discharges of turbidity/TSS, as an activity that has the ability to exceed numerical and narrative regulatory water quality objectives established in Basin Plans, may additionally be regulated by separate permitting authority of the RWQCBs pursuant to the CWA and

Porter-Cologne. While no such permitting processes have been established by the RWQCBs for the Program discharges or for the Department's previously authorized suction dredging program, such authority, if exercised, would have the potential to provide additional assurance that sufficient regulatory controls exist to prevent adverse effects to beneficial uses. At their discretion, individual RWQCBs or the SWRCB could develop a complementary permitting program for suction dredging activity to further address compliance with water quality regulations.

Suction dredging activities conducted in compliance with the revised regulations are not expected to result in substantial discharges of turbidity/TSS. Thus, the Department does not anticipate implementation of the Program to result in turbidity/TSS discharges of sufficient magnitude, frequency, and geographic extent to adversely affect beneficial uses. The revised regulations prohibit and/or limit specific channel disturbance activities and thus, limit the potential for excessively high turbidity/TSS levels from dredging activities. Because dredging activities are largely conducted on a seasonal, temporary, and intermittent basis in California, the Department expects any water quality degradation to be infrequent and dispersed and not a cause of substantial, long-term degradation of water quality. Turbidity and TSS are not bioaccumulative constituents and thus are not a concern for uptake in the food chain or health risk to wildlife or humans. The Department finds, as a result, that environmental impacts under the revised regulations associated with turbidity/TSS discharges will be less than significant for purposes of CEQA.

4. Effects of Trace Organic Compounds Discharged from Suction Dredging

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on waterways as a result of the release of trace organic compounds such as the now-banned and persistent legacy chlorinated hydrocarbon pesticides (e.g., DDT, dieldrin, and chlordane) from sediment.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: There are several characteristics of trace organic compounds that reduce the potential for there to be adverse effects to beneficial uses associated with their resuspension caused by suction dredging. First, legacy chlorinated hydrocarbon pesticides in particular have a high affinity for binding to sediment; thus, resuspension is unlikely to result in substantial release of bioavailable compounds to the water column. Second, these trace organic compounds were generally not widely used in the rural areas where suction dredging activity typically occurs; thus, there are unlikely to be "hot spot" areas for these compounds where dredging occurs. Third, suction dredging activities target areas with relatively active stream flow conditions. Consequently, to the degree that a portion of re-suspended trace organics would be present in the water column in bioavailable forms, their concentrations would not be expected to be at levels that would cause toxicity to aquatic life at the site or immediately downstream of the site. Finally, because sediment

mobilization associated with suction dredging is not expected to re-mobilize high concentrations of trace organics (but rather mobilize sediments having "typical" levels of these compounds adsorbed to the sediments), its re-deposition downstream should not substantially alter downstream sediment concentrations of these compounds.

Based on the information discussed above, along with revised regulations that include (1) restrictions on nozzle size, and (2) guidance to avoid areas of fine sediment, the Department does not expect suction dredging under the Program to increase levels of trace organics in any water body such that the water body would exceed state or federal water quality criteria by frequency, magnitude, or geographic extent that would result in adverse effects on one or more beneficial uses. In addition, suction dredging as permitted by the revised regulations will not result in substantial, long-term degradation of trace organic conditions that would cause substantial adverse effects to one or more beneficial uses of a water body. Finally, the Department does not expect suction dredging to mobilize trace organics in a manner or to an extent that would increase levels of any bioaccumulative trace organic in a water body by frequency and magnitude such that body burdens in populations of aquatic organisms would measurably increase, thereby substantially increasing the health risks to wildlife (including fish) or humans consuming these organisms. The Department finds, as a result, that the environmental impacts associated with trace organic compounds discharged from suction dredging will be less than significant for purposes of CEQA.

C. Biological Resources (Draft SEIR Section 4.3)

1. Direct Effects on Spawning Fish and their Habitat

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on *Fish* (specifically, for the purposes of this impact discussion, on fin fish and amphibian) reproduction.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The revised regulations impose spatial and temporal restrictions on suction dredging activities that are based on life history, distribution and abundance of *Fish* action species. These restrictions on suction dredging span the period immediately before spawning and during critical early life stages (i.e., spawning, incubation, and early emergence) of *Fish* action species (Draft SEIR, Table 4.3-1). Streams within the state that provide habitat for fish species that are either very limited in number and/or distribution will be closed to suction dredging (Class A), or closed during critical spawning periods. Therefore, the disturbance to spawning *Fish* and crushing of embryos and larvae posed by the act of suction dredging is not likely to occur for *Fish* action species. Impacts of dredging

to other *Fish* species (i.e., those listed in Draft SEIR, Table 4.3-2, as well as more common or widespread native and non-native fishes) are also not likely to result in impacts that would be considered significant.

The revised regulations further minimize the potential for disturbance to all spawning *Fishes* and their habitats by requiring dredgers to (1) provide the Department with information regarding the location of their dredging operation(s), allowing the Department to monitor and manage areas with high dredging use, and potentially modify regulations if deleterious effects are identified, (2) level all tailing piles prior to working another excavation site or abandoning the excavation site, minimizing the potential for *Fish* to spawn on unstable substrate, and (3) avoid the disturbance of redds and adult fish. The Department finds, as a result, that environmental impacts on spawning *Fish* and their habitat will be less than significant for purposes of CEQA.

2. Direct Entrainment, Displacement or Burial of Eggs, Larvae and Mollusks

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on fish eggs, fry and larvae, mollusks such as clams, mussels, snails, and limpets, and amphibian eggs and larvae, such as those of frogs and toads, as a result of displacement, entrainment, and burial.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation:

The revised regulations incorporate spatial and temporal restrictions to protect the most vulnerable early life stages of *Fish* action species (Draft SEIR, Table 4.3-1). The Department has utilized a broad range of scientific data and management tools to develop the revised regulations which ensure a deleterious effect and/or significant impact to *Fish* species is not likely to occur. For example, for foothill yellow-legged frog, the revised regulations impose Class E restrictions for select watersheds in the Department's Region 2. These watersheds are generally tributaries of mainstem streams whose hydrology has been altered by hydropower operations. In these watersheds, the tributaries provide important refugia for the species, and therefore Class E restrictions are imposed to avoid or minimize impacts to early lifestages. To provide additional protection for this species, streams within the known range of foothill yellow-legged frog, which encompasses a significant portion of the state, are designated Class D. The Class D restrictions will protect egg masses from entrainment; while tadpoles may still be present at the times that streams are open to suction dredging, sufficient refugia are believed to exist such that significant impacts would not result. Further, the revised regulations identify year-round closures(Class A) for other action species which in many cases would provide surrogate protection for foothill yellow-legged frog tadpoles. Similarly, surrogate protection may result from land use designations (e.g., National Parks, Wilderness Areas). Finally, the

revised regulations require dredgers to avoid disturbance of eggs, redds, tadpoles and mollusks. In summary, for the example of the foothill yellow-legged frog, the revised regulations' employment of spatial, temporal and operational restrictions will ensure that suction dredging activities will not have a significant impact on the species as a whole, and therefore the Department finds that the environmental impacts on foothill yellow-legged frog will be less than significant for purposes of CEQA.

The revised regulations further minimize the potential for entrainment, displacement, or burial of eggs, larvae and mollusks in areas open to suction dredging by requiring dredgers to (1) provide the Department with information regarding the location of their dredging operation(s), allowing the Department to monitor and manage areas with high dredging use, and potentially modify regulations if deleterious effects are identified, (2) take reasonable care to avoid dredging silt and clay materials that may result in increased turbidity and deposition of fines on the gravels, (3) level all tailing piles prior to working another excavation site or abandoning the excavation site, and (4) avoid the disturbance of eggs, redds, tadpoles and mollusks. The revised regulations also prohibit dredging in mussel beds.

With these regulations in place, the Department finds that the environmental impacts associated with direct entrainment of eggs and larvae of *Fish* species by a suction dredge will be less than significant for purposes of CEQA. The Department finds that the environmental impacts associated with burial of mollusks is also less than significant for purposes of CEQA based on the revised regulations' restriction on dredging in mussel beds, and the historical and projected level of suction dredging activity.

3. Effects on Early Life Stage Development

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on fish species (including salmonids and lamprey) and amphibians as a result of the release of fine particles that reduce flow and oxygen concentrations and negatively affect early life stage development.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The revised regulations impose spatial and temporal restrictions on suction dredging where necessary to protect the development of critical early life stages of *Fish* action species (Draft SEIR, Table 4.3-1). Spatial and temporal closures of streams for *Fish* action species provides surrogate protection for many other species of aquatic fauna with life histories similar to the action species. In addition, the revised regulations further minimize the potential impacts to critical early life stages by prohibiting dredgers from (1) dredging or removing material within 3 feet of the lateral edge of the current water level, protecting against streambank destabilization that could result in release of fine sediment, and (2) damaging or removing streamside vegetation, protecting against streambank

destabilization that could result in release of fine sediment. The revised regulations also require dredgers to (1) take reasonable care to avoid dredging silt and clay materials that may result in increased turbidity and deposition of fines on the gravels, reducing the potential for eggs and larvae to be impacted by increased turbidity and fine sediment, (2) level all tailing piles prior to working another excavation site or abandoning the excavation site, ensuring that large piles of fines are not left in the stream that could later blanket embryos, and (3) avoid the disturbance of redds and tadpoles.

The Department finds, as a result, that the environmental impacts on development of early life stages of *Fish* species will be less than significant for purposes of CEQA.

4. Direct Entrainment of Juvenile or Adult Fish in a Suction Dredge

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on juvenile and adult fish as a result of direct entrainment.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Species at risk for this impact are those not able to escape velocities at the dredge intake, and whose populations are severely limited in size or distribution. The revised regulations impose Class A restrictions on, and therefore close to suction dredging, streams within the state that provide habitat for species that are very limited in number and distribution thus avoiding the potential for impacts. These closures are necessary to maintain the viability of these species, as direct impacts or degradation of habitat could have a substantial effect on the population or range of the species. In addition, the revised regulations further minimize the potential for entrainment of juvenile and adult Fish by requiring dredgers to (1) cover the intake for the suction dredge pump with screening mesh, which effectively eliminates the potential for entrainment of juvenile salmonids into the pump intake, and (2) avoid the disturbance of fish.

While some entrainment of juveniles and adult *Fish* species is likely to occur, the Department finds that the revised regulations avoid or minimize the environmental impacts based on spatial and temporal restrictions on dredging, and the operational requirements outlined above, and therefore the impacts on juvenile or adult fish from direct entrainment will be less than significant for purposes of CEQA.

5. Behavioral Effects on Juvenile or Adults

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on fish and amphibian behavior as a result of environmental changes and stimuli caused by silt deposition, noise, and vibrations.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Behavioral impacts are of particular concern during mating, spawning and early life stages. The revised regulations incorporate spatial and temporal restrictions on suction dredging in the period immediately before spawning/breeding and during critical early life stages of *Fish* action species (i.e., incubation, development, early emergence) (Draft SEIR, Table 4.3-1). The revised regulations also mandate specific closures of areas within streams that are known to provide thermal refugia (i.e., cold water holding pools) for Chinook and coho salmon in the Klamath River basin. Closures of these areas provide for protection of organisms and maintenance of stream features that serve as habitat during stressful periods (e.g. over-summer habitat for juveniles). Therefore, the potential to stress holding adults and/or juveniles of these species from actions associated with suction dredging is not likely to commonly occur. In addition, the revised regulations further minimize the potential for suction dredging to result in behavioral effects on fish and amphibians by requiring dredgers to avoid the disturbance of fish.

With the revised regulations' protections in place, the Department finds that environmental impacts related to behavioral effects will be avoided and/or minimized, and thereforeless than significant for purposes of CEQA.

6. Effects on Movement/Migration

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on the migration and/or movement of fish, invertebrates, and amphibians.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The revised regulations impose spatial and temporal restrictions on suction dredging activities within the range of *Fish* action species. The revised regulations designate as Class A and close to suction dredging streams within the state that provide habitat for species that are either very limited in number and/or distribution, thus avoiding the potential for impacts. The Department intends these restrictions to maintain the viability of these species, as disruptions of migration or movement may have a substantial effect on the population or range of the species. Areas of the state designated Class B through G by the revised regulations similarly provide direct protection for *Fish* action species and surrogate protection for the movement and migration of many other species (see Draft SEIR Appendix J, Tables J-1 and J-2).

In addition, the revised regulations further minimize the potential for impacts to migration and movement of *Fish* by requiring dredgers to (1) provide the Department with

information regarding the location of their dredging operation(s), allowing the Department to monitor and manage areas with high dredging use, and potentially modify regulations if deleterious effects are identified, and (2) avoid the disturbance of fish. The revised regulations also prohibit dredgers from (1) diverting the flow of a river or stream into the bank, (2) constructing permanent or temporary dams, (3) concentrating flow in a way that reduces the total wetted area of the stream, or (4) obstructing a stream or lake in such a manner that fish passage is impeded. The Department finds that, with the revised regulations in place, environmental impacts related to movement and migration will be sufficiently avoided and/or minimized, and therefore less than significant for purposes of CEQA.

7. Effects on the Benthic Community/Prey Base

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on the composition of communities of benthic and epibenthic invertebrates on and within the stream substrate.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The impacts of suction dredging on stream benthic communities will be less than significant. The revised regulations will further reduce already less than significant temporal impacts to benthic and epibenthic communities by imposing spatial and temporal restrictions for streams within the state that provide habitat for *Fish* species. These restrictions either completely avoid impacts to benthic and epibenthic communities (i.e., in streams designated Class A) or allow for recovery of the benthic community (i.e., in streams designated Class B through G).

In addition, the revised regulations further minimize the potential for impacts to benthic and epibenthic communities by (1) requiring dredgers to provide the Department with information regarding the location of their dredging operation(s), allowing the Department to monitor and manage areas with high dredging use, and potentially modify regulations if it identifies deleterious effects, (2) limiting the nozzle size of dredging equipment, effectively reducing the potential area disturbed by an individual dredger, (3) prohibiting the cutting, movement or destabilization of woody debris, which is important for macroinvertebrate habitat and production. The revised regulations also prohibit the removal or damage of streamside vegetation. Terrestrial invertebrates can make up a significant portion of a fish's diet during some periods (Nakano and Murakami, 2001; Garman, 1991). Riparian trees and other vegetation are the source of these organisms. Prohibiting the removal of riparian vegetation will help maintain this component of the prey base.

The Department finds, as a result, that the environmental impacts on stream benthic communities will be less than significant for purposes of CEQA.

8. Creation and Alteration of Pools and other Thermal Refugia

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on stream pool habitat as a result of the creation, alteration or destruction of pools that provide coldwater (or thermal) refugia that are important to salmonids and other fishes as both over-summering juvenile and adult holding habitat. Dredging activities often create pools locally, but these features may not be persistent, nor function hydrologically in a manner similar to naturally formed pools. Suction dredging can alter or destroy pools by redistributing stream substrate in a manner that would destabilize bed form, or simply by filling a pool with dredge tailings.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Unrestricted dredging of thermal refugia utilized by Chinook salmon in the Klamath and Salmon River watersheds could result in a substantial decline of the species, alteration of thermal refugia habitat, and affect movement of the species within summer holding areas. However, the revised regulations impose specific year-round closures of areas within streams that are known to provide thermal refugia for this species (see Draft SEIR, Appendix L). Closures of these areas, and appropriate buffers in the upstream direction, will provide protection for this type of habitat. In addition, the revised regulations further minimize the potential for suction dredging to alter or otherwise degrade pool habitat by (1) prohibiting the cutting, movement or destabilization of woody debris, which is important for pool habitat formation and maintenance; and (2) requiring dredgers to level all tailing piles prior to working another excavation site or abandoning the excavation site, which limits the potential for dredgers to leave tailings that could be easily transported downstream and fill pools, and plug or reduce hyporheic flow in critical areas.

With the revised regulations in place, the Department finds that impacts related to alteration of pool and thermal refugia habitat would be sufficiently avoided and/or minimized, and therefore the environmental impacts will be less than significant for purposes of CEQA.

9. Destabilization/Removal of Instream Habitat Elements (e.g., Coarse Woody Debris, Boulders, Riffles)

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on instream habitat elements as a result of removing or destabilizing CWD (instream wood greater than 12 inches in diameter (measured at any point) and 6 feet in length, and root wads of any size), boulders, or riffles.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The importance of CWD and large boulders on the formation and maintenance of aquatic habitat structure is well documented. If left unrestricted, impacts of suction dredging on the abundance and distribution of CWD in sensitive habitats, including but not limited to USFWS/NMFS designated critical habitat, would be potentially significant. Likewise, displacement of large boulders that are important for formation and maintenance of aquatic habitat and stream structure would be potentially significant. However, the revised regulations minimize the potential for suction dredging to destabilize or remove instream habitat features by (1) prohibiting the use of motorized winches or other motorized equipment to move boulders or logs without prior approval and section 1602 notification, which limits the potential for dredgers to destabilize or alter instream habitat by moving large objects, (2) prohibiting the cutting, movement or destabilization of woody debris including root wads and stumps or logs, and (3) requiring dredgers to level all tailing piles prior to working another excavation site or abandoning the excavation site, which limits the potential for dredgers to destabilize or alter riffle and pool habitat.

With the revised regulations in place, the Department finds that the potential for key stream elements to be destabilized or removed by suction dredging would not commonly occur, and therefore the environmental impacts will be less than significant for purposes of CEQA.

10. Destabilization of the Streambank

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on aquatic and riparian habitats as a result of streambank destabilization.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: If left unrestricted, impacts of suction dredging on streambank stability would be potentially significant. Specifically, streambank destabilization may result in (1) excessive sedimentation in habitat utilized by *Fish* species, (2) degradation of sensitive habitat such as riparian areas, and (3) adverse effects on federally protected wetlands in or adjacent to streams through direct modification or sedimentation. The revised regulations will reduce the potential for suction dredgers to destabilize streambanks by (1) requiring dredgers to provide the Department with information regarding the location of their dredging operation(s), allowing the Department to monitor and manage areas with high dredging use, and potentially modify regulations if it identifies deleterious effects, (2)

prohibiting dredging and removal of material within 3 feet of the current water level at the time of dredging, greatly reducing the likelihood that a dredger would destabilize a streambank, and (3) prohibiting the removal of streamside vegetation.

While the revised regulations prohibit suction dredge activities into streambanks, illegal activities could cause streambank destabilization under the Program. This potential for bank erosion and instability as an outcome of suction dredge activities is considered a departure from the current baseline condition whereby no suction dredging occurs because it is prohibited by statute and court order. The Department anticipates that with the revised regulations in place, the extent of bank destabilization caused by dredging activity will be minimal and will not substantially degrade the biological function of rivers and stream of the state. The Department finds, therefore, that environmental impacts related to destabilization of streambanks will be less than significant for purposes of CEQA.

11. Effects on Habitat and Flow Rates Through Dewatering, Damming or Diversions

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on *Fish* as a result of channel flow manipulations, such as damming, dewatering and diversions.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: If left unrestricted, impacts of modification of flow regimes by suction dredgers would be considered potentially significant. More specifically, diversion or dewatering caused by dredgers may strand or impede the movement or migration of *Fish* species. The revised regulations prohibit (1) constructing permanent or temporary dams, (2) concentrating flow in a way that reduces the total wetted area of the stream, and (3) obstructing a stream or lake in such a manner that fish passage is impeded. Such activities would require compliance with Fish and Game Code section 1602, which may require a project-specific CEQA analysis. In addition, the revised regulations incorporate restrictions to protect the development of critical early life stages of *Fish* action species such that unauthorized diversion, dewatering or damming are not likely to cause significant impacts. The revised regulations requires dredgers to provide the Department with information regarding the location of their dredging operation(s), and therefore enable the Department to monitor dredging activities and enforce Program regulations that prohibit diversion, dewatering or damming of streams. While some unauthorized channel manipulations are likely to occur in spite of these restrictions, these are not anticipated to be widespread because of the revised regulations which prohibit this type of activity. The Department finds, therefore, that environmental impacts of modification of flow regimes will be less than significant for purposes of CEQA.

12. Effects on Special-Status Terrestrial and Non-Riverine Aquatic Invertebrates

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on special-status terrestrial and non-riverine aquatic invertebrates including species such as fairy shrimp (*Branchinecta spp.*), vernal pool tadpole shrimp (*Lepidurus packardi*), Trinity bristle snail (*Monadenia infumata setosa*) and valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*).

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Suction dredging itself is not likely to adversely affect special-status terrestrial and non-riverine aquatic invertebrate species; ancillary activities such as encampments have a higher potential to impact these organisms and their habitats. However, the revised regulations solely address the suction dredging activity itself, and not related activities such as deployment of suction dredge equipment and camping, except as to damage to the streambank and minimum distance from the water that fuel, lubricants, or chemicals may be stored. Therefore, even with the revised regulations in place, ancillary activities associated with suction dredging may still result in impacts to one or more special-status terrestrial/non-riverine aquatic invertebrates species, some of which are protected under ESA or CESA.

With respect to fairy shrimp, vernal pools that support listed species are not common habitat features in the landscapes where dredging activities most commonly occur (see Chapter 3 of the Draft SEIR for a description and maps of suction dredging locations). Furthermore, vernal pools that do occur adjacent to streams will often be dry and organisms will be in the dormant embryonated cysts form when dredgers are present (typically the summer and fall months due to seasonal restrictions for other species). Thus, the potential for substantial disturbance to fairy shrimp and their habitat will be minimized because (1) when vernal pools are dry the organisms are in a life stage that is relatively resilient to disturbance (i.e., cyst form), and (2) the habitat would be less prone to disturbance/degradation that may be caused by ancillary suction dredge activities (e.g., encampments).

In the case of Trinity bristle snail and valley elderberry longhorn beetle, there is a somewhat higher potential for impacts due to dredging because their life cycles are not timed such that they enjoy surrogate protection from disturbance by activities that are ancillary to dredging. Thus, it is likely that some level of disturbance to terrestrial/non-riverine aquatic invertebrates will occur. However, the level of impact associated with activities that are ancillary to dredging (e.g., camping, access and egress) is not likely to result in a substantial adverse effect to any special-status terrestrial/non-riverine aquatic invertebrate species. Furthermore, the revised regulations require dredgers to comply with

applicable laws, including ESA and CESA. The Department finds, therefore, that environmental impacts to special-status terrestrial and non-riverine aquatic invertebrates will be less than significant for purposes of CEQA.

13. Effects on Special-Status Raptors Associated with Riparian Habitat

Impact Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on the behavior, movements and distributions of special-status raptors as a result of human activity and associated noise from suction dredging activities. Suction dredging activities that occur during the raptor breeding season (typically March through August) may alter behavioral patterns of individual birds and potentially prevent special-status raptors species from continued nesting in a section of their territory. This may result in nest abandonment (even temporary), causing mortality to eggs or nestlings.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: In the absence of the revised Regulations, impacts to special-status raptor species would be considered potentially significant. The revised regulations impose spatial and temporal restrictions based on *Fish* action species that will provide surrogate protection for some nesting raptors within portions of these species' ranges. The revised regulations further minimize the potential for suction dredgers to impact nesting special-status raptor species and their habitats by prohibiting (1)dredging and removal of material within 3 feet of the lateral edge of the current water level, and (2) the removal of streamside vegetation, both of which, though not specifically intended to do so, minimize potential disturbance to nesting raptors and their habitat.

The Department finds that, while it is likely that some level of disturbance to raptors will occur, it is not likely to result in a substantial adverse effect on special-status raptor species or their habitats, and therefore the environmental impacts will be less than significant for purposes of CEQA.

14. Effects on other Special-Status and Non-listed Terrestrial Wildlife Species

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on the behavior, survival, reproduction, and distribution of special-status and non-listed terrestrial wildlife species as a result of ancillary upland activities such as dumping of waste materials, nocturnal light sources, ground disturbance, and noise from encampments.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Activities associated with suction dredging have the potential to impact other special-status and non-listed terrestrial wildlife species and their habitats. The revised regulations impose spatial and temporal restrictions on suction dredging activities for *Fish* species, providing surrogate protection for other special-status and non-listed terrestrial wildlife species within the same geographical areas. The revised regulations further minimize the potential for suction dredgers to impact other special-status and non-listed terrestrial wildlife species and their habitats by requiring (1) dredgers to provide the Department with information regarding the location of their dredging operation(s), allowing the Department to monitor and manage areas with high dredging use, and potentially modify regulations if it identifies deleterious effects, and (2) all equipment be cleaned of mud, oil, grease, debris, and plant and animal material before accessing riparian areas or use in streams, limiting the dispersal of potentially harmful chemicals, invasive species, and other noxious materials. The revised regulations also prohibit (1) dredging and removal of material within three feet of the lateral edge of the current water level, limiting the potential for bank destabilization, and the subsequent impact to adjacent habitats that may support other special-status and non-listed terrestrial species, and (2) removing streamside vegetation., limiting the potential for disturbance to areas that provide habitat for other special-status and non-listed terrestrial species.

While it is likely that some level of disturbance to other special-status and non-listed terrestrial wildlife species will occur, it is not likely to result in a substantial adverse effect of any species listed in Draft SEIR, Table 4.3-4. The Department finds, therefore, that environmental impacts will be less than significant for purposes of CEQA.

15. Effects on Aquatic and Wetland-Associated Special-Status Plant Species and their Habitat

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on special-status aquatic and wetland associated plant species as a result of suction dredging activities including 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).

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Activities associated with the Program may cause impacts to special status aquatic and wetland-associated plant species and their habitats that are potentially significant. Draft SEIR, Table 4.3-5 provides a determination with regard to the potential for suction dredging to impact special-status aquatic and wetland associated plant species and their habitats in the absence of the Proposed Regulations. Species associated with

vernal pools, freshwater marshes, bogs, seeps, and fens are considered to have a "Low" potential for adverse impacts, since these are areas where suction dredgers are unlikely to be dredging or conducting related activities (e.g., staging, camping). Therefore, while these habitats may occur adjacent to, or in the vicinity of, streams, the potential for significant adverse impacts to these habitats is low. Species that only occupy areas where suction dredging is not likely to occur (e.g., Mojave Desert endemics such as Mojave tarplant [*Deinandra mohavensis*]) are also considered to have a low potential for adverse impacts. In general, the Department considers species associated with lotic, swift-flowing aquatic habitat, riparian areas, wet meadows and streambanks to have a "Moderate" potential to be impacted by suction dredging activities, since they have a higher potential to be co-located with suction dredging and related activities.

Of the 293 special-status aquatic and wetland associated plant species with the potential to occur in the Program Area, the Department considers 48 to have a moderate potential to be impacted by the dredging in the absence of the revised regulations. None of the 48 species have federal or state listing status; 22 of the species are RPR list 1.b status, and 26 are RPR List 2 status (Draft SEIR, Table 4.3-5).

While RPR List 1.b and 2 species are believed to occur in the vicinity of suction dredging activities, the precise locations of these species relative to specific suction dredging activities is not known. Where they do occur in proximity to one another, the potential exists for suction dredgers to trample, disturb or otherwise destroy individuals of these species. The revised regulations minimize the potential for suction dredgers to impact special-status aquatic and wetland-associated plant species and their habitats by: (1) requiring dredgers to provide the Department with information regarding the location of their dredging operation(s), allowing the Department to monitor and manage areas with high dredging use, and potentially modify regulations if it identifies deleterious effects, (2) restricting dredging and removal of material within 3 feet of the lateral edge of the current water level, (3) prohibiting the removal of streamside vegetation, and (4) requiring that all equipment be cleaned of mud, oil, grease, debris, and plant and animal material before accessing riparian areas or use in streams, limiting the dispersal of potentially harmful chemicals, invasive species, and other noxious materials.

With the revised regulations in place, impacts related to special-status aquatic and wetland-associated plant species would be avoided or minimized. It is reasonably foreseeable that some disturbance to special-status aquatic and wetland-associated plant species will occur, particularly RPR List 1.b and 2 species; however, with the revised regulations in place, there is a low probability that activities authorized under the Program will result in a substantial adverse effect to special-status aquatic or wetland plant species. The Department finds, therefore, that environmental impacts will be less than significant for purposes of CEQA.

16. Effects on Upland Special-Status Plant Species and their Habitat

Impact: Suction dredging as authorized under the revised regulations could result in

potentially significant environmental effects on special-status upland plant species as a result of suction dredging activities including access to and egress from streams, establishment of encampments in upland areas, the dispersal of non-native or invasive species, and activities such as direct removal of vegetation, or release of noxious materials (e.g., fuel).

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Of the 912 special-status upland plant species with the potential to occur in the Program Area, the Department considers 14 to have a moderate potential to be impacted by the dredging in the absence of the revised regulations. These 14 are generally associated with streams, alluvial floodplains and/or riparian habitats. One of these species, slender-horned spineflower (*Dodecahema leptoceras*), is listed as endangered under ESA and CESA. Eight of the species are RPR list 1.b status, and 6 are RPR List 2 status (Draft SEIR, Table 4.3-6).

While special-status upland plant species are believed to occur in the vicinity of suction dredging activities, the precise locations of these species relative to specific suction dredging activities is not known. Where they do occur in proximity to one another, there is the potential for suction dredgers to trample, disturb or otherwise destroy individuals of these species. That said, activities associated with suction dredging that may affect upland plants, such as camping and access to streams, are most likely to occur in previously disturbed areas that have a low potential to support special-status upland plant species (e.g., campgrounds). Furthermore, the disturbance mechanisms associated with these activities are not likely to substantially alter sub-surface plant or soil structure, though some moderate compaction and erosion may occur. Complete destruction of suitable habitat or a local population is highly unlikely to occur. The revised regulations further minimize the potential for suction dredgers to impact upland plant species and their habitats by (1) prohibiting dredging and removal of material within 3 feet of the lateral edge of the current water level, minimizing the potential for disturbance of upland vegetation located at the top of bank, (2) prohibiting the removal of streamside vegetation (including upland species), and (3) requiring that all equipment be cleaned of mud, oil, grease, debris, and plant and animal material before accessing riparian areas or use in streams, limiting the dispersal of potentially harmful chemicals, invasive species, and other noxious materials.

With the revised regulations in place, impacts related to special-status upland plant species will be minimized. While the revised regulations will reduce the potential for suction dredging itself to affect these species, it is reasonably foreseeable that some disturbance to special-status upland species will occur as a result of related activities (e.g., camping). However, there is a low probability that these activities will result in a substantial adverse effect to special-status upland plant species. The Department finds, therefore, that environmental impacts will be less than significant for purposes of CEQA.

17. Effects on Federal and State Protected Wetlands

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on federal and state protected wetlands as a result of suction dredging activities including access to and egress from streams, direct dredging in wetlands, the dispersal of non-native or invasive species, and unauthorized activities such as filling of wetlands, direct removal of vegetation, destabilization of streambanks, or release of noxious materials (e.g., fuel spills).

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The Department developed the revised regulations to prevent suction dredging activities from being deleterious to *Fish*. The regulations include measures to protect habitats that *Fish* are dependent upon, such as wetlands within and adjacent to streams.

The regulations minimize the potential for suction dredgers adversely affect federal and state protected wetlands by (1) requiring dredgers to provide the Department with information regarding the location of their dredging operation(s), allowing the Department to monitor and manage areas with high dredging use, and potentially modify regulations if it identifies deleterious effects, (2) prohibiting the use of motorized winches or other motorized equipment to move boulders or logs without prior authorization and section 1602 notification, limiting the potential for dredgers to destabilize or alter wetland habitat by moving large objects, (3) prohibiting dredging and removal of material within three feet of the lateral edge of the current water level, minimizing the potential for disturbance to off-channel wetlands such as vernal pools, (4) prohibiting the removal of streamside vegetation, limiting the potential for disturbance of wetland, riparian and upland vegetation, (5) prohibiting the diversion of the flow of a river or stream into the bank, (6) prohibiting construction of permanent or temporary dams, concentrating flow in a way that reduces the total wetted area of the stream, and obstructing a stream or lake in such a manner that fish passage is impeded, limiting the potential for wetlands to be dewatered, (7) prohibiting the import of any earthen or fill material into a stream, river or lake, limiting the potential for dredgers to fill wetlands, (8) requiring that all fueling and servicing of dredging equipment must be done in a manner such that petroleum products are not leaked, spilled or otherwise released into waters of the state, (9) requiring that stream substrates may only be moved within the current water level, limiting the potential for disturbance of aquatic and wetland vegetation, and (10) requiring that all equipment be cleaned of mud, oil, grease, debris, and plant and animal material before accessing riparian areas or use in streams, limiting the dispersal of potentially harmful chemicals, invasive species, and other noxious materials.

While it is likely that some level of disturbance associated with Program activities will occur with the revisedregulations in place, it is not likely to result in substantial adverse effects to federal and state protected wetlands when considered statewide. The Department finds, therefore, that environmental impacts will be less than significant for purposes of CEQA.

18. A Fundamental Change to the Structure of a Community or Stream Ecosystem, Including Substantial Reductions in Biodiversity or Resiliency to Disturbance

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on benthic invertebrate abundance and community composition which could reduce resiliency to disturbance. Suction dredging activities could also have potential adverse impacts on the stream ecosystem as a result of dredging activities that displace large volumes of material, change substrate characteristics, disperse non-native or invasive species, and release noxious materials (e.g., fuel spills).

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The Department developed the revised regulations to prevent suction dredging activities from being deleterious to *Fish*. These regulations include measures designed to maintain stream ecosystem function so that substantial reductions in biodiversity or resiliency do not occur.

The revised regulations minimize the potential for suction dredgers to adversely impact community or ecosystem level structure and function by (1) imposing seasonal closures of streams, which allows for recovery from disturbance caused by Program activities, and permanent closures of other streams, preventing disturbance caused by Program activities, (2) requiring dredgers to provide the Department with information regarding the location of their dredging operation(s), allowing the Department to monitor and manage areas with high dredging use, and potentially modify regulations if it identifies deleterious effects, (3) limiting the nozzle size of dredging equipment, effectively reducing the potential area disturbed and the amount of material displaced by an individual dredger, (4) prohibiting the use of motorized winches or other motorized equipment to move boulders or logs without prior authorization and section 1602 notification, limiting the potential for dredgers to destabilize or alter habitat by moving large objects, (5) prohibiting the cutting, movement or destabilization of woody debris, important for macroinvertebrate habitat and production, (6) prohibiting the diversion of the flow of a river of stream into the bank, (7) prohibiting construction of permanent or temporary dams, concentrating flow in a way that reduces the total wetted area of the stream, and obstructing a stream or lake in such a

manner that fish passage is impeded, limiting the potential for alteration of the channel structure, and (8) requiring dredgers to level all tailing piles prior to working another excavation site or abandoning the excavation site.

Activities associated with the Program are likely to cause noticeable temporary reductions in biodiversity and/or resiliency at the dredging site and potentially at the reach scale. However, the Program activities, when viewed at the state-wide scale, are unlikely to cause a measureable departure from the baseline condition with respect to stream community and ecosystem structure and function, or a measureable reduction in biodiversity or resiliency. Moreover, most reductions in biodiversity and/or resiliency at dredging sites are likely to be only temporary; the relevant literature indicates that most sites will largely recover their structure and function within a few months to a year following disturbances. The Department finds, therefore, that environmental impacts will be less than significant for purposes of CEQA.

19. Direct Disturbance to Riparian and Aquatic Habitats, and Other Sensitive Natural Communities

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on sensitive natural communities as a result of suction dredging activities including access to and egress from streams, establishment of encampments, direct dredging in aquatic and riparian areas, the dispersal of non-native or invasive species, and unauthorized activities such as direct removal of vegetation, destabilization of streambanks, or release of noxious materials (e.g., fuel spills).

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The Department regulates activities that occur in aquatic and riparian habitats through Fish and Game Code section 1602, which states that no person shall "substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake" without first notifying the Department of that activity. The revised regulations include provisions which may allow suction dredgers to use equipment (e.g., larger nozzle size dredges, motorized winches) which has the potential to substantially alter aquatic and riparian habitat, after the Department conducts an on-site inspection and notification is made to the Department as specified in Fish and Game Code section 1602 subdivision (a)(1) and the provisions of Fish and Game Code section 1602 subdivision (a)(4)(A) or section 1602 subdivision (a)(4)(B) have been completed.

The Department developed the revised regulations to prevent suction dredging activities from being deleterious to *Fish*. The revised regulations include measures to protect habitats that *Fish* are dependent upon, such as aquatic and riparian habitats. The revised regulations minimize the potential for suction dredgers to adversely affect aquatic and

riparian habitats by (1) imposing seasonal closures of streams which allows for recovery from disturbance caused by Program activities, (2) requiring dredgers to provide the Department with information regarding the location of their dredging operation(s), allowing the Department to monitor and manage areas with high dredging use, and potentially modify regulations if it identifies deleterious effects, (3) limiting the nozzle size of dredging equipment, effectively reducing the potential area disturbed and the amount of material displaced by an individual dredger, (4) prohibiting the use of motorized winches or other motorized equipment to move boulders or logs without prior authorization and section 1602 notification, limiting the potential for dredgers to destabilize or alter aquatic habitat by moving large objects, (5) prohibiting the cutting, movement or destabilization of woody debris, and (6) requiring dredgers to level all tailing piles prior to working another excavation site or abandoning the excavation site, limiting the potential for dredging to impact the aquatic habitat by not filling pools, destroying riffles, or removing and destabilizing structural components.

Though not specifically intended to do so, many of the revised regulations would also minimize the potential for suction dredgers to impact sensitive upland natural communities. While it is likely that some level of disturbance associated with Program activities will occur, it is unlikely to cause a substantial departure from the baseline condition with respect to the integrity, function and quality of sensitive natural communities throughout the state. The Department finds, therefore, that environmental impacts will be less than significant for purposes of CEQA.

20. Introduction and/or Dispersal of Aquatic Invasive Species and Pathogens

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on stream ecosystems as a result of transporting aquatic invasive species (AIS) and pathogens through the movement of suction dredging equipment including intake nozzles, pumps, pontoons, sluice boxes, masks, wetsuits and other items from one waterbody to another.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Currently, the Department has an active program to educate boaters, anglers and other recreationists such as suction dredgers concerning the risks of AIS and the methods available to address those risks. The revised regulations require that all dredging equipment be cleaned of mud, oil, grease, debris, and plant and animal material before accessing riparian areas or being used in streams. While the revised regulations will minimize the potential dispersal of AIS and pathogens, suction dredging equipment is still likely to serve as a vector for AIS. However, most waters accessed by dredgers are also used by other recreationists such as anglers, kayakers, and rafters. Thus, it is likely that introductions would occur regardless of Program activities because dredgers constitute only a very small fraction of all recreational water users, averaging 3,650 permits annually

for the 15 years prior to the moratorium established in July 2009, and the revised regulations reduce the number of permits to less than half of this average. In addition, because dredging equipment is heavy and cumbersome, dredgers cannot change locations as readily as other recreationists; dredgers typically only occupy several waterbodies in a given season. Finally, the revised regulations require dredgers to provide the Department with information regarding the location of their dredging operation(s). This will allow the Department to monitor Program activities, and inform dredgers of the AIS status and risks in the areas they are accessing. While it is likely that some dispersal of AIS and pathogens will be associated with Program activities, it is not likely a major source of dispersal when considered among other user groups and vector mechanisms. The Department finds, therefore, that environmental impacts associated with dispersal of AIS and pathogens will be less than significant for purposes of CEQA.

21. Introduction and/or Dispersal of Non-native Invasive (terrestrial) Plant Species

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on native species and wildland ecosystems as a result of the introduction of non-native plants.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The revised regulations require that all dredging equipment be cleaned of mud, oil, grease, debris, and plant and animal material before accessing riparian areas or used in streams. While this regulation will reduce the potential dispersal of non-native invasive terrestrial plants, suction dredging activities are still likely to serve as a vector. However, dredgers constitute only a very small fraction of all recreational wildland users. While it is likely that some dispersal of non-native invasive terrestrial plants will be associated with Program activities, it is not likely a major source of dispersal when considered among other user groups and vector mechanisms. The Department finds, therefore, that environmental impacts associated with dispersal of non-native invasive terrestrial plant species will be less than significant for purposes of CEQA.

22. Effects of Encampments and Other Activities Associated with Suction Dredging

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on plant communities, wildlife habitat quality, and a variety of species that are sensitive to habitat structure (e.g., rodents, reptiles, amphibians, and invertebrates) as a result of trampling of vegetation, compaction of soils, improper disposal of trash and chemicals, unsanitary disposal of human waste, and use of off-road vehicles.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The potential exists that suction dredgers' encampments will have an adverse effect on the environment. As with any user group, it is possible that unauthorized activities will occur that could substantially harm the environment. When it issues a suction dredge permit, the Department does not authorize the permittee to violate any local, state or federal laws that address public health and safety, hazardous materials, protection of the environment, or any other statute. Encampments of permittees that adhere to local, state and federal laws are not likely to pose a significant threat to the environment or cause lasting degradation of functional wildlife habitats. Furthermore, the Department will distribute a "Best Management Practices" pamphlet which will be issued to each permittee under the Program. The "Best Management Practices" information pamphlet provides guidance to keep encampment sites clean and advice on the proper treatment of wastes. Operation in accordance with the proposed regulations and suggested "Best Management Practices" measures will reduce the potential for damage to plant communities and habitats from encampments and other activities related to suction dredging. The Department finds, therefore, that environmental impacts associated with encampments and suction dredging-related activities will be less than significant for purposes of CEQA.

D. Hazardous Materials (Draft SEIR Section 4.4)

1. Use, Handling, Storage, Transport, Disposal and/or Accidental Release of Oil or Gasoline Used in Suction Dredges

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on water bodies via indirect (i.e., stormwater runoff) or direct transport as a result of accidental spills of fuel or oil from suction dredging equipment and activities.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The revised regulations require that miners fuel and service equipment such that petroleum products are not leaked, spilled or otherwise released. In addition, miners are required to comply with relevant hazardous waste regulations. Furthermore, the Department will distribute a "Best Management Practices" informational packet to provide guidance on safe practices and proper conduct as it relates to suction dredging activities. The "Best Management Practices" guidelines will include an overview of relevant hazardous waste regulations and appropriate procedures for dredgers to follow in the event of a spill. Such measures will include a description on how and when to notify the Office of Spill Prevention and Response and site remediation steps, as appropriate.

Operation in accordance with the revised regulations and suggested "Best Management Practices" measures would reduce the potential for the handling, use, storage, transport, disposal, and/or accidental spilling of fuels and oils associated with the suction dredge mining activities to significantly affect the public and/or the environment. The Department finds, therefore, that environmental impacts associated with discharge of petroleum products will be less than significant for purposes of CEQA.

2. Handling, Storage, Transport and/or Disposal of Toxic Materials Collected by Suction Dredges

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on human health, particularly that of suction dredge miners, as a result of exposure to mercury, lead, and toxic substances during the handling, storage, transport, and/or disposal processes of suction dredge activities.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Compliance with applicable laws guiding the proper handling, storage, transport, and disposal of toxic materials will ensure that significant impacts will not occur. If miners implement the OSHA-recommended toxic waste handling, storage, and disposal measures, the potential for any risk to the miners' health will be reduced. Similarly, the State has established regulations related to the transport and disposal of household hazardous wastes (e.g., 15-gallon limit on the transport of household hazardous waste per trip and a 5-gallon limit on the maximum individual hazardous waste storage container size). The designated waste collection centers will accept various types of household hazardous waste, including potentially contaminated dredging concentrates. Information regarding applicable State laws, OSHA-recommendations, and descriptions on how to obtain further information for local disposal and treatment of hazardous materials, will be included in the "Best Management Practices" information document and distributed to each individual permit holder. Compliance with the State regulations regarding the transport and disposal of hazardous wastes and the specific disposal and operation rules of the local hazardous waste collection center will reduce the potential risk of the collected wastes affecting human health or the environment.

Although violations to State laws and OSHA regulations could result in the exposure of people or the environment to hazardous conditions, there has been no effort to determine if violations are common place. However, since the total number of suction dredgers state-wide is small, and the number of violations is anticipated to be even smaller, the Department finds that environmental impacts related to exposure to toxic materials will be less than significant for purposes of CEQA.

3. Use, Handling, Storage, Transport, Disposal, and/or Accidental Release of Materials Used to Process Suction Dredge Concentrates

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on human and environmental health as a result of exposure to mercury, mercury vapor, mercuric nitrate, or nitric acid used to process suction dredging concentrates. Suction dredge miners, in particular, could be exposed to any of these hazardous chemicals during use, handling, storage, transport, or disposal. In addition, accidental spills of any of these substances could result in potential impacts on human health and/or the environment.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Compliance with laws guiding the proper use, handling, storage, transport, and disposal of mercury and nitric acid will reduce the chances of significant impacts. If miners implement the OSHA-recommended hazardous chemical handling, storage, and disposal measures, the potential for risk to the miners' health will be reduced. In addition, the State has regulations regarding the maximum quantity of household hazardous wastes that can be transported per trip and the maximum volume of an individual hazardous waste storage container. Hazardous waste collection centers may also have specific rules related to the types and quantities of hazardous wastes accepted. Thus, if suction dredge miners comply with the State regulations regarding the transport and disposal of hazardous chemicals/wastes and the specific disposal and operation rules of the local hazardous waste collection center, the potential risk of mercury or the acids affecting human health or the environment will be reduced. The designated waste collection centers will accept various types of household hazardous waste, including acids and mercury.

As previously noted, the Department will provide information regarding the recommended and/or required protocols for the use, handling, storage, transport, and disposal of these hazardous chemicals in the "Best Management Practices" information document. The Department will distribute this guidance document to each individual permit holder to inform safe practices and proper conduct during dredge operations. If all suction dredge miners rigorously implement all of the recommended and/or required protocols, the chances of significant hazardous waste related incidents will be reduced. The Department finds, therefore, that environmental impacts associated with exposure to mercury and nitric acid will be less than significant for purposes of CEQA.

4. Human Wastes from Dredge Encampments

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on human health as a result of improper disposal of human waste.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Encampments of permittees that adhere to local, state and federal laws and ordinances are not likely to pose a significant threat to human health or the environment substantially different from those encampments of other recreationalists. Furthermore, the Department will incorporate into the "Best Management Practices" information document guidance for the proper disposal of waste, including human waste, to avoid disturbance to or contamination of streams, lakes or their surrounding environments. While such measures are outside of the Department's jurisdiction to regulate, violations may be reported to the local authorities. The Department finds, therefore, that environmental impacts associated with improper disposal of human waste will be less than significant for purposes of CEQA.

5. Safety Hazards to Dredgers and Others from Suction Dredge Operations, Equipment, and/or Geomorphic Changes

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on human safety as a result of anchoring equipment across or along channels, the creation of dredge potholes or tailings piles, and equipment staging.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The hazards presented by suction dredge equipment and operations will be regulated by local law enforcement entities. In addition, the revised regulations include general requirements prohibiting power-winching and any permanent grade alteration in the water body, and restricting the placement and movement of stream substrate. These requirements will reduce the potential for the suction dredge miners to create any long-term significant safety hazards. The Department finds, therefore, that the environmental impacts associated with operations, equipment, and/or geomorphic changes will be less than significant for purposes of CEQA.

6. Exacerbation of Wildland Fires

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects associated with an increased risk of wildland fires as a result of the use of certain equipment, including engines and hazardous materials (e.g., fuels, oils, etc.), during suction dredging activities. In addition, campfires used by miners during overnight camping excursions would pose a wildfire risk if the fires are not properly controlled or extinguished.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The equipment used by suction dredgers is not substantially different from those used by other motorized recreationalists and, with implementation of standard precautions, is not anticipated to result in a substantially increased threat of wildfire. Similarly, the wildfire risk associated with miners' campfires will not be substantially different than the risks from other overnight recreationalists. Suction dredge miners are required to comply with applicable wildfire-prevention measures, including limits or prohibitions on the use of campfires, established by the private land owners or state and federal land management agencies (e.g., U.S. Forest Service or BLM). An overview of applicable wildfire-prevention measures will be incorporated into the "Best Management Practices" informational packet distributed by the Department to all permit holders. The Department finds, therefore, that the environmental impacts associated with the risk of wildfire will be less than significant for purposes of CEQA.

7. Create Safety Hazards or Releases of Hazardous Materials in Proximity to a School

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects associated with increased risk of exposure to hazards near schools of other sensitive receptors if hazardous materials associated with suction dredging are transported through stormwater runoff to nearby receptors.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Suction dredging activities typically occur in undeveloped, remote locations along rivers or creeks. The likelihood of the hazards occurring near schools is therefore considered to be low. As such, the potential for hazardous emissions or the handling of hazardous or acutely hazardous material, substances, or waste occurring within one-quarter mile of an existing or proposed school is not considered to be substantial. Additionally, the revised regulations require compliance with federal, state, and local laws guiding the proper use, handling, storage, transport, and disposal of hazardous materials, which will reduce the potential for significant impacts. The Department finds, therefore, that environmental impacts associated with safety hazards in proximity to schools will be less than significant for purposes of CEQA.

8. Exposure to Mercury or Acid Vapor

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects associated with increased risk of exposure to mercury or acid vapor as a result of waste disposal or gold processing procedures.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Vaporizing mercury is an illegal disposal method known to be used by some suction dredge miners. A small portion of miners process their gold using mercury or nitric acid; however many miners do not (see *Suction Dredger Survey Results* in Draft SEIR, Appendix F). Miners processing gold using mercury and nitric acid do so at their campsites and homes, in a garage or similar space. No studies or anecdotal reports were available to the Department during preparation and environmental review of the revised regulations that indicated that incidents of mercury or acid poisoning of suction dredgers pose a substantial concern. However, as a precaution, the Department will include safety warnings against improper usage and handling of mercury or other hazardous chemicals in the "Best Management Practices" informational packet. The Department finds, therefore, that environmental impacts associated with exposure to mercury or acid vapor will be less than significant for purposes of CEQA.

E. Cultural Resources (Draft SEIR Section 4.5)

1. Disturbance of Human Remains

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on human remains, including those which may be interred outside of a formal cemetery, as a result of suctioning and sorting activities of suction dredge mining.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Potential impacts to human remains are significant; however California state law requires specific steps be followed when human remains are discovered accidentally (section 7050.5 of the Health and Safety Code and section 5097.98 of the Public Resources Code). The specific steps to be taken in the event of discovery of human will be included in the information packet distributed to each suction dredge permit holder. Compliance with State law, as required by Section 228(n) of the proposed regulations, would ensure impacts are less than significant. The Department finds, therefore, that environmental impacts associated with disturbance of human remains will be less than significant for purposes of CEQA.

F. Aesthetics (Draft SEIR Section 4.6)

1. Viewer Response to Suction Dredging Activities at the Suction Dredge Site

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on visual quality to a wide range of viewer groups, varying from very sensitive viewers (home or landowners / individuals opposed to suction dredging) to less sensitive viewers (other miners or motorized recreational proponents).

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The majority of views of the suction dredging activity within the stream channel are generally screened from view by riparian vegetation growing within the streambank corridor. Viewer response to the suction dredge and its operation will be variable, depending upon the viewer group in general, and perceptions of individuals within each viewer group.

Overall, the visual effects from the suction dredge for most viewers are short-term and limited (the average duration of suction dredging activities for California residents extend approximately 30 days per year with active dredging occurring an average of 5.24 hours per day; for non-California residents, the average duration of suction dredging activities extend for 33.4 days per year with an average active dredging duration of 5.43 hours per day. The revised regulations include prescribed hours outside of which suction dredge mining activities are restricted. The dredging activity itself is screened from view in many cases. Viewer response is anticipated to be a mix of positive and negative reactions. There are likely to be substantial adverse effects in particular locations with higher numbers of sensitive viewers and more intense dredging activity. However, when considering the relatively small number of dredgers dispersed throughout the state (a maximum of 1,500 permitted dredgers per year under the revised regulations), and the relatively short percentage of the year that dredging activities will occur, adverse visual effects are not considered substantial in the statewide context of the Program. Furthermore, the revised regulations additionally prohibit the removal of streamside vegetation. The Department finds, therefore, that environmental impacts associated with viewer response to suction dredge mining activities will be less than significant for purposes of CEQA.

2. Temporary Degradation of Visual Character from Turbidity Plumes Generated by Suction Dredging

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects associated with changes in water color and clarity as a result of suction dredging activities.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The turbidity plume extends downstream for variable distances and dissipates shortly after dredging activities have ceased. In comparison to the viewshed of the dredging site, the viewer in many cases will likely be minimally affected by color and clarity changes over a small portion of the stream channel. While there are likely to be substantial adverse effects in particular locations where suction dredging is resulting in more extensive turbidity plumes, the overall impact on most viewers would be short-term and limited. Additionally, the proposed regulations include provisions that will avoid or minimize the potential for generation of turbidity plumes, such as limits on dredge size and prohibitions on dredging in gravel bars or areas with silt and clays. The Department finds, therefore, that environmental impacts associated with the visual character of turbidity plumes will be less than significant for purposes of CEQA.

3. Alteration of Visual Character or Quality, or Scenic Resources, Following Completion of Suction Dredging Activities

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on natural scenic resources such as natural features such as water bodies, vegetation, rock outcrops, and the overall landscape as a result of alteration of the physical morphology of the environment within a stream channel, including generation of dredge holes and tailings piles, and potentially movement of large rocks and boulders which serve as visual features.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The extent to which changes resulting from suction dredging and related activities are visible and have adverse effects will be variable and related to the sensitivity of the viewer group, the duration of exposure, and other factors. In many cases the duration of effect will be temporary and limited to a particular dredging season, as any residual evidence of dredging in the streambed itself is generally erased by winter storms. Further, the average recreationalist or motorist (the majority of viewers within designated scenic resource areas) will not notice geomorphic changes remaining in the channel after dredging activities have ceased because they likely are viewing the site for the first time and have no previous reference to compare the pre- and post-dredging conditions of the site. A relatively small number of residential and commercial viewers who are very familiar with the viewshed and suction dredging sites are more likely to recognize geomorphic changes to the area. However, considering that dredging activities will be limited to a group of approximately 1,500 permittees who generally dredge a relatively small portion of the state in areas identified as a scenic resource, the overall viewer response would not be considered substantially adverse.

Visible changes resulting from suction dredging activities may occur in areas considered to be scenic resources, such as a designated Wild and Scenic River reach. However, when conducted according to the requirements of the Program, alterations to the site will not significantly or permanently alter the visual character or quality of the site in comparison with the larger viewshed. The revised regulations prohibit alteration to riparian or in-channel vegetation or to the overall channel form or functioning, and require that suction dredgers restore the dredge site when ceasing dredge activities (e.g., leveling of tailing piles). Unauthorized activities have been reported to occur, including dredging into banks, removal of large woody debris, and damage to riparian vegetation from cables used to anchor dredges, which may have long-term visual effects. Additionally, ropes and cables left attached to trees and rocks on the banks, abandoned mining equipment, and trash such as discarded vacuum hoses may be left in the area after dredging activities have ceased. However, the Department does not consider visual effects of unauthorized activities to be substantial overall due to the relatively small number of dredgers believed to engage in such activities. The Department finds, therefore, that environmental impacts associated with natural scenic resources will be less than significant for purposes of CEQA.

4. Alteration of Visual Character or Quality from Upland Activities Related to Suction Dredging

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on the visual character of upland areas as a result of suction dredge encampments, staging, and access.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: There are no known reports of adverse visual effects from staging and access. There is also no evidence that the general aesthetic character of suction dredge encampments differs from that of campsites in general (considering all types of campers). As such, there is no information to suggest that suction dredge encampments would result in substantially different aesthetic conditions than those arising from camping in general, or that adverse aesthetic conditions are likely to be present in a substantial number of suction dredge encampments. The Department will distribute an informational packet to each suction dredge permit holder to provide "Best Management Practices" advice. This information packet will include guidance on proper site maintenance, equipment storage, and conduct as it relates to suction dredging activities. Finally, management of campsites is overseen by the landowner/manager (public or private), which may implement restrictions limiting aesthetic impacts. The Department finds, therefore, that environmental impacts associated with adverse visual effects from staging and access will be less than significant for purposes of CEQA.

G. Noise (Draft SEIR Section 4.7)

1. Result in a Temporary Increase in Noise Above Ambient Levels

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on existing ambient noise levels as a result of gasoline-powered engines.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Suction dredging causes temporary increases in noise above ambient levels. The degree of increase is dependent upon the ambient noise environment and distance from the suction dredging activity. It is likely that in certain instances, this increase will have the potential to adversely affect receptors, particularly those sensitive to increases in noise (e.g., residents, those seeking a quiet nature experience). However, this impact is not considered substantial overall due to the relatively small number of instances where these impacts are anticipated to occur, given the relatively small number of dredgers statewide, and the numerous other sources of noise that can be found in the riverine environment. Furthermore, the revised regulations prohibit the operation of more than one suction dredge within 500' of another operating suction dredge, and restrict suction dredging to the hours between 10:00 a.m. and 4:00 p.m. The Department finds, therefore, that environmental impacts associated with increase in noise will be less than significant for purposes of CEQA.

H. Recreation (Draft SEIR Section 4.8)

1. Effects on the Quality of Recreational Resources or Experience

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on the perceived quality of recreation resources or recreation experience of recreationists, particularly those who participate in non-motorized activities (ex., hiking, rafting, fishing).

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Some of the potential conflicts that can occur between suction dredge miners and other recreationists are related to perceptions that ecological conditions have been degraded by suction dredge mining. The revised regulations include provisions which protect and restore ecological conditions during and after suction dredge mining activities. Some of the applicable regulations include restrictions related to chemical storage and use, equipment cleaning, vegetation removal or disturbance, and the disturbance of stream

substrates or flows. Similarly, the "Best Management Practices" informational packet to be distributed by the Department will provide guidance regarding equipment storage, waste disposal, and proper conduct as it relates to suction dredging activities. Adherence to the guidelines and enforcement of the revised regulations will reduce the potential for conflicts associated with suction dredge activities.

Finally, there are a relatively small number of suction dredge miners compared to the number of other recreationists in California, and most public recreational areas are managed to provide diverse opportunities for a wide variety of recreational activities and experiences, including suction dredging. Therefore, while individual instances may occur where non-suction dredging recreational resources or experiences may be substantially degraded under the Program, these occurrences are not expected to happen so frequently or for a long enough period of time to be considered substantial. Additionally, when taken as a whole, the overall impact on the quality of recreational resources, or the experiences of recreationists, in California, is not believed to be substantial. The Department finds, therefore, that environmental impacts associated with recreational resources will be less than significant for purposes of CEQA.

2. Changes in Recreational Facility Use or Availability

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on the availability of recreational facilities for other recreationists as a result of occupation or use of trails and/or recreational areas by suction dredge miners. The other recreationists could be displaced and potentially accelerate deterioration of nearby facilities.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: The access, staging, and dredging activities associated with suction dredge mining will be temporary and intermittent and will not cause entire trails or facilities to become unavailable. Furthermore, the Department's "Best Management Practices" informational packet will identify site access and staging methods that demonstrate courtesy to other area users, as well as additional measures which reduce the potential for conflicts.

In addition, dredging operations typically take place on public lands, where the right to use the area is equally applicable to all users. While anecdotal observations have cited instances where miners have, in effect, excluded other recreationists from the use of a particular location, this is believed to only occur infrequently, and numerous other locations remain for others to recreate. Moreover, any actions by miners to illegally exclude other recreationists from using a public area would be a law enforcement issue, to be handled by the appropriate agency with jurisdiction over the affected area. Based on the quantity of suction dredge permits issued in recent years, and the limit in the revised

regulations of 1,500 permits, the number of suction dredgers that will potentially use public recreational facilities in California will comprise only a very small portion of the millions of recreationists participating in other activities. Overall, the Department does not anticipate the Program will result in a substantial decrease in available recreational areas. Thus, the Program will not result in a significant displacement of recreational users that could accelerate the deterioration of nearby facilities. The Department finds, therefore, that environmental impacts associated with recreational facility availability will be less than significant for purposes of CEQA.

I. Transportation and Traffic (Draft SEIR Section 4.9)

1. Traffic Hazards Caused by Suction Dredging

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on traffic by creating hazards for the general public as a result of erratic or unsafe driving maneuvers, unsecured equipment, and malfunctioning vehicles or trailers.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Dredgers frequently use personal vehicles in order to transport equipment and supplies to dredging locations. The number and size of vehicles used is dependent on the equipment being used, the number of persons in their group, and the duration of their stay. Such vehicular transport can range in size from small cars or pickups up to large SUVs and RVs. These vehicles may also be equipped with trailers. The potential risk for traffic hazards is inherent to all drivers operating such vehicles on California's roadways. Because this risk is not exclusive to drivers who participate in suction dredging activities, and given the historically small percentage of drivers who are transporting suction dredge equipment relative to other drivers in these locations throughout California, implementation of the Program will not result in a substantial increase in traffic hazards. Furthermore, the revised regulations require all dredgers to comply with local and state laws and ordinances, including those related to traffic hazards. The Department finds, thefore, that environmental impacts associated with traffic hazards will be less than significant for purposes of CEQA and no mitigation is necessary.

2. Inadequate Parking Capacity

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on limited parking resources for other users.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Parking is required by all activities involving personal vehicular transport to and from recreational areas, and parking demand is not exclusive to Program activities. Most parking spaces are generally utilized on a first-come, first-served basis regardless of recreational endeavor, whereby even individuals participating in suction dredging may be unable to find parking at their desired locations. Furthermore, the revised regulations require Program participants to comply with local policies regarding long-term parking and Program participants may be cited for improper or illegal placement if they fail to comply. As such, Program participants are not singularly responsible for lack of parking capacity, but rather, these conditions are a reflection of an area's recreational popularity and available facilities.

Because suction dredgers in general are anticipated to generate a small portion of the overall parking demand in areas subject to suction dredging, the Department finds that environmental impacts associated with potential parking demand and utilization associated with the implementation of the Program under the revised regulations will be less than significant for purposes of CEQA.

X. PROJECT SPECIFIC SIGNIFICANT AND UNAVOIDABLE EFFECTS EXPECTED UNDER CEQA WITH APPROVAL OF THE REVISED REGULATIONS

The 2012 EIR analyzes in detail the environmental effects of suction dredging under the proposed regulations originally noticed by the Department in February and March 2011, including impacts associated with, among other things, resuspension and discharge of mercury and other trace metals from suction dredging; direct and indirect impacts on biological resources; cultural resources; noise; and cumulative impacts. (See generally DSEIR, § 4, pp. 4.0-1 to 4.10-10, and § 5, pp. 5-1 to 5-32; FSEIR, § 4, pp. 4-1 to 4-142.) The 2012 EIR reflects the Department's independent judgment and related determination that, even with the proposed regulations as originally noticed, various effects would remain significant and unavoidable. As described above, the revised regulations noticed by the Department in February 2012 would further lessen these significant effects, most to a considerable degree compared to the proposed regulations and certainly compared to suction dredging under the 1994 regulations.

The Department finds as set forth below, informed by the 2012 EIR and other substantial evidence in its administrative record of proceedings, that suction dredging authorized under the revised regulations will result in significant and unavoidable impacts on water quality, biological resources, cultural resources, noise, and cumulative impacts. These significant and unavoidable environmental effects are expected to persistent because it is infeasible for the Department to do more in the regulations that it is required to adopt to implement Fish and Game Code section 5653. Of the expected significant and unavoidable effects, many are the responsibility of and are subject to the jurisdiction of another public agency. Having done everything it can to avoid and substantially lessen these effects consistent with its substantive legal authority available in the present context, the

Department finds that overriding economic, legal, social, and other benefits of the revised regulations outweigh the resulting significant and unavoidable impacts.

A. Water Quality and Toxicology (Draft SEIR Section 4.2)

1. Effects of Mercury Resuspension and Discharge from Suction Dredging

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on levels of mercury as a result of resuspension and discharge from suction dredging.

Finding: Specific economic, legal, social, technological, or other considerations make infeasible the mitigation measures or alternatives identified in the 2012 EIR. (Pub. Resources Code, § 21081, subd. (a)(3); CEQA Guidelines, § 15091, subd. (a)(3).) Potentially feasible mitigation measures or alternatives may exist and are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency. (Pub. Resources Code, § 21081, subd. (a)(2); CEQA Guidelines, § 15091, subd. (a)(2).)

Explanation: Suction dredging under the revised regulations has the potential to contribute to: (1) watershed mercury loading to downstream reaches within the same water body and to downstream water bodies, (2) methylmercury formation in the downstream reaches/water bodies, and (3) bioaccumulation in aquatic organisms in these downstream reaches/water bodies. The associated increase in health risks to humans consuming these organisms is also considered a significant impact.

Potentially feasible mitigation measures to reduce this significant impact would necessarily involve actions to avoid or reduce total mercury discharge from areas containing elevated sediment mercury and/or elemental mercury from suction dredging activities under the revised regulations. However, it has been infeasible for the Department to identify a comprehensive set of actions to mitigate this significant impact through avoidance or minimization of mercury discharges has not been determined at this time. The Department finds this impact remains and will remain significant until such time that specific feasible mitigation is developed. The Department also notes there is no guarantee that this type of mitigation is practicable.

With respect to this effect and the 2012 EIR, the Department has done its best with the generous support and technical assistance of the State Water Resources Control Board to find out and disclose all that it feasibly can. The water quality effects of suction dredging generally, including under the revised regulations, involve some of the most complex, challenging environmental issues associated with the activity. Certainly water quality effects overlap with related impacts on biological resources, but at some point the issues diverge and the effects in each resource category persist in their own right. The Department has done its level best throughout its environmental review and rulemaking effort to identify that dividing line, informed by the technical expertise of staff at the State

Water Resources Control Board, as well as with the independent peer review of its water quality analysis conducted through and with the oversight of the Water Board.

Informed by its effort and the related input from the State Water Resources Control Board, the Department believes it has avoided and substantially lessened this significant effect to the extent feasible consistent with its substantive legal authority available in the present case and as required by CEQA's substantive mandate. The Department's explicit substantive legal authority to address significant impacts associated with proposed suction dredging under the revised regulations is limited in the present context to deleterious effects to fish. (Fish & G. Code, § 5653, subd. (b).) Those effects, however, are only a subset of the potentially significant environmental impacts caused by the activity. With the exercise of its available substantive authority the Department has determined that suction dredging consistent with the revised regulations will not be deleterious to fish and that related effects in all but two biological resource categories will be less than significant for purposes of CEQA. As to significant water quality effects, the Department finds that the revised regulations – compared to the proposed regulations as originally noticed in February and March 2011 – with further avoid and lessen those effects. Indeed, under the revised regulations permittees are subject to and must comply with all other applicable federal, state, and local law, and such other applicable law will further lessen significant effects. With its substantive authority available in the present case, however, it is infeasible for the Department to further reduce this significant and unavoidable effect, including importantly to below a level of significance under CEQA. The Department finds based on substantial evidence in its administrative record of proceedings that this effect remains significant and unavoidable as a result.

2. Effects of Resuspension and Discharge of Other Trace Metals from Suction Dredging

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on levels of other trace metals as a result of resuspension and discharge from suction dredging.

Finding: Specific economic, legal, social, technological, or other considerations make infeasible the mitigation measures or alternatives identified in the 2012 EIR. (Pub. Resources Code, § 21081, subd. (a)(3); CEQA Guidelines, § 15091, subd. (a)(3).) Potentially feasible mitigation measures or alternatives may exist and are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency. (See generally Pub. Resources Code, § 21081, subd. (a)(2); CEQA Guidelines, § 15091, subd. (a)(2).)

Explanation: Generally, discharge of trace metals with individual suction dredge operations should result in less than significant impacts. However, suction dredging at known trace metal hot-spots resulting from acid mine drainage and characterized by contaminated sediment (e.g., low pH levels and high metal concentrations in the pore water) would remobilize potentially bioavailable forms of metals and has the potential to

increase levels of one or more trace metals in water body reaches such that the water body reach would exceed California Toxics Rule metals criteria by frequency, magnitude, and geographic extent that could result in adverse effects to one or more beneficial uses, relative to baseline conditions. The Department finds this is significant impact under the revised regulations.

Potentially feasible mitigation measures to reduce the impact would necessarily involve identifying known trace metal hot-spots associated with past mining operations (e.g., problematic sites with acid mine drainage), and closing those identified areas to suction dredging. However, not all locations with such contamination are known. Likewise, identifying those areas with the level of certainty sufficient to develop related closures, if appropriate, is speculative and infeasible at this time. As such, the Department considers this impact significant and unavoidable until such time that a sufficient and feasible mitigation program can be developed.

Informed by its effort and the related input from the State Water Resources Control Board, the Department believes it has avoided and substantially lessened this significant effect to the extent feasible consistent with its substantive legal authority available in the present case and as required by CEQA's substantive mandate. The Department's explicit substantive legal authority to address significant impacts associated with proposed suction dredging under the revised regulations is limited in the present context to deleterious effects to fish. (Fish & G. Code, § 5653, subd. (b).) Those effects, however, are only a subset of the potentially significant environmental impacts caused by the activity. With the exercise of its available substantive authority the Department has determined that suction dredging consistent with the revised regulations will not be deleterious to fish and that related effects in all but two biological resource categories will be less than significant for purposes of CEQA. As to significant water quality effects, the Department finds that the revised regulations – compared to the proposed regulations as originally noticed in February and March 2011 – with further avoid and lessen those effects. Indeed, under the revised regulations permittees are subject to and must comply with all other applicable federal, state, and local law, and such other applicable law will further lessen related significant effects. With its substantive authority available in the present case, however, it is infeasible for the Department to further reduce this significant and unavoidable effect, including importantly to below a level of significance under CEQA. The Department finds based on substantial evidence in its administrative record of proceedings that this effect remains significant and unavoidable as a result.

B. Biological Resources (Draft SEIR Section 4.3)

1. Effects on Special-Status Passerines Associated with Riparian Habitat

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on the behavior, movements and distributions of special-status passerines associated with riparian habitat as a result of noise associated with dredge rigs, dredgers accessing streams, direct disturbance of riparian habitat,

alteration of prey resource base, and suction dredging encampment activities at night (e.g., lights and noise), especially if suction dredging activities occur during the passerine breeding season.

Finding: Specific economic, legal, social, technological, or other considerations make infeasible the mitigation measures or alternatives identified in the 2012 EIR. (Pub. Resources Code, § 21081, subd. (a)(3); CEQA Guidelines, § 15091, subd. (a)(3).)

Explanation: The revised regulations substantially minimize potential impacts to special-status passerine species, but not completely avoided. Best Management Practices provided to permittees will also help to reduce the probability of significant effects. The same is true of various other provisions of the Fish and Game Code and other relevant law, including CEQA. (See, e.g., Fish & G. Code, §§ 2000, 3503, 3503.5, 2080.) However, the potential for direct disturbance of nests or adverse behavior modifications due to human activity under the revised regulations would remain.

Informed by its effort, the Department believes it has avoided and substantially lessened this significant effect to the extent feasible consistent with its substantive legal authority available in the present case and as required by CEQA's substantive mandate. The Department's explicit substantive legal authority to address significant impacts associated with proposed suction dredging under the revised regulations is limited in the present context to deleterious effects to fish. (Fish & G. Code, § 5653, subd. (b).) Those effects, however, are only a subset of the potentially significant environmental impacts caused by the activity. With the exercise of its available substantive authority the Department has determined that suction dredging consistent with the revised regulations will not be deleterious to fish and that related effects in all but two biological resource categories, including the effect at issue here, will be less than significant for purposes of CEQA. As to expected significant effects on passerines associated with riparian habitat, the Department finds that the revised regulations – compared to the proposed regulations as originally noticed in February and March 2011 – with further avoid and lessen those effects. Indeed, under the revised regulations permittees are subject to and must comply with all other applicable federal, state, and local law, and such other applicable law will further lessen related significant effects. With its substantive authority available in the present case, however, it is infeasible for the Department to further reduce this significant and unavoidable effect, including importantly to below a level of significance under CEQA. The Department finds based on substantial evidence in its administrative record of proceedings that this effect remains significant and unavoidable as a result.

C. Cultural Resources (Draft SEIR Section 4.5)

1. Substantial Adverse Changes, When Considered Statewide, in the Significance of Historical Resources

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on historical resources such as historically-

significant submerged vessels, historic-era mining sites and features that are submerged within or adjacent to waterways, and traditional cultural properties (TCPs).

Finding: Specific economic, legal, social, technological, or other considerations make infeasible the mitigation measures or alternatives identified in the 2012 EIR. (Pub. Resources Code, § 21081, subd. (a)(3); CEQA Guidelines, § 15091, subd. (a)(3).)

Explanation: Program activities under the revised regulations have the potential to result in a substantial adverse change in the significance of a historical resource due to possible demolition, relocation, or alteration. Similarly, the introduction of increased human activity in around the state's waterways could cause a substantial adverse change to traditional cultural properties. For these reasons, impacts to historical resources and traditional cultural properties resulting from suction dredge mining activities under the revised regulations are considered potentially significant. Potentially feasible mitigation measures to reduce impacts to a less-than-significant level for historical resources include archival research at the California Historical Resources Information System (CHRIS) or the State Lands Commission or field surveys by qualified archaeologists and/or architectural historians to determine the location of recorded resources prior to dredging activities and data recovery and other documentation efforts to collect or record the significant data associated with the resources. Lacking the substantive legal authority to include such measures in the revised regulations, however, the Department finds that impacts under the revised regulations to historical resources and TCPs remain significant and unavoidable.

Informed by its effort, the Department believes it has avoided and substantially lessened this significant effect to the extent feasible consistent with its substantive legal authority available in the present case and as required by CEQA's substantive mandate. The Department's explicit substantive legal authority to address significant impacts associated with proposed suction dredging under the revised regulations is limited in the present context to deleterious effects to fish. (Fish & G. Code, § 5653, subd. (b).) Those effects, however, are only a subset of the potentially significant environmental impacts caused by the activity. With the exercise of its available substantive authority the Department has determined that suction dredging consistent with the revised regulations will not be deleterious to fish and that most other environmental effects at issue here will be less than significant for purposes of CEQA. As to expected significant effects on historical resources, the Department finds that the revised regulations – compared to the proposed regulations as originally noticed in February and March 2011 – with further avoid and lessen those effects. Indeed, under the revised regulations permittees are subject to and must comply with all other applicable federal, state, and local law, and such other applicable law will further lessen related significant effects. With its substantive authority available in the present case, however, it is infeasible for the Department to further reduce this significant and unavoidable effect, including importantly to below a level of significance under CEQA. The Department finds based on substantial evidence in its administrative record of proceedings that this effect remains significant and unavoidable as a result.

2. Substantial Adverse Changes, When Considered Statewide, in the Significance of Unique Archaeological Resources

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on unique archaeological resources including resources that have yielded, or may be likely to yield, information important in prehistory or history.

Finding: Specific economic, legal, social, technological, or other considerations make infeasible the mitigation measures or alternatives identified in the 2012 EIR. (Pub. Resources Code, § 21081, subd. (a)(3); CEQA Guidelines, § 15091, subd. (a)(3).)

Explanation: Riverine settings are considered highly sensitive for the existence of significant archaeological resources. Suction dredge mining activities under the revised regulations could cause a substantial adverse change to a unique archaeological resource through riverbed suctioning and screening activities that could disturb or destroy cultural materials which may be located just below the surface of the riverbed or along its banks. Impacts to unique archaeological resources resulting from suction dredge mining could also occur through increased human activity in the vicinity of the state's waterways. Such impacts to unique archaeological resources are considered potentially significant. Potentially feasible mitigation measures to reduce impacts to a less-than-significant level for archaeological resources include archival research at the California Historical Resources Information System (CHRIS) or the State Lands Commission or field surveys by qualified archaeologists and/or architectural historians to determine the location of recorded resources prior to dredging activities and data recovery and other documentation efforts to collect or record the significant data associated with the resources. Lacking the substantive legal authority to include such measures in the revised regulations, however, the Department finds that impacts under the revised regulations to unique archaeological resources remain significant and unavoidable.

Informed by its effort, the Department believes it has avoided and substantially lessened this significant effect to the extent feasible consistent with its substantive legal authority available in the present case and as required by CEQA's substantive mandate. The Department's explicit substantive legal authority to address significant impacts associated with proposed suction dredging under the revised regulations is limited in the present context to deleterious effects to fish. (Fish & G. Code, § 5653, subd. (b).) Those effects, however, are only a subset of the potentially significant environmental impacts caused by the activity. With the exercise of its available substantive authority the Department has determined that suction dredging consistent with the revised regulations will not be deleterious to fish and that most other environmental effects at issue here will be less than significant for purposes of CEQA. As to expected significant effects on unique archaeological resources, the Department finds that the revised regulations – compared to the proposed regulations as originally noticed in February and March 2011 – with further avoid and lessen those effects. Indeed, under the revised regulations permittees are subject to and must comply with all other applicable federal, state, and local law, and such

other applicable law will further lessen related significant effects. With its substantive authority available in the present case, however, it is infeasible for the Department to further reduce this significant and unavoidable effect, including importantly to below a level of significance under CEQA. The Department finds based on substantial evidence in its administrative record of proceedings that this effect remains significant and unavoidable as a result.

D. Noise (Draft SEIR Section 4.7)

1. Exposure of the Public to Noise Levels in Excess of City or County Standards

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant environmental effects on existing noise levels in excess of city or county standards as a result of the use of noise-generating equipment.

Finding: Specific economic, legal, social, technological, or other considerations make infeasible the mitigation measures or alternatives identified in the 2012 EIR. (Pub. Resources Code, § 21081, subd. (a)(3); CEQA Guidelines, § 15091, subd. (a)(3).) Potentially feasible mitigation measures or alternatives may exist and are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency. (See generally Pub. Resources Code, § 21081, subd. (a)(2); CEQA Guidelines, § 15091, subd. (a)(2).)

Explanation: Suction dredging activities under the revised regulations have potential to generate noise in excess of local noise standards, which is a significant impact. Although all recreationists using noise-generating equipment, including suction dredge miners, are equally required to abide by local noise ordinances, violations can still occur. Violations can be reported at any time to the local authorities who have the jurisdiction to enforce applicable regulations as appropriate. However, because local noise standards are outside of the authority of the Department to enforce, the impact cannot be discounted.

Informed by its effort, the Department believes it has avoided and substantially lessened this significant effect to the extent feasible consistent with its substantive legal authority available in the present case and as required by CEQA's substantive mandate. The Department's explicit substantive legal authority to address significant impacts associated with proposed suction dredging under the revised regulations is limited in the present context to deleterious effects to fish. (Fish & G. Code, § 5653, subd. (b).) Those effects, however, are only a subset of the potentially significant environmental impacts caused by the activity. With the exercise of its available substantive authority the Department has determined that suction dredging consistent with the revised regulations will not be deleterious to fish and that most other environmental effects at issue here will be less than significant for purposes of CEQA. As to expected noise-related significant effects, the Department finds that the revised regulations – compared to the proposed regulations as originally noticed in February and March 2011 – with further avoid and lessen those effects. Indeed, under the revised regulations permittees are subject to and must comply

with all other applicable federal, state, and local law, and such other applicable law will further lessen related significant effects. With its substantive authority available in the present case, however, it is infeasible for the Department to further reduce this significant and unavoidable effect, including importantly to below a level of significance under CEQA. The Department finds based on substantial evidence in its administrative record of proceedings that this effect remains significant and unavoidable as a result.

XI. 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.

XII. LESS-THAN-SIGNIFICANT CUMULATIVE EFFECTS EXPECTED UNDER CEQA WITH APPROVAL OF THE REVISED REGULATIONS

1. Cumulative Effects on Fish Species and their Habitats

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant cumulative effects on *Fish* species (including wild fish, mollusks, crustaceans, invertebrates, and amphibians, including any part, spawn, or ova thereof) and their habitats.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: 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. 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.

When developing the revised regulations, the Department 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 revised 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 Department considered the cumulative effects of all known projects, foreseeable impacts, and environmental stressors in designing the revised regulations such that the Program would not make a cumulatively considerable contribution to the decline of any *Fish* species. The Department finds, therefore, that the incremental contribution of the Program on *Fish* species and their habitats will not be cumulatively considerable and will thus be less than significant for purposes of CEQA.

2. Cumulative Effects on Special-Status Plant Species

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant cumulative effects on 293 special-status aquatic and wetland-associated plant species and 912 special-status upland plant species.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: 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.

With respect to upland plant species (Draft SEIR, 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 Department does not

consider the incremental contribution of the Program to be cumulatively considerable, but instead less than significant.

Dredging will be more likely to contribute to cumulative impacts on aquatic and wetland plant species (Draft SEIR, Table 4.3-5). However, various program regulations such as those prohibiting dredging of vegetation will provide protection for these species. With these measures in place, the Department finds that the incremental contribution of the Program on special-status plant species will not be cumulatively considerable and will thus be less than significant for purposes of CEQA.

3. Cumulative Effects Contributing to Non-Attainment Status

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant cumulative effects on non-attainment for a range of criteria pollutants (see Draft SEIR, Tables 5-3 through 5-5).

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Criteria pollutant emissions can result from the gasoline combustion engines typically used during suction dredge operations. Emissions from suction dredging, however, will be consistent with the amounts assumed in the baseline emissions inventories of the attainment plans, and will 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 will 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 CO2 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). Moreover, Section 228(g) of the proposed regulations limits the annual number of permits to 1,500. The Department finds, therefore, that the incremental contribution of emissions associated with suction dredging will not be cumulatively considerable and will thus be less than significant for purposes of CEQA.

4. Cumulative Effects Associated with Greenhouse Gas Emissions

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant cumulative effects associated with greenhouse gas (GHG) emissions.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Considering the small size of the engines, the relatively small number of dredges that can be operated under the 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 CO2 emissions from gasoline and diesel fuel combustion by 10% by 2020. Furthermore, the Pavley regulation will additionally reduce CO2 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 CO2 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 CO2 emissions.

Particularly since the revised regulations limit the annual number of permits to 1,500, the Department does not anticipate emissions from suction dredge operations to have a measurable effect on the State's ability to meet its greenhouse gas reduction goals under AB 32, and those emissions are therefore not considered to make a cumulatively considerable contribution to this significant cumulative impact. In making this determination, the Department is keenly aware of the important issues faced by the State of California in terms of expected climate change. The Department 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, the Department'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, the Department'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 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. The Department finds, therefore, that the incremental contribution of emissions associated with suction dredging will not be cumulatively considerable and will thus be less than significant for purposes of CEQA.

5. Cumulative Impacts of Resuspension and Discharge of Other Trace Metals from Suction Dredging

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant cumulative effects associated with discharges of trace metals besides Hg (i.e., copper, lead, silver, cadmium, and zinc).

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: 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.

Suction dredging will 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 will 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 will 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 revised 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 the Department finds, therefore, that the incremental contribution of trace metal discharges associated with suction dredging will not be cumulatively considerable and will thus be less than significant for purposes of CEQA.

6. Cumulative Impacts on Ambient Noise Levels in Suction Dredge Locations

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant cumulative effects associated with 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.

Finding: Changes or alterations have been required in, or incorporated into, the program which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: 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 will 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 indicating that ambient noise levels at sensitive receptor locations along the water bodies covered by the 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. The Department finds, therefore, that the incremental contribution of ambient noise levels associated with suction dredging will not be cumulatively considerable and will thus be less than significant for purposes of CEQA.

7. Cumulative Impacts on Recreational Facility Use or Availability

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant cumulative effects on existing recreational facilities and trails in California.

Finding: Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant effects on the environment. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Suction Dredge Mining 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 of the Draft SEIR, 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 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 Program would significantly increase the demand for or use of such facilities in a widespread geographic context. Thus, the Department finds that the incremental impacts associated with recreational facility availability are not cumulatively considerable and will thus be less than significant for purposes of CEQA.

XIII. SIGNIFICANT AND UNAVOIDABLE CUMULATIVE EFFECTS EXPECTED UNDER CEQA WITH APPROVAL OF THE REVISED REGULATIONS

1. Cumulative Effects on Wildlife Species and their Habitats

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant cumulative effects on wildlife species and their habitats.

Finding: Specific economic, legal, social, technological, or other considerations make infeasible the mitigation measures or alternatives identified in the 2012 EIR. (Pub. Resources Code, § 21081, subd. (a)(3); CEQA Guidelines, § 15091, subd. (a)(3).)

Explanation: Suction dredging and ancillary activities under the revised regulations 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. As described in Chapter 4.3, Biological Resources, 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.

Best Management Practices provided to permittees by the Department at the time of permit issuance will also help to reduce the probability of significant effects. The same is true of various other provisions of the Fish and Game Code and other relevant law, including CEQA, along with the related obligation in the revised regulations requiring permittees to comply with all other federal, state, and local law. (See, e.g., Fish & G. Code, §§ 2000, 3503, 3503.5, 2080.) However, the potential for direct disturbance of nests or adverse behavior modifications due to human activity under the revised regulations would remain.

With respect to this effect and the 2012 EIR, the Department has done its best to find out and disclose all that it feasibly can. Informed by that effort the Department believes it has avoided and substantially lessened this significant effect to the extent feasible consistent with its substantive legal authority available in the present case and CEQA's substantive mandate. While, the Department's explicit substantive legal authority for purposes of addressing impacts associated with the proposed suction dredge implementing regulations is limited, the effects of suction dredging on fish, are only a subset of the potentially significant environmental impacts caused by the activity. Suction dredge permittees remain obligated to comply with the legal requirements of other federal, state and local regulatory entities whose jurisdiction does address those impacts not within the Department's jurisdictional reach. The Department's substantive legal authority relevant in the context of the revised regulations is Fish and Game Code section 5653, subdivision (b). With the exercise of that authority the Department has determined that suction dredging consistent with the revised regulations will not be deleterious to fish and that related effects in all but two biological resource categories, this one included, will be less than significant for purposes of CEQA. As to expected significant cumulative impacts on wildlife species and their habitats, the Department finds that the revised regulations – compared to the proposed regulations as originally noticed in February and March 2011 – with further avoid and lessen those effects. With its substantive authority available in the present case, however, it is infeasible for the Department to further reduce this significant and unavoidable effect, including importantly to below a level of significance under CEQA. The Department finds based on substantial evidence in its administrative record of proceedings that this effect remains significant and unavoidable as a result.

2. Cumulative Effects of Turbidity/TSS Discharges from Suction Dredging

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant cumulative effects on turbidity/TSS discharges.

Finding: Specific economic, legal, social, technological, or other considerations make infeasible the mitigation measures or alternatives identified in the 2012 EIR. (Pub. Resources Code, § 21081, subd. (a)(3); CEQA Guidelines, § 15091, subd. (a)(3).) Potentially feasible mitigation measures or alternatives may exist and are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency. (See generally Pub. Resources Code, § 21081, subd. (a)(2); CEQA Guidelines, § 15091, subd. (a)(2).)

Explanation: Although the revised regulations under the Proposed Program would reduce the potential incremental contribution of the suction dredge discharges to a cumulative impact in impaired waters, sediment discharges would not be entirely avoided. Where such discharges are occurring in water bodies with existing turbidity/TSS impairments, the incremental contribution from suction dredging would be cumulatively considerable. To reduce these effects, potential mitigation could include closures or restrictions on suction dredging in waterbodies impaired for sediment. The Department finds this impact remains and will remain significant until such time that specific feasible mitigation is developed.

Informed by its effort and the related input from the State Water Resources Control Board, the Department believes it has avoided and substantially lessened this significant effect to the extent feasible consistent with its substantive legal authority available in the present case and as required by CEQA's substantive mandate. The Department's explicit substantive legal authority to address significant impacts associated with proposed suction dredging under the revised regulations is limited in the present context to deleterious effects to fish. (Fish & G. Code, § 5653, subd. (b).) Those effects, however, are only a subset of the potentially significant environmental impacts caused by the activity. With the exercise of its available substantive authority the Department has determined that suction dredging consistent with the revised regulations will not be deleterious to fish and that related effects in all but two biological resource categories will be less than significant for purposes of CEQA. As to significant water quality effects, the Department finds that the revised regulations – compared to the proposed regulations as originally noticed in February and March 2011 – with further avoid and lessen those effects. Indeed, under the revised regulations permittees are subject to and must comply with all other applicable federal, state, and local law, and such other applicable law will further lessen related significant effects. With its substantive authority available in the present case, however, it is infeasible for the Department to further reduce this significant and unavoidable cumulative effect, including importantly to below a level of significance under CEQA. The Department finds based on substantial evidence in its administrative record of proceedings that this cumulative effect remains significant and unavoidable as a result.

3. Cumulative Impacts of Mercury Resuspension and Discharge from Suction Dredging

Impact: Suction dredging as authorized under the revised regulations could result in potentially significant cumulative effects associated with mercury suspension and discharge.

Finding: Specific economic, legal, social, technological, or other considerations make infeasible the mitigation measures or alternatives identified in the 2012 EIR. (Pub. Resources Code, § 21081, subd. (a)(3); CEQA Guidelines, § 15091, subd. (a)(3).) Potentially feasible mitigation measures or alternatives may exist and are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency. (See generally Pub. Resources Code, § 21081, subd. (a)(2); CEQA Guidelines, § 15091, subd. (a)(2).)

Explanation: Although the revised regulations governing the Proposed Program would reduce the potential for flouring and reduce the potential incremental contribution of the suction dredge discharges to the significant cumulative impact, mercury discharges would continue. Such discharges associated with Program activities would make a cumulatively considerable contribution to existing cumulative impacts related to watershed mercury loading, methylmercury formation in downstream areas, and bioaccumulation in aquatic organisms (and associated risks related to human or wildlife consumption). To reduce these effects, potential mitigation could include closing mercury contaminated watersheds, limiting the number of permits in areas impaired for mercury, or further restrictions on nozzle size, number of permits, and hours/days spent dredging. Potentially feasible mitigation measures to reduce this significant impact would necessarily involve actions to avoid or reduce total mercury discharge from areas containing elevated sediment mercury and/or elemental mercury from suction dredging. Imposing such mitigation in the revised regulations is infeasible, however, and the impact remains significant and unavoidable.

Informed by its effort and the related input from the State Water Resources Control Board, the Department believes it has avoided and substantially lessened this significant effect to the extent feasible consistent with its substantive legal authority available in the present case and as required by CEQA's substantive mandate. The Department's explicit substantive legal authority to address significant impacts associated with proposed suction dredging under the revised regulations is limited in the present context to deleterious effects to fish. (Fish & G. Code, § 5653, subd. (b).) Those effects, however, are only a subset of the potentially significant environmental impacts caused by the activity. With the exercise of its available substantive authority the Department has determined that suction dredging consistent with the revised regulations will not be deleterious to fish and that related effects in all but two biological resource categories will be less than significant for purposes of CEQA. As to significant water quality effects, the Department finds that the revised regulations – compared to the proposed regulations as originally noticed in February and March 2011 – with further avoid and lessen those effects. Indeed, under the revised regulations permittees are subject to and must comply with all other applicable

federal, state, and local law, and such other applicable law will further lessen related significant effects. With its substantive authority available in the present case, however, it is infeasible for the Department to further reduce this significant and unavoidable cumulative effect, including importantly to below a level of significance under CEQA. The Department finds based on substantial evidence in its administrative record of proceedings that this cumulative effect remains significant and unavoidable as a result.

XIV. ALTERNATIVES

Where a lead agency has determined that, even after the adoption of all feasible mitigation measures, a project as proposed will still cause one or more significant environmental effects that cannot be substantially lessened or avoided, the agency, prior to approving the project as mitigated, must first determine whether, with respect to such impacts, there remain any project alternatives that are both environmentally superior and feasible within the meaning of CEQA. (See, e.g., *Citizens for Quality Growth v. City of Mt. Shasta* (1988) 198 Cal.App.3d 433, 445.)

As required by CEQA, the 2012 EIR includes a detailed discussion of a reasonable range of potentially feasible alternatives that would achieve most of the basic project objectives and avoid or substantially lessen one or more of the potentially significant effects expected with suction dredging under the proposed regulations as originally noticed by the Department in February and March 2011. (See, e.g., DSEIR, §§ 6.1, 6.3.) The DSEIR also describes the Department's effort and rationale to devise the range of alternatives, guided by the rule of reason. (*Id.*, § 6.2.) Likewise, the DSEIR includes a discussion of other alternatives considered, but dismissed as infeasible, as well as including a related discussion regarding the environmentally superior alternative as also required by CEQA. (*Id.*, §§ 6.4, 6.5.) The FSEIR also includes discussion regarding alternatives to the proposed regulations. (FSEIR, pp. 4-28 to 4-33.)

The revised regulations at issue here for purposes of the Department's proposed permitting program include a number of environmental improvements compared to the regulations as originally proposed in February and March 2011. As described above in Section I.A., Project Description, many of these changes are elements included and addressed in the DSEIR as part of the Reduced Intensity Alternative. In addition to various waterbody-specific revisions, the most important elements included in the revised regulations consistent of: (1) a reduction in the permitting cap from 4,000 as originally proposed to 1,500; (2) a density restriction prohibiting the operation of vacuum and suction dredge equipment within 500' feet of another operating suction dredge; (3) a restriction limiting the hours of operation from 10:00 a.m. to 4:00 p.m.; and (4) various reporting and up-to-date record keeping obligations. These revisions are expected to further reduce and lessen the significant effects associated with suction dredging authorized under the revised regulations. Even so, as discussed in the preceding section of these findings, the Department expects suction dredging under the revised regulations will still cause a number of significant and unavoidable environmental effects.

Informed by the 2012 EIR and other substantial evidence in its administrative record of proceedings the Department finds there are no other project alternatives that are both feasible and environmentally superior compared to the revised regulations. With respect to the 1994 Regulations Alternative, for example, the Department would resume the issuance of suction dredge permits under the current regulations found in Title 14. However, the Department determined in October 2007, however, that suction dredging under the existing regulations was resulting in deleterious effects to fish. The 1994 Regulations Alternative is not environmentally superior to suction dredging under the revised regulations. With its deleterious effects, the 1994 Regulations Alternative is also inconsistent with the Department's stated objectives in the present case and legally infeasible. (See generally DSEIR, § 6.3.2, pp. 6-6 to 6-9.)

As to the Water Quality Alternative, the DSEIR highlights the various environmental *pros and cons* of this alternative compared to the regulations originally proposed by the Department in February and March 2011. With respect to water quality impacts, this alternative by design is environmentally superior to the Department's original proposal and the same is true of the revised regulations, albeit the difference is less with the revisions to the proposed program highlighted earlier. The Water Quality Alternative, however, is legally infeasible in the present case given the permissible substantive reach of the Department's regulations under Fish and Game Code section 5653, subdivision (b). For the same reason the Water Quality Alternative also fails to achieve the Department's stated project objectives to the same extent as the revised regulations. The Water Quality Alternative in this respect, though environmentally superior in terms of significant water quality effects, is not feasible for purposes of CEQA. (See generally DSEIR, 6.3.3, pp. 6.9 to 6.12.)

The same is true of the No Program Alternative. Under this alternative the existing moratorium on Department issuance of permits and the related statutory prohibition on instream suction dredge mining would persist. Absent permits and no related suction dredging in California, no related environmental effects would occur. That outcome, of course, makes the No Program Alternative environmentally superior to the revised regulations under CEQA, specifically so with respect to the expected significant and unavoidable effects under the revised regulations. This alternative for purposes of related action by the Department, however, would essentially require the Department disapproving the revised regulations and declining to take the action prescribed by Fish and Game Code section 5653.9. This predicament, in the Department's opinion, renders the No Program Alternative infeasible for purposes of CEQA. The Department believes as stated above and explained elsewhere in its administrative record of proceedings that suction dredging as authorized under the revised regulations will not be deleterious to fish. With that finding under the Fish and Game Code the Department is skeptical it has the legal authority in the present context under CEQA to disapprove the proposed project. Doing so is infeasible for the additional reason that, in the Department's opinion, the revised regulations constitute a significant improvement compared to the 1994 regulations; the revised regulations with those environmental and regulatory benefits, even with the existing statutory moratorium, should be codified in Title 14, replacing the 1994

regulations. The No Program Alternative, in this respect, would not achieve project objectives to the same extent as the revised regulations. The Department finds for these reasons that the No Program Alternative is not a feasible, environmentally superior alternative under CEQA compared to the revised regulations. (See generally DSEIR, 6.3.1, pp. 6-5 to 6-6.)

The Department finds the Reduced Intensity Alternative is also not a feasible, environmentally superior alternative under CEQA compared to the revised regulations. As noted above, the revised regulations incorporate nearly all of the substantive elements that rendered the Reduced Intensity Alternative the environmentally superior alternative in the DSEIR for purposes of CEQA. That the alternative remains environmentally superior compared to the revised regulations, at least to some small degree, stems from the related prohibition on the use of anything larger than a 4-inch nozzle. Yet, the revised regulations with its related restrictions, including required notification in certain circumstances subject to the Department's streambed regulatory authority, are consistent with and otherwise comply with the Department's substantive legal mandate in the present case under the Fish and Game Code. The Department has no current factual or legal basis under its explicit substantive authority relative to the revised regulations to find that the additional restrictions under the Reduced Intensity Alternative are necessary to fulfill that statutory charge. In so doing the Reduced Intensity Alternative does not achieve the Department's stated project objectives to the same degree as the revised regulations. The lack of evidence and related authority also renders the Reduced Intensity Alternative as a whole legally infeasible. The Department finds, as a result, that the Reduced Intensity Alternative is not a feasible, environmentally superior alternative under CEQA compared to the revised regulations. (See generally DSEIR, 6.3.4, pp. 6-12 to 6-14.)

With respect to other potentially feasible, environmentally superior alternatives, both the DSEIR and FSEIR, as discussed above, both consider and explain the basis for the Department's related infeasibility determination. Given the Department's substantive legal authority in the present case relative to the proposed regulations, the Department relies on and incorporates the related discussion of these other alternatives for purposes of its findings here. In so doing, the Department acknowledges the importance of *bridging the analytical gap* in these findings between the underlying environmental analysis and its decision to approve the revised regulations. Central to its final action is its determination regarding the nature and extent of its substantive authority in the present case under Fish and Game Code section 5653 and 5653.9. To the same end, the Department recognizes various potentially feasible alternatives exists that may well avoid or substantially lessen the significant and unavoidable effects the Department expects with approval of the revised regulations. Yet, those alternatives and any related potentially feasible mitigation measures are beyond the substantive legal reach of the Department in the context of the proposed regulations. (See Pub. Resources Code, § 21004.)

In summary, the revised regulations incorporate various elements of the Reduced Intensity Alternative described in detail in the 2012 EIR. As such, the Department expects and finds for purposes of CEQA that the significant environmental effects expected with the revised

regulations will be reduced when compared to the proposed regulations originally noticed by the Department in February and March 2011. The same effects will be substantially less compared to the 1994 regulations.

The Department finds based on substantial evidence in its administrative record that there is no other feasible, environmentally superior alternative that will avoid or substantially lessen the significant and unavoidable environmental effects expected to occur with the revised regulations. This finding is based on, among other reasons, notions of legal infeasibility. The Department is obligated by court order and Fish and Game Code section 5653.9, to complete its environmental review and rulemaking effort consistent with existing law. In fact, the December 2006 Order in the *Karuk* litigation directs the Department to complete the effort by June 2008, which it was not able to do. Likewise, the Department's explicit substantive authority for purposes of the regulations required by the Fish and Game Code in this case is specifically limited to a subset of the adverse effects caused by suction dredging. Many of the potentially feasible alternatives before the Department at this time may well reduce related significant and unavoidable effects compared to the revised regulations, the proposed regulations as originally noticed by the Department, and the 1994 regulations. However, none are feasible in light of the Department's relevant authority in Fish and Game Code section 5653, subdivision (b).

XV. STATEMENT OF OVERRIDING CONSIDERATIONS

This section addresses the Department's obligations under Public Resources Code section 21081, subdivisions (a)(3) and (b). (See also CEQA Guidelines, §§ 15091, subd. (a)(3), 15093.) Under these provisions, CEQA requires the Department to balance, as applicable, the economic, legal, social, technological, or other benefits, including region-wide or statewide environmental benefits, of the revised regulations against the backdrop of unavoidable significant environmental impacts. For purposes of CEQA, if the specific economic, legal, social, technological, or other benefits of a proposed project outweigh the unavoidable significant environmental effects, those effects may be considered acceptable and the decision making agency may still approve the underlying project. CEQA, in this respect, does not prohibit the Department from approving the revised regulations even if suction dredging as authorized under the Fish and Game Code may cause significant and unavoidable environmental effects.

The DSEIR analyzes and discusses the significant and unavoidable environmental effects the Department expected with the updated regulations as originally proposed. (See, e.g., DSEIR, pp. ES-11 to 14; § 4.2.5, pp. 4.2-33 to 59; § 4.3.5, pp. 4.3-48; § 4.5.5, pp. 4.5-11 to 15; § 4.7.5, pp. 4.7-9 to 10; § 5.3, pp. 5-1 to 2; § 5.5.3, pp. 5-23 to 24, and 5-28 to 29; § 6.2.3, p. 6-4.) The FSEIR also includes considerable related discussion. (See, e.g., FSEIR, § 4.1, pp. 4.8 to 15, 4-35 to 37, 4-41 to 49, and 4-57 to 58; § 4.2, pp. 4-58 to 126, and 4-127 to 130; § 4.3, pp. 4-131 to 142.) In addition, the FSEIR identifies a small number of changes to the related discussion in the DSEIR and, importantly, identifies revisions to the regulations as originally proposed that were prompted by public input and the Department's consideration of that information. (FSEIR, § 5, pp. 5-1 to 61, and 5-61 to 5-65.)

As discussed above in detail, even though the Department revisions to the regulations as originally proposed will further reduce impacts from suction dredge mining, the Department's approval of the revised regulations will still result in significant and unavoidable effects to water quality, cultural resources, and noise. For purposes of CEQA, the Department's adoption of the revised regulations is expected to result in the following significant and unavoidable effects to non-biological trust resources:

- WQ-4: Effects Associated with Mercury Resuspension and Discharge;
- WQ-5: Effects Associated with Resuspension and Discharge of other Trace Metals;
- CUL-1: Substantial Adverse Changes, When Considered Statewide, in the Significance of Historical Resources;
- CUL-2: Substantial Adverse Changes, When Considered Statewide, in the Significance of Unique Archeological Resources;
- NZ-1: Exposure of the Public to Noise Levels in Excess of City or County Standards;
- CUM-6: Cumulative Effects Associated with Turbidity and Discharge of Total Suspended Sediment (TSS); and
- CUM-7: Cumulative Effects Associated with Mercury Resuspension and Discharge.

As also discussed in detail earlier, the Department's adoption of the revised regulations is also expected to result in two significant and unavoidable effects to biological trust resources. Again, these effects are not acceptable. The Department underscores that the revised regulations in no way relieve potential permittees from compliance with other laws. Yet, these two effects persist because of the Department's limited substantive authority in the context of the revised regulations, and the Department's related obligations under the December 2006 Order in the *Karuk* litigation under Fish and Game Code section 5653.9. The two significant and unavoidable effects to biological resources expected with approval of the revised regulations are the following:

- BIO-WILD-2: Effects on Special Status Passerines Associated with Riparian Habitat; and
- CUM-2: Effects on Non-Fish Wildlife Species and their Habitats.

A. The Benefits of Department Final Action to Approve the Revised Regulations

As noted above, the Department is charged by CEQA to balance, as applicable, the economic, legal, social, technological, or other benefits, including region-wide or statewide environmental benefits, of the revised regulations against the backdrop of significant

unavoidable environmental impacts. This section describes those benefits. In addition, as explained in the next section, the Department finds that, on balance, the benefits of taking final action and adopting the revised regulations override the significant and unavoidable effects expected to occur with Department action alone.

The Department begins this discussion acknowledging a certain unease. That sentiment is not for lack of preparation or out of concern about its compliance with controlling law. For purposes of CEQA, in fact, the Department believes it has proceeded in the manner required by law and that its factual determinations are supported by substantial evidence. The same is true for purposes of the APA and the Fish and Game Code. The revised regulations are neither arbitrary and capricious, nor lacking in evidentiary support. Likewise, the Department is confident in the exercise of its independent judgment under the Fish and Game Code from a policy, scientific, and legal perspective. Indeed, the Department believes that suction dredging consistent with the revised regulations will not be deleterious to fish and that the revised regulations are a substantial improvement compared to the 1994 regulations currently found in Title 14.

The Department's unease is rooted instead in the prospect that the revised regulations, once approved and effective, if and when the moratorium is lifted, will cause significant and unavoidable effects on the environment, particularly on non-fish biological resources that the Department holds in trust for the people of California. The prospect of such effects is reduced with the revised regulations both with respect to the proposed regulations as originally noticed and certainly compared to the 1994 regulations. Various other provisions of the Fish and Game Code also provide additional legal safeguards that will likely lessen the remaining significant effects, particularly those to biological resources. (See, e.g., Fish & G. Code, §§ 1900 et seq., 2000, 3503, 3503.5, 2080.) Yet, the prospect that the remaining significant effects are lessened by the revised regulations, and likely further still by other legal safeguards, makes no more palatable the approval of regulations the Department has determined will cause significant impacts on the environment.

Another part of the Department's unease in the present context is rooted in its experience over the last number of years. That experience is marked since 2005, in particular, by considerable controversy about the future of suction dredge mining in California. The Department, more so by far than any other public agency, has been in the middle of that conflict, often as a policy and litigation target for disparate interests with understandably different views on the subject. The Department, however, has been unable to mediate that dispute in a judicial forum or otherwise identify common ground mutually agreeable to the interested stakeholders, facing nine related lawsuits since 2005, nearly always involving the same parties, all critical of the Department for different reasons. Of note, related taxpayer costs since 2005 for the Department alone, including the present environmental review and rulemaking effort, total millions of dollars. And the controversy, and the related expenditure of significant public funds, will continue in the foreseeable future in the Department's estimate regardless of its final action. The Department thus contemplates final action with an understanding that the revised regulations will not likely resolve years of related conflict.

With respect to the benefits expected with final action, the Department underscores that it is charged by existing law, including a related court order, to complete its environmental review and rulemaking effort, and to adopt regulations that ensure authorized suction dredging, if and when the moratorium is lifted, will not be deleterious to fish. CEQA, in this respect, required the Department to prepare its environmental analysis assuming the regulations will take effect and that related suction dredging will occur. As discussed more fully below, in this particular case, where the revised regulations serve to fulfill the Department's obligations under existing law, many of the adopted regulation's benefits are those inherent to completing that undertaking, and the manner in which the Department has done so.

There is no doubt, however, that the revised regulations are a substantial improvement, consistent with related requirements in the Fish and Game Code, over the existing regulations from 1994. When and if the current statutory moratorium lifts, the revised regulations as effective in Title 14 will constitute a substantial improvement, conferring an important statewide benefit from a regulatory and environmental perspective compared to the 1994 regulations. With respect to the 1994 regulations, the Department underscored its willingness to exercise leadership among the myriad conflicting stakeholder groups – despite the Department's limited authority to address the full spectrum of suction dredging's impacts with possible legal and political costs - when the Department noted in a court filing in October 2006, for example, that the Department itself believed suction dredging under those regulations was causing deleterious effects to fish in California. (*Karuk Tribe of California et al. v. California Dept. of Fish and Game*, Super. Ct. Alameda County, 2005, RG05211597, Defendants' Case Status Report with Declarations etc., October 3, 2006.) For purposes of its overall mission and charge under the Fish and Game Code generally, the revised regulations provide important benefits compared to the now-outdated regulations currently found in Title 14. In particular, the revised regulations rely on information on the distribution and status of aquatic species which was not available when the Department developed the 1994 regulations. The revised regulations also recognize that numerous species have declined over the years, requiring a greater level of protection than provided in the 1994 regulations.

Another important benefit of adopting the revised regulations concerns the Department's related legal obligations. Fish and Game Code section 5653.9, for example, as emphasized throughout these findings, directs the Department in mandatory terms to adopt regulations governing the issuance of related permits. The same section also directs the Department to adopt those regulations in compliance with CEQA and the APA, which is happening here. (See also Fish & G. Code, § 5653.1, subd. (a).) In the same vein, and perhaps even more importantly, is the order and consent judgment issued by the Alameda County Superior Court in the *Karuk* litigation in December 2006. That order, entered by the Superior Court on December 20, 2006, specifically directs the Department to conduct "further environmental review" of its suction dredge permitting program under the 1994 regulations and, if necessary, to conduct related rulemaking under the APA. The December 2006 Order also directs the Department to complete its related effort by June 2008. A

significant benefit of taking final action, in this respect, is the Department meeting its related legal obligation to do so by statute and court order.[3]

The benefit of completing the Department's environmental review and rulemaking effort is also highlighted by comments from the current and former governors. In vetoing a related portion of Senate Bill (SB) 87, the California 2011 Budget Act, Governor Brown objected to a related provision that would have prohibited the Department from expending public funds to complete this effort. Governor Brown did so underscoring the proposed funding restriction conflicted with the Department's legal obligation to complete the environmental review effort required by court order. (Stats. 2011, ch. 33, p. 4, Item 3600-001-00001, Provision 3.)

Former Governor Schwarzenegger acknowledged the same obligation and the importance of completing the effort in October 2007. The former governor did so vetoing Assembly Bill (AB) 1032 (Wolk), which would have provided the Department with related funding, but also imposed various restrictions on suction dredging while the Department completed the required environmental review. In vetoing the bill, which itself specifically acknowledged the Department's obligations under the court order, Governor Schwarzenegger commented he was doing so because the required *scientific environmental review* should necessarily precede any such restrictions or other changes to the Department's 1994 regulations. (Assem. Bill No. 1032 (2007-2008 Reg. Sess.), Governor's Veto Message, October 13, 2007.)

In August 2009, former Governor Schwarzenegger also signed SB 670 (Wiggins). In so doing, the State of California enacted the existing statewide moratorium on suction dredging as an initial matter. (Stats. 2009, ch. 62, § 1, adding former Fish & G. Code, § 5653.1.) As enrolled and signed by the former governor, SB 670 specifically acknowledges and codifies the Department's obligations under the December 2006 Order in the *Karuk* litigation. Governor Brown noted the same obligations signing AB 120 in July 2011, affirming the Department's obligation to complete the current effort while continuing the moratorium. (Stats. 2011, ch. 133, § 6, amending former Fish & G. Code, § 5653.1.)

Finally, at least one other important benefit of the Department completing the current effort bears emphasis. As noted above, the 2012 EIR and the Department's rulemaking effort generally constitute the most thorough, up-to-date technical analysis of suction dredging and its related effects in California history. The analysis, in turn, reflects the hard work and related expertise of the Department, its technical staff, as well as numerous consultants with related subject matter expertise working on the effort on behalf of the Department. The analysis also reflects the Department's partnership with and the work

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[3] The importance of completing the environmental review and rulemaking effort is further underscored by an Order and Citation of Contempt issued against the Department in the *Karuk* litigation on August 20, 2009. Importantly, the order and citation does not constitute a judicial finding that the Department was in contempt of the December 2006 Order requiring updated environmental review. However, order and citation further underscore the importance of the Department completing the current effort consistent with its existing legal obligations. (See also *Karuk Tribe of California et al. v. California Dept. of Fish and Game*, Super. Ct. Alameda County, 2005, RG05211597, Order Discharging Contempt Citation, etc., October 15, 2009.)

product of the State Water Resources Control Board and its technical staff, and related peer review conducted by the Water Board independent of the Department. In addition, the analysis has been subject to and is a product of considerable public input from across the stakeholder spectrum, including input from many private sector and public agency technical experts. Finalizing the underlying technical analysis is not only a necessary and important component of the Department's final action from a regulatory standpoint. The technical analysis, once finalized, will also provide the important benefit of helping to inform ongoing debate by the people and State of California regarding whether and how to regulate suction dredge mining in the years to come.

B. Balancing The Benefits of Final Action by the Department With the Significant and Unavoidable Environmental Effects

CEQA next requires the Department to balance the benefits of proposed final action with the expected significant and unavoidable environmental effects. Unique to the CEQA Guidelines, compared to CEQA itself, is the notion that the decision making public agency may ultimately deem the adverse effects at issue *acceptable.* (CEQA Guidelines, § 15093, subd. (a).) To be clear, the Department does not intend to deem, nor does it consider any or all of the identified significant effects acceptable, particularly the significant and unavoidable impacts on biological trust resources. The Department finds instead, as set forth below, only that the benefits of final action and the substance of revised regulations generally, once effective in Title 14, override the expected significant effects.

The Department recognizes the authority acknowledged by the CEQA Guidelines to disapprove a proposed project to protect the environment where significant effects are implicated. (*Id.*, § 15002, subd. (h)(5).) A related provision acknowledging the important difference between lead and responsible agencies also underscores that any agency's relevant jurisdictional authority may be a limiting factor for such a disapproval. (*Id.*, § 15042; see also *San Diego Navy Broadway Complex Coalition v. City of San Diego* (2010) 185 Cal.App.4th 924, 937-941.) Here for purposes of CEQA, as explained earlier in detail, all impacts to fish subject to the Department's relevant substantive authority are reduced by the revised regulations to below a level of significance. Having fulfilled its substantive obligation under the Fish and Game Code section 5653.9 (i.e., promulgating regulations to ensure that authorized suction dredging will not be deleterious to fish), the Department believes it likely lacks the legal authority to decline to take final action in the present case (i.e., disapprove the project) in response to other significant effects beyond its substantive reach. (See, e.g., Fish & G. Code, 5653, subd. (b) (substantive parameters of the regulations the Department is required to adopt in the present context).)

Even if the Department is vested with the legal authority to disapprove the project at hand, it believes the benefits of final action to adopt the revised regulations override the expected significant effects. Again as noted earlier, the benefits of Department final action include substantial improvements to the existing regulations governing suction dredging under the Fish and Game Code, certainly as compared to the 1994 regulations; fulfilling its legal obligation by statute and court order to adopt updated regulations consistent with existing

law and to complete related environmental review; and finalizing in coordination with the State Water Resources Control Board the most comprehensive, up-to-date scientific and technical analysis of suction dredging and its related effects ever prepared in California. Taking final action, in this respect, will mean that, if and when the existing statutory moratorium is lifted, suction dredging as authorized under the Fish and Game Code will not be deleterious to fish. Likewise, any further policy and technical debate about appropriate regulation of the activity will benefit from the Department and the State Water Board's related efforts as reflected in the certified 2012 EIR.

As to the expected significant effects, none will occur in the relative short term with the existing statutory moratorium. (See generally *Id.*, § 5653.1.) Likewise, should the moratorium be lifted by a change in law or by court order, the significant and unavoidable effects expected with the revised regulations will still persist beyond the existing substantive legal reach of the Department relevant in the narrow circumstance at hand. Moreover, as to those effects, the Department took a conservative approach under CEQA, erring on the side of caution based on substantial evidence, to deem impacts significant even where the probability of related effects is small. Furthermore, nearly all of the significant and unavoidable effects expected with the revised regulations are subject to the regulatory authority and substantive expertise of other federal, state, and local agencies. The State and Regional Water Quality Control Boards' regulatory authority over water quality is but one example. (Wat. Code, § 13000 et seq.) Indeed, as emphasized by a provision in the Department's existing regulations left virtually unchanged in the current proposal, nothing in any suction dredge permit issued by the Department relieves the permittee of the obligation to comply with other applicable federal, state, and local law. (See Cal. Code Regs., tit. 14, § 228, subd. (g).) And the same is true of other controlling law in the Fish and Game Code that may apply to any given suction dredge operation. (See, e.g., Fish & G. Code, §§ 1900 et seq., 2000, 3503, 3503.5, 2080.)

All things considered, the Department finds on balance that the benefits of final action outweigh the significant and unavoidable effects expected to occur with suction dredging as authorized under the revised regulations. The Department is mandated by statute and court order to complete the environmental review and rulemaking effort under existing law. Moreover, in fulfilling that mandate from a substantive perspective, the Department's legal authority is prescribed in narrow terms based on Fish and Game Code section 5653, subdivision (b), specifically. Though unpalatable and inconsistent with the Public Trust Doctrine and its trustee charge under the Fish and Game Code, the Department believes it can do no more.

In CEQA terms, the Department has done all that it feasibly can to avoid and substantially lessen the significant effects associated with the revised regulations. The Department in fact and law has reduced to below a level of significance all the adverse environmental effects within its substantive reach under Fish and Game Code section 5653, subdivision (b). On balance, again, particularly with the Department's legal obligation to complete its environmental review and rulemaking effort, the Department's finds the benefits of final

action to approve the revised regulation are sufficient to override the remaining significant effects at issue.

Also relevant as the Department completes this Statement of Overriding Considerations are a few comments related to AB 120. (Stats. 2011, ch. 133, § 6, amending Fish & G. Code, § 5653.1.) The Department disagrees that AB 120 requires it to adopt updated regulations that *fully mitigate* all identified significant effects associated with suction dredging. The Department also disagrees that AB 120 expands or otherwise provides the Department with the independent substantive legal authority to fully mitigate or otherwise reduce such effects to below a level of significance under CEQA through the regulations required by the Fish and Game Code. The AB 120 amendments to Fish and Game Code section 5653.1 simply identify five substantive conditions that the Department would need to certify to the Secretary of State for the existing statutory moratorium to end any earlier than June 30, 2016. (Fish & G. Code, § 5653.1, subd. (b).) The AB 120 amendments do not expand the Department's substantive legal authority available in the present case. (*Id.*, § 5653, subd. (b).) Likewise, the amendments provide no legal authority for the Department to modify the existing, statutorily based fee structure for its related permitting program. (*Id.*, subd. (c).) Arguments along these lines, in the Department's opinion, simply highlight the broader need for comprehensive regulatory reform to address and resolve the complex issues associated with the future of suction dredging in California. The Department hopes that its final action in the present case, and its related lead agency effort to find out and disclose all that it reasonably can, aided considerably by the State Water Resources Control, will inform further dialogue.

Finally, the Department concludes with a comment about the significant and unavoidable effects to cultural resources expected to occur with the revised regulations. The Department believes, as noted earlier, that the prospect of such effects with the changes incorporated into the revised regulations is much less when compared to both the 1994 regulations and the proposed regulations originally noticed by the Department in February and March 2011. The Department also appreciates that this improvement over the 1994 regulations, and through the revisions to the regulations as originally noticed, may be of little consolation in the eyes of Native American interests. The Department wishes to specifically acknowledge that the State of California under Governor Brown, and the Department itself, recognize the importance and benefit going forward of robust coordination in the natural resource context with California Native Americans.

XVI. FINDINGS

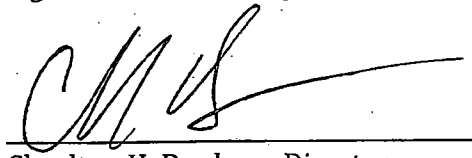
The Department's findings set forth above identify and address all of the adverse project-level and cumulative environmental impacts expected with adoption of the revised regulations and the issuance of related permits under Fish and Game Code section 5653 et seq. The findings also address all the feasible changes to the revised regulations that would reduce related impacts to less than significant levels to the extent feasible under CEQA. Finally, the findings address all the potentially feasible alternatives to the revised regulations, including all environmentally superior alternatives, and whether they might avoid or substantially lessen the significant and unavoidable effects expected with the revised regulations and related suction dredging as authorized under the existing, relevant provisions of the Fish and Game Code.

Department final action to adopt the revised regulations will result in substantial improvements to the existing regulations governing instream suction dredge mining under the Fish and Game Code, certainly compared to the 1994 regulations currently found in Title 14 of the California Code of Regulations. In so doing, the Department will fulfill its legal obligation by statute and court order to complete updated environmental review and to adopt regulations consistent with existing law. Completing the environmental review effort with the support of the State Water Resources Control Board and adopting the revised regulations will also allow the Department to finalize the most comprehensive, up-to-date scientific and technical analysis of suction dredging and its related effects ever prepared in California.

These benefits do not render the related significant and unavoidable environmental effects acceptable. The Department finds, however, that the benefits of adopting the revised regulations outweigh the significant and unavoidable effects expected to occur as a result of its final action. The benefits of the revised regulations, in this respect, are hereby determined to be a basis for the Department to override all unavoidable project-level and cumulative environmental effects identified in the 2012 EIR and in these findings.

DFG has reviewed and considered the information contained in the 2012 EIR, finds that the 2012 EIR reflects its independent judgment and discretion, finds that the 2012 EIR was completed in compliance with CEQA, and hereby certifies the 2012 EIR.

In so doing, the Department adopts these findings of fact and the Statement of Overriding Considerations as set forth above; approves the revised regulations for purposes of CEQA and the APA, and Fish and Game Code sections 5653, 5653.1, and 5653.9; and adopts the revised regulations as its Mitigation Monitoring and Reporting Program for purposes of CEQA.



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3/16/12

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SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF SAN BERNARDINO

Coordination Proceeding Special Title (Rule 1550(b))	Coordinated Case No. JCCP4720 Re: Included Case No. SCCVCV120048
SUCTION DREDGE MINING CASES	**EVIDENCE IN SUPPORT OF DEFENDANTS' OPPOSITION TO PLAINTIFFS' MOTION FOR SUMMARY ADJUDICATION, IN *The New 49ers et al. v. State of Calif., et al.*** Date: May 1, 2014 Time: 8:30 a.m. Dept: R8 Judge: Honorable Gilbert Ochoa Trial Date: None Set Action Filed: April 12, 2012
Included Actions:	
Karuk Tribe of California, et al. v. California Department of Fish and Game	RG 05211597 - Alameda County
Hillman, et al. v. California Department of Fish and Game	RG 09434444 - Alameda County
Karuk Tribe of California, et al. v. California Department of Fish and Game	RG 12623796 - Alameda County
Kimble, et al. v. Kamala Harris, Attorney General of California, et al.	CIVDS 1012922 - San Bernardino County
Public Lands for the People, et al. v. California	CIVDS 1203849 - San Bernardino County

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COUNTY OF SAN BERNARDINO

Coordination Proceeding Special Title (Rule 1550(b))	Coordinated Case No. JCCP4720 Re: Included Case No. SCCVCV120048
SUCTION DREDGE MINING CASES	**DECLARATION OF BURRETT W. CLAY IN SUPPORT OF DEFENDANTS' OPPOSITION TO PLAINTIFFS' MOTION FOR SUMMARY ADJUDICATION RE: PREEMPTION IN *NEW 49ERS V. STATE OF CALIF.*** Date: May 1, 2014 Time: 8:30 a.m. Dept: R8 Judge: Honorable Gilbert Ochoa Trial Date: None Set Action Filed: April 13, 2012
Included Actions:	
Karuk Tribe of California, et al. v. California Department of Fish and Game	RG 05211597 - Alameda County
Hillman, et al. v. California Department of Fish and Game	RG 09434444 - Alameda County
Karuk Tribe of California, et al. v. California Department of Fish and Game	RG 12623796 - Alameda County
Kimble, et al. v. Kamala Harris, Attorney General of California, et al.	CIVDS 1012922 - San Bernardino County
Public Lands for the People, et al. v. California Department of Fish and Game	CIVDS 1203849 - San Bernardino County

The New 49er's, et al. v. State of California, California Department of Fish and Game, et al.	SCCVCV120048 - Siskiyou County
Walker v. Harris, et al.	34-2013-80001439 - Sacramento County
Foley et al. v. California Department of Fish and Wildlife, et al.	SCCVCV1300804 - Siskiyou County

I, BURRETT W. CLAY, DECLARE:

1. I submit this declaration in support of defendants' oppositions to the plaintiffs' December 21, 2013 motions for summary judgment and/or summary adjudication filed in *Kimble v. Harris* (No. CIVDS1012922, San Bernardino County), *Public Lands for the People v. Calif. Dept. of Fish & Game* (No. CIVDS 1203849, San Bernardino County), and *The New 49ers v. State of California* (No. SCSCCV1300804, Siskiyou County) (hereinafter simply "*Kimble*," "*PLP*," and "*The New 49ers*").

BACKGROUND AND QUALIFICATIONS

2. I have been a United States Bureau of Land Management ("BLM") Mineral Examiner since 1977, and was employed by BLM in various capacities from 1977 until my retirement in July 2010. The BLM also brought me back in June 2011 for 16 months thru Sept 2012. My area of focus while at BLM was the examination of mining claims, for the purpose of economic evaluation, and determining their validity, including profitability.

3. During my tenure at BLM, I served as:

- Mineral Examiner in the Colorado State Office, Denver Colorado (July 1977 - Nov. 1980);
- District Geologist in the Salt Lake District Office, Salt Lake City, Utah (Dec. 1980 - Nov. 1984);
- Mining Staff Specialist in the BLM Division of Mining Law and Saleable Minerals, Washington, D.C. (Dec. 1984 - Sept. 1985);
- Mineral Program Leader in the BLM Phoenix Training Center, Phoenix, Arizona (Oct. 1985 - Dec. 1987);
- Assistant Chief, Division of Training Development in the BLM Phoenix Training Center, Phoenix, Arizona (Dec. 1987 - April 1989);
- Chief, Division of Minerals Training in the BLM Phoenix Training Center, Phoenix, Arizona (Dec. 1989 - Sept. 1994);
- Acting Director, BLM National Training Center, Phoenix, Arizona (Jan. 1995 - June 1995); and
- Division Chief/Supervisory Geologist, responsible for minerals training programs at the BLM National Training Center, Phoenix, Arizona (July 1995 - July 2010).
- Review Mineral Examiner in the BLM Nevada State Office, Reno, Nevada (June 2011 – Sept 2012)

4. In addition, in 1989, at the request of BLM's Assistant Director for Minerals, I led the development of the BLM's Mineral Examiner Certification Program. From 1990 until my retirement in July 2010, I was a member of the BLM National Mineral Examiners Certification Panel, and served as Chairman of that Panel from approximately 1994 until my retirement in 2010. I was a Certified Review Mineral Examiner (CRME 001) from the program's inception until I retired in 2010, and then again in 2011 and 2012 when I was rehired by the Nevada State Office (only current BLM employees are permitted to hold Reviewer status). I have been a Certified Mineral Examiner (CME 0001) since the program's inception and still maintain that status today.

5. I have authored or co-authored numerous pieces of BLM guidance related to the examination of mining claims, including BLM Manual Section 3895 - Certification of Mineral Examiners; BLM Handbook section 3890-1 - Mineral Examiners Handbook; and BLM Handbook section 3890-3 - Validity Mining Reports.

6. I also have been an instructor in several BLM courses, training other mineral examiners, including course nos. 3800-01 (Mining Claim Validity Examination Procedures); 3800-02 (Mine and Beneficiation Methods); 3800-03 (Mining and Beneficiation Cost Estimation and Economic Evaluation); 3800-04 (Placer Examination Techniques); 3800-08 (Technical Standards for Mineral Reports); and 3800-14 (Alaska Advanced Placers). Principle subjects taught include, but are not limited to, field methods, sampling procedures, heavy equipment operation, underground mining methods, beneficiation methods, grass roots cost estimating, placer sampling, gold panning, calculation of placer resources, small placer mine design, introduction to heavy equipment for placer mining, placer cost estimation, economic analysis, technical review, professional ethics, expert witness testimony, and mining law.

7. I have testified as an expert witness for BLM on the validity of mining claims in administrative hearings on several occasions.

8. I also have provided technical assistance to the United States Department of Interior Solicitors (Washington and Regional offices), both on specific cases and on general technical questions.

9. I also have assisted law enforcement (BLM, various states, FBI, and U.S. DOJ) in several cases involving mining fraud.

10. My training for the above functions includes, but is not limited to:

Bachelor of Science (geology, with honors), 1977, Weber State College, Ogden, Utah

Beginning Minerals Training, Course 3000-1, July-Dec. 1977 BLM Phoenix Training Center, Phoenix, Arizona

Mine and Beneficiation, Capital and Cost Estimating, Course 3000-11, Nov. 1983, BLM Phoenix Training Center, Phoenix, Arizona,

Advanced Minerals Training, Course 3000-3, March 1983, BLM Phoenix Training Center, Phoenix, Arizona,

Disseminated Gold Deposits; Evaluation, Patenting & Management, Course 3000-3, Feb. 1988, BLM Phoenix Training Center, Phoenix, Arizona

Fundamentals and Applications of Fire Assay, August 2000, Center for Advanced Mineral and Metallurgical Processing, Montana Tech, Butte MT

31st Annual Rocky Mountain Mineral Law Institute, July 1985 Rocky Mountain Mineral Law Foundation

35th Annual Rocky Mountain Mineral Law Institute, July 1989 Rocky Mountain Mineral Law Foundation

39th Annual Rocky Mountain Mineral Law Institute, July 1993 Rocky Mountain Mineral Law Foundation

40th Annual Rocky Mountain Mineral Law Institute, July 1994 Rocky Mountain Mineral Law Foundation

112th Annual Meeting, Exposition & Short Courses, Dec 2006 Northwest Mining Association

113th Annual Meeting, Exposition & Short Courses, Dec 2007 Northwest Mining Association

114th Annual Meeting, Exposition & Short Courses, Dec 2008 Northwest Mining Association

115th Annual Meeting, Exposition & Short Courses, Dec 2009 Northwest Mining Association

117th Annual Meeting, Exposition & Short Courses, Dec 2011 Northwest Mining Association

11. My experience includes the validity examination, including economic evaluation, of well over 500 mining claims, the majority being placer claims, as well as the technical review of the work of other Mineral Examiners.

STATEMENTS APPLICABLE TO ALL CASES

12. For clarity, I need to provide some definitions of terms as I use them:

a. Discovery: The mining law has applied some specific definitions to words that are in common usage. The two most important of these for my discussion are discovery and valid or validity. Under the mining law to "make a discovery" means finding a "valuable mineral deposit" where "minerals have been found and the nature is such that a person of ordinary prudence would be justified in the further expenditure of their labor and means with the reasonable expectation of developing a valuable mine...," and that the minerals can be extracted and marketed at a profit. (See *U.S. v. Coleman* (1968) 390 U.S. 599, 600, 602.) These are usually referred to as the "prudent person" and "marketability" tests.

b. Validity/Location: Mining claimants often speak of having a valid claim when what they mean is that they have completed the acts of location. That is; they found a quantity of mineral, they properly staked the claim on the ground, they filed a notice of location with the county and with the BLM, and they have paid their recording and annual maintenance fees. The law does not consider their claim to be valid unless it can also meet the prudent person and marketability tests.

c. Small miner: When I speak of small miners I am referring to operations, often family run, often using between 1 and 4 staff and generally processing less than 50 to 100 bank cubic yards of gravels per day. (Bank cubic yards (BCY) refers to gravels measured in place before mining. The volume of a gravel swells when it is disturbed and can increase significantly usually by more than 20%). This is in contrast to large commercial operations.

13. When BLM accepts materials for the purpose of recording (which some people incorrectly refer to as "registering") a mining claim, and issue a mining claim serial number (called a CAMC number for California mining claims), it does not routinely make a determination regarding the validity of the mining claim. In fact, the recordation materials that

miners submit do not contain sufficient information to make that determination, and the staff accepting and processing the recordation information are not qualified to make a determination of validity. The Bureau also does not routinely make a determination regarding whether any submerged portions of the claim are under navigable or non-navigable waters. In fact, the recordation materials that miners are required to submit do not contain sufficient information to make that determination.

14. Every placer mining claim has unique characteristics, including but not limited to the areal extent, its shape, its concentration, and purity of the mineral in the deposit (for gold this is usually reported in fineness; pure gold has a fineness of 1000), the surrounding environment, the difficulty in accessing both the mining claim and any mineral deposits on the mining claim, the rate at which minerals can be recovered by various means of mining, and the costs of mineral recovery by various means. Accordingly, the determination of whether it is possible to profitably mine gold or other valuable minerals by any given method (or, in fact, by any method), can only be made on the basis of a site- and operation- specific examination of each particular placer mining claim.

15. The factors just described will vary not only from mining claim to mining claim, but from place to place within a given mining claim. Because of this variability, the value of the minerals on a mining claim will vary not only from mining claim to mining claim, but from location to location within a given mining claim as well. Additionally the methods which can be used to profitably extract those minerals may also vary from mining claim to mining claim and from location to location within a given mining claim. This variability is particularly great for placer mining claims, such as those the plaintiffs in these cases say they hold. Consequently, federal law requires mineral examiners to evaluate the validity (including profitability) of placer mining claims separately for each 10-acre portion of a placer mining claim.

16. For the same reasons, whether any particular site can be profitably mined by any particular method in a manner that complies with applicable environmental laws will depend on specific characteristics of the site and specific characteristics of the mining operation, including

but not limited to the site's physiographic and geological characteristics, and the distribution, shape, location, and concentration of the mineral deposits.

17. For placer mining claims like those of the plaintiffs in these cases, because of the variation between and within mining claims of factors relevant to determining economic value of a mining operation, determining the profitability of mining the placer mining claim by any given means requires, among other things:

a. Collecting physiographic data about the site, such as elevation, relief, precipitation, available infrastructure, and temperature range, all of which can affect mining costs and potential revenues (e.g., temperature range can affect the potential operating season; precipitation can affect stream flows, again affecting the potential operating season for in-stream mining).

b. Collecting geologic data, to determine among other things, the type of placer deposit (e.g. transport, residual), its shape, aerial extent, the depth to bedrock, composition and size range of gravels, presence of clay or boulders, nature of the bedrock (e.g. natural riffles, joints, potholes, solution cavities), and the thickness and amount of overburden that must be removed to reach it. Obtaining this data requires, among other things, site-specific sampling at various locations within a placer mining claim to determine the location, concentration, quality, quantity, continuity, and accessibility of valuable mineral deposits. Such sampling requires, again among other things, (1) a visual inspection and geologic mapping to locate geomorphological features such as point bars, grade changes, gravel lenses, and archaic stream channels related to the deposition of placer gold, in order to locate areas that are likely to contain gold-bearing deposits; (2) taking a sample from each such location by digging down from the surface to bedrock and taking a sample (usually at least 3/4 of a cubic yard); (3) processing each sample to determine the concentration and characteristics* of any mineral deposits; and (4) estimating the total amount of valuable minerals represented by each sample. [*The character of the

minerals (which can vary from mining claim to mining claim, and indeed from location to location within placer mining claims) will affect both a miners' revenues and costs. For example, gold nuggets versus fine gold flakes will differ both in the value the gold will fetch upon sale, and the methods best suited to extracting and recovering that gold (each method having different associated costs and recovery rates). Gold that has a higher fineness will also usually fetch a higher price.]

c. Determining what percentage of the total amount of placer minerals found on the site can be recovered by various mining methods.

d. Determining the total estimated value of the recoverable minerals, which will depend not only on the current price of, e.g., gold, but also on the characteristics of the gold that can be recovered, as explained above.

e. Comparing the estimated value of the minerals (based on data described above) with costs associated with extracting and recovering those minerals. Many of these costs will depend on site-specific characteristics of a given mining claim, including, for example, the location of any cultural resources that must be avoided or protected; the distance of the mining claim from the nearest town or the miner's home base (affecting the cost of, e.g., transporting supplies to the claim); the location of the mining claim (differing parts of a state, and differing states, will have differing labor costs; labor costs must be included in valuing a mining claim; even a miner's own labor must be valued at a cost for the going rate for hiring labor at the particular location); the topography of the claim (e.g., whether it is steep or level); the geology of the claim surface; the nature and density of vegetation that must be protected or removed; the presence of endangered species that must be protected as a matter of law; and the costs of compliance with both federal and state regulations, including reclamation requirements. For mineral deposits that are submerged, additional site-specific factors affecting the costs must be considered, including, but not limited to, the

depth and flow rate of the water body, and the particle size and sorting of the mineral-bearing gravels. The costs of mining submerged gravels also will vary depending on the mining method used. The costs associated with any given mining method also will depend, in part, on the specific characteristics of the mining site, such as those described above.

18. Paragraph 17 highlights and summarizes a small portion of the factual information that is required to assess the profitability of a mining claim. Attached hereto as Exhibit A is a copy of *BLM Manual H-3890-3 - Validity Mineral Reports*. I was a coauthor of this part of the BLM Manual, among others. In this part, Chapter II, sections B.6 to B.12 (pp. II-4 to II-12), and Chapter IV, sections G.6 to G.12 (pp. IV-3 to IV-7) list the essential information required to make a determination of the economic value of a mining claim in more detail than I have above.

19. Such detailed, site-specific information is essential in the economic evaluation of a mining operation not only because there is no way to generalize across all mining claims, for the reasons just discussed, but also because miners frequently hold incorrect beliefs concerning the profitability of their own mining operations. In almost all of the economic evaluations of mining operations I have performed, the mine owner/operator believed the claim to be profitable, yet in the majority of cases, a full examination that accounted for all applicable cost and revenue factors showed that the claims could not be profitably mined by any method.

20. Small miners' reports of past revenues generally are not an accurate indicator of the economic viability or profitability of their mining operation. First, those reports are not an accurate record even of past experience unless they show that they are based on a full accounting of all appropriate costs. Second, even if the reports of past profits did accurately and fully account for all applicable costs, past profits are not necessarily in themselves a predictor of future profits. Mineral deposits in a placer mining claim are not uniform or infinite. Thus, for example, the miners' past profits may be based on having found and mined a small and localized, but particularly rich, gravel lens which now has been depleted. Thus, in every case where past revenues are used as evidence of a mining claim's value, it is necessary to also have the

information described in paragraphs 17 and 18, above, in order to be able to predict whether the claim can continue to be mined at a similar profit level using the same means in the future.

21. The determination of whether a placer mining claim is valid requires not only the site-specific factual data discussed above (in order to determine the mining claim's profitability), but also sufficient factual data to determine whether the mining claim is on federal land that was open to location at the time the placer mining claim was located or whether the mining claim or portions of the mining claim have been withdrawn from mineral entry or are subject to other prior existing rights, and so forth. (See, e.g., Exhibit. A, p. II-4 [re: Land Status and Record Data].) These data include the legal description by aliquot part and complete lots using the U.S. Public Land Survey System and its rectangular subdivisions or geographic coordinates of the boundaries of the mining claim as staked by the claimant.

22. Suction dredging is not the only way to mine instream placer deposits. Other mechanized methods include the use of heavy equipment such as an excavator or a dragline in combination with a traditional tromel or shaker screen and riffles. There are also hand methods such as a shovel and pan or rocker box but these are very labor intensive. The use of any given mechanized method (with or without first diverting the water) is dependent on the specifics of the deposit in question. Paragraphs 17 and 18, above, address the data necessary to make these decisions. Other than suction dredging, these methods also apply to placer deposits that are not submerged.

23. Placer deposits that are not under water must be mined by means other than suction dredging. There are non-submerged deposits where gold can be profitably mined in compliance with all applicable environmental regulations.

24. I have reviewed all of the evidence submitted by the plaintiffs in support of the motions for summary judgment/adjudication in *Kimble, PLP*, and *The New 49ers*. In my opinion, the information provided in that evidence is not sufficient to demonstrate that any of the claimants has all of the knowledge, skills, abilities, and training necessary to render expert opinions regarding the valuation of mining claims. They may in fact have sufficient skill and experience, but the evidence submitted does not show that.

STATEMENTS SPECIFIC TO *KIMBLE*

25. I have reviewed all of the evidence submitted in support of the plaintiffs' motion for summary judgment/adjudication in *Kimble*. Because the economic evaluation of a mining claim requires site/operation-specific facts, as described above, and because the plaintiffs' evidence in *Kimble* does not include the necessary facts (or, in fact, any site/operation-specific facts), there is insufficient evidence to show that any of the plaintiffs' placer mining claims: (a) can be mined at a profit by suction dredging, (b) cannot be mined at a profit by means other than suction dredging, or (c) are valid. More specifically:

26. I have reviewed all of the evidence submitted in connection with the plaintiffs' motion for summary adjudication in *Kimble*, including the evidence cited to support the fact alleged in paragraph 4 of the Separate Statement of Undisputed Material Facts of Plaintiffs Ben Kimble, *et al.* 's Motion for Summary Judgment or Adjudication ("Kimble SS" or "Kimble Separate Statement") that: "Without a permit from DF&W to operate a suction dredge, Plaintiffs cannot lawfully recover profitable quantities of gold, and other precious metals, from their Federal mining claims." The evidence submitted is not sufficient to support that factual assertion as to any of the *Kimble* plaintiffs' placer mining claims. As explained above, whether any placer mining claim can be profitably mined by any particular method depends on a variety of site/operation-specific facts. The required facts, as they pertain to any of the *Kimble* plaintiffs' placer mining claims, are not contained in any of the evidence submitted to support the *Kimble* motion.

27. The declarations cited in support of paragraph 4 of the Kimble Separate Statement all say that, "suction dredge mining is the only means for the small and medium scale miner to economically, and in an environmentally sound manner, recover gold from a river. . . ." I do not know what they meant by "small and medium scale," as the declarations do not define these terms. I know what I mean when I use the term small miner (see Paragraph 12, above), and based on that definition, I personally have examined several small placer mining operations that were profitable and complied with applicable environmental laws without the use of suction dredge equipment.

28. The declarations cited in support of paragraph 4 of the Kimble Separate Statement all state that, "Most suction dredge mining claims are in narrow canyons with no viable deposits on the banks." This statement is misleading because there is no such thing as a "suction dredge mining claim." BLM regulations do not classify mining claims on the basis of the method by which the claimant intends to mine. This statement is untrue because (assuming "viable" means "can be mined profitably"), numerous placer mining claims (and, in fact, most that I have personally examined) are not in narrow canyons, and many of these placer mining claims have viable mineral deposits on their banks, benches, and other non-submerged locations. Moreover, nothing in the declarations or the other evidence submitted by the Kimble plaintiffs is sufficient to show whether their particular placer mining claims are "in narrow canyons with no viable deposits on the banks." Although, this may be a correct statement about any given placer mining claim, but the evidence provided does not support it as to the plaintiffs' particular mining claims.

29. The declarations cited in support of paragraph 4 of the Kimble Separate Statement all state that, "The only viable deposits are usually located in the deepest part of the stream." Assuming "viable" means "can be mined at a profit," for the reasons explained above (see, e.g., paragraphs 14-20), there is no factual basis for such a blanket generalization. Profitable gold deposits frequently are located in places other than the deepest part of a stream. Moreover, nothing in the evidence submitted by the Kimble plaintiffs is sufficient to show whether the only viable deposits of valuable minerals on their particular mining claims are "located in the deepest part of the stream."

30. The declarations cited in support of paragraph 4 the Kimble Separate Statement all state that, using "drag lines, bucket line dredge, bulldozers and trammels [sic]" in lieu of suction dredging "would greatly and adversely affect the environment." This blanket generalization is untrue. Whether any particular mining method can be used in compliance with all applicable environmental laws depends on numerous specific characteristics of the mining site involved, and specific characteristic of the mining operation. Mining operations frequently use these techniques and are able to profitably mine gold while complying with all applicable environmental regulations.

31. The declarations cited in support of paragraph 4 of the Kimble Separate Statement all state that, "Suction dredge mining is the only economically and environmentally sound method for accessing these [deep-water] deposits. No other method . . . can economically or environmentally justify the development of these mining claims." For the reasons explained above, there is no factual basis for such a blanket generalization about placer mining claims. While it may be true for some specific cases that suction dredging is the only way to mine effectively, it is definitely not true in all cases. In fact, I have personally examined placer mining claims that can be mined profitably and in compliance with all applicable environmental regulations by means other than suction dredging. Moreover, nothing in the evidence submitted by the Kimble plaintiffs is sufficient to show "[n]o other method . . . can economically or environmentally justify the development of" the Kimble plaintiffs' mining claims.

32. The evidence submitted by the Kimble plaintiffs does not include the site- and operation- specific data necessary to determine the profitability of a mining claim, as described above. Accordingly, not only is the evidence submitted insufficient to show that suction dredge mining is the only profitable way to mine the Kimble plaintiffs' placer mining claims; the evidence is insufficient to show that their placer mining claims can be profitably mined by any means at all.

33. Determining whether a mining claim is valid requires, among other things, evidence verifying that it is on federal land (and that land was not closed to mineral entry or otherwise encumbered at the time the claim was located), including the placer mining claim's legal description by aliquot part and complete lots using the U.S. Public Land Survey System and its rectangular subdivisions or geographic coordinates of the claim's boundaries as staked by the miner. It also requires evidence, including the information described in paragraphs 17 and 18, above, that there are valuable minerals on the mining claim that can be mined and marketed at a profit. I have reviewed all of the evidence submitted by the Kimble plaintiffs, and they have not offered sufficient facts to show that any of their placer mining claims are valid.

STATEMENTS SPECIFIC TO *PLP*

34. I have reviewed all of the evidence submitted in support of the motion for summary judgment/adjudication in *PLP*, and there is no evidence sufficient to show that any of the plaintiffs' placer mining claims: (a) cannot be mined at a profit by suction dredging done in compliance with the state regulations they challenge; (b) can be mined at a profit by suction dredging even without the restrictions imposed by the state regulations the PLP plaintiffs challenge; (c) cannot be profitably mined by means other than suction dredging; or (d) are valid. For example:

35. Restricting the suction dredge nozzle size on suction dredges to 4 inches does not necessarily make the economic working of all placer mining claims infeasible. Whether a 4 inch nozzle restriction would make it unprofitable to mine any particular claim would depend on all of the site-specific characteristics described above (see, e.g., paragraphs 17-18) that necessarily vary from claim to claim, including the shape, concentration, and distribution of gold, and (to the extent the gold is under water) the size of the material overlying the gold. For example, provided the size of the gravels being mined is less than 4 inches in diameter, the power of the pump, not the diameter of the nozzle, will be the main factor limiting the depth at which material can be extracted. Similarly, I have examined many placer mining claims that have gold that is not under water which not only can be profitably mined, but cannot be mined with the use of suction dredge equipment. Moreover, the evidence submitted in support of the PLP plaintiffs' motion does not contain site-specific facts sufficient to establish that their particular mining claims cannot be profitably mined while complying with this restriction, or even that the mining claims can be profitably mined without this restriction.

36. Restricting, or even prohibiting, the use of motorized winches does not necessarily make it economically infeasible to work all placer mining claims. Whether such a restriction would make it unprofitable to mine any particular mining claim would depend on all of the site/operation-specific characteristics explained above (see, e.g.,. paragraphs 17-18) that necessarily vary from mining claim to mining claim, including the shape, concentration, and distribution of gold, and the deposit's relation to large boulders that cannot be moved by any

other means. Many placer mineral deposits can be profitably mined without the use of motorized winching equipment or the need to move large boulders at all, because among other things, not all profitable placer deposits are proximate to boulders that impair access to those deposits. Moreover, the evidence submitted in support of the PLP plaintiffs' motion does not contain site-specific facts sufficient to establish that their particular placer mining claims cannot be profitably mined while complying with this restriction. For example, they have provided no evidence that boulders are in fact present on any of their placer mining claims in places that interfere with the mining of mineral deposits on those mining claims.

37. Requiring that all suction dredging sites be returned to a pre-mining grade does not necessarily make all suction dredge prospecting and mining uneconomical. Although such reclamation obviously is an additional cost, that additional cost would render mining unprofitable only when it – added to all other costs – exceeds the net revenue for a mining operation. Because the costs and revenues from any mining operation necessarily vary from site to site and operation to operation, depending on numerous factors such as those described in paragraphs 17-18 above, whether the additional cost of complying with this regulation will make the difference between a profitable mining operation and an unprofitable one necessarily only can be determined on the basis of those site/operation-specific factors. Put differently, complying with this requirement will render a particular operation unprofitable only when the marginal cost of compliance exceeds the marginal profit before compliance. Because those marginal costs and profits necessarily vary from site to site and operation to operation, there is no way to say whether complying with this requirement will render any particular mining operation, or any mining operation at all, unprofitable, without knowing the site/operation specific data described in paragraphs 17 and 18, above. The PLP plaintiffs' evidence submitted in support of their motion does not contain the site/operation specific facts sufficient to establish that their particular mining claims (or any particular mining claims) cannot be profitably mined while complying with this requirement.

38. Requiring that suction dredging be limited to 10 a.m. to 4:00 p.m. does not necessarily make all suction dredge prospecting and mining uneconomical. Although this requirement could reduce the revenues that can be derived from a mining operation as compared

to a longer permitted mining day, whether any particular placer mining operation would be rendered uneconomical by such a requirement depends on whether the total revenues that can be obtained while mining under this time restriction exceed the total costs of mining. As repeatedly noted above, those total revenues and total costs will vary from site to site, and operation to operation. So whether this particular restriction will render mining on any given mining claim unprofitable will depend on the numerous site/operation specific factors that go into any profitability determination. The evidence submitted in support of the PLP plaintiffs' motion does not contain site/operation specific facts sufficient to establish that their particular placer mining claims (or any particular placer mining claims) cannot be profitably mined while complying with this requirement.

39. Determining whether a mining claim is valid requires, among other things, evidence verifying that it is on federal land (and that land was not closed to mineral entry or otherwise encumbered at the time the claim was located), including the placer mining claim's legal description by aliquot part and complete lots using the U.S. Public Land Survey System and its rectangular subdivisions or geographic coordinates of the claim's boundaries as staked by the miner. It also requires evidence, including the information described in paragraphs 17 and 18, above, that there are valuable minerals on the mining claim that can be mined and marketed at a profit. I have reviewed all of the evidence submitted by the PLP plaintiffs, and they have not offered sufficient facts to show that any of their placer mining claims are valid.

STATEMENTS SPECIFIC TO *THE NEW 49ERS*

40. I have reviewed all of the evidence submitted in support of the motion for summary judgment/adjudication in *The New 49ers*, and there is no evidence sufficient to show that the only way they can recover profitable quantities of gold from their placer mining claims is by suction dredging, as asserted in paragraph 6 of The New 49ers Separate Statement of Undisputed Fact in Support of Motion for Partial Summary Judgment ("49ers Separate Statement, or "49ers SS"). Nor is there sufficient evidence provided to show that they can profitably mine gold from their placer mining claims using suction dredging. As explained in paragraphs 14-20, above, there are numerous site/operation specific facts that are required in order to determine the profitability of

any mining claim. Without these facts, it is not possible to reliably determine the profitability of any placer mining claim, or of mining a placer claim by any particular method. As also explained above (paragraph 20), miners' own reports of past profits obtained from their mining claims are not sufficient evidence to assess a mining claims' current profitability.

41. Because it lacks the necessary mining claim specific data just described, the information provided in Exhibit 6 to the Buchal Declaration submitted in support of The New 49ers motion for partial summary judgment (summary adjudication), while being of some interest as a historical document describing the plight of depression era miners, is irrelevant when it comes to the determination of validity/profitability of The New 49ers' own placer mining claims, or any current mining claims. There is no data in the exhibit that can be tied directly to suction dredging in California in the last ten years, let alone to a specific placer mining claim today. Moreover, because the price of gold was drastically different from today's prices when the data in Exhibit 6 was compiled, as were virtually all other relevant cost and revenue factors, even if Exhibit 6 had considered every relevant, site/operation specific factor necessary to evaluate the profitability of the plaintiffs' placer mining claims, that evaluation, now over 70 years old, would not be relevant to determining the profitability of their claims today, and no reasonable expert in the field of mineral examination or the economic evaluation of mining operations would rely on it.

42. I have reviewed the statements made about each mining claim discussed in Exhibit 2 to the Buchal Declaration. Although they all express opinions about the profitability of the miners' particular placer mining claims via suction dredging, none of the statements demonstrate that the miner had a sufficient factual basis for giving an opinion that their particular mining claim cannot be profitably mined by any means other than suction dredging, or even that it can be profitably mined using suction dredging. By way of example only:

43. Re: All of the New 49ers' claims (Buchal Decl., Exh. 2, pp. 1-4):

a. The miners offer no evidence that the mining claims can be profitably mined by any means: no cost information, no revenue information, no survey information, and so forth. (See paragraphs 17-18, above.)

b. Similarly the miners – without providing any geological data such as survey information about the actual depth of the mineral deposits, or the nature of the overburden – each state the opinion that all remaining commercial gold deposits are too deep to reach with a four inch dredge nozzle. Absent that geological information, there is no factual basis presented for the miners' opinion about the location of the gold deposits. Moreover, the power/size of the pump used (an operation-specific fact not mentioned), is more limiting on the depth to which a dredge can work than the nozzle size. Nozzle size restrictions are mainly important in production rates, and if the size of the gravels being mined (another site-specific fact not mentioned) exceeds the nozzle diameter.

44. Re: Kleszyk claim, Buchal Decl., Exh. 2, p. 4: This discussion provides insufficient information to support any estimate of the profitability of mining the claim, for several reasons.

a. The miner's revenue estimates are based on no actual resource or production data. Although the miner estimates that he "should make a profit of $146 per day" suction dredging, that estimate is based on a hypothetical "target" recovery rate of 1/2 ounce of gold per day. The miner does not state nor does he provide evidence (none of the necessary evidence described in paragraphs 17 and 18, above, and not even anecdotal evidence that he ever has recovered that much) that he can and does meet this production rate on a regular basis. Neither does the miner provide all the information necessary to make an estimate of profitability. For example, the miner states that he needs $48.75 (one pennyweight - 1/20th of an ounce) per day to cover relocation expenses, and the same to cover operating costs. He does not address which operating costs these amounts cover. It is doubtful that all the applicable costs, including labor costs, capital costs, refining costs, etc. are included in this number. For example if labor costs are included in the $48.75 estimated operating expenses (as they should be), and the claimant works an eight hour day, then the entire $48.75 would only cover a wage of less than $6.12 per hour, far below even the

minimum wage, without accounting for any other operating expenses such as fuel costs. If he has an assistant or works longer days as is common for small operators that number drops sharply. The statement lacks all of this information which is necessary to determine the profitability of a claim.

b. Similarly, he states that he has averaged "about 1 DWT per day using hand methods when we have conducted sampling using them." But sampling is not the same as active mining, and he provides no information sufficient to establish whether or not he could profitably mine using hand methods.

c. More importantly, he only compares suction dredging to hand mining. But there are other methods that can be used for mining gold both in and out of water (see paragraph 22, above). Without the necessary information described in paragraphs 17 and 18, above, there is no way to determine whether his placer mining claim could be profitably mined by any of those other methods. Hence his statements provide insufficient support for the statement in paragraph 6 of the New 49ers Separate Statement that suction dredging is the only profitable way to mine his placer claim.

45. Billy and Chad Stanford (Buchal Decl., Exh. 2, p. 5):

a. These miners only compare suction dredge mining to using hand mining methods. Because they do not consider the profitability of mining by other methods, their statements do nothing to support the fact asserted in paragraph 6 of the 49ers Separate Statement that suction dredging is the only profitable way to mine their placer mining claims.

b. Moreover they do not even provide sufficient information to show that they can make a profit by suction dredging. All they do is provide an estimate that they can process "10 yards per 12-14 hour work day," and say that this is "more likely to lead to a profitable work day." Not only do they not state that they do or can make a profit (just that it is "more likely"), but they provide none of the cost and revenue data necessary to determine profitability. As to revenues, they

provide no information such as the concentration of gold in the 10 yards of material they extract, how much of that gold they can recover (and at what fineness), or the price at which it can be sold. As to costs, they provide no information at all, such as the cost of labor, fuel, transportation, lodging, capital cost of equipment, costs of complying with applicable state and federal regulations, and so forth. (See paragraphs 17 and 18, above.)

46. Ray Derrick and Ronald Burnside (Buchal Decl., Exh. 2, p. 9): These miners offer no evidence that their placer mining claims can be profitably mined by suction dredging, much less that suction dredging it the only profitable way to mine their placer claims. For example:

a. They provide no information, much less sufficient information, to determine whether the instream deposits on their placer mining claims can be profitably mined by any means.

b. They provide only anecdotal information about the amount of gold they, and a prior owner, were able to extract, but no information about the value of that gold or the costs of extracting, recovering, processing, and selling it. Thus, they provide insufficient information concerning whether the mining claim can be mined profitably by suction dredging.

c. Even if those past efforts were profitable, there is no evidence that future efforts would be equally profitable. Although these miners give the opinion that "there are well over a hundred ounces still to be recovered," they do not show that they have performed any of the geological work necessary to make such an estimate (see paragraphs 17 and 18, above.)

d. Similarly, these miners say they are "confident that the only significant available deposits are underwater," and state that they have done 100 hours of sampling areas on the mining claim out of the water and found no significant amounts of gold. However, they provide no evidence that the sampling they did with the high banker was systematic enough and properly done (e.g., did it

reach bedrock; were the samples large enough to be representative) to be able to make that determination.

47. David Gary, David Ransom, Robert and Anna Sonnenburg, Northwest Mining LLC (Buchal Decl., Exh. 2, pp. 5, 8, 9): These miners only say that all or some of their placer mining claims are within areas closed to suction dredging by the new regulations. But they offer no evidence, much less all the factual evidence that is required to make a determination, that those areas cannot be profitably mined by means other than suction dredging. Nor do they provide evidence sufficient to show that their mining claims could profitably be mined by suction dredging if they were not closed. The Sonnenburgs offer the additional fact that that they once recovered 5 ounces of gold in two weeks when suction dredging was allowed, but only 2 ounces after four months of work without suction dredging. (Buchal Decl. pp. 8-9.) Not only is such anecdotal evidence not sufficient to determine the profitability of a mining claim (see paragraph 20, above), but even as to the anecdotes, the Sonnenburgs provide no evidence: (a) about the profitability of mining mineral deposits on non-submerged portions of their mining claims; (b) about the non-dredging methods they tried to use on the submerged portions; (c) about their total costs incurred in obtaining that gold; or (d) sufficient geological and other data that would be required to show that their two-week experience is typical of what they could expect if they continued to mine their placer mining claims in the future. (See, e.g., paragraphs 17 and 18, above).

48. Richard and Sue Burton (Buchal Decl., Exh. 2, p. 5): These miners state their opinion that their placer mining claims require suction dredging to be profitable, but they do not show that that opinion is based on the factual data that are required (see paragraphs 17 and 18, above).

49. Martha Cronin and Raymond Phillips (Buchal Decl., Exh. 2, p. 8): These miners offer some anecdotal evidence about their past revenues. But, as previously noted, past experience alone is not a reliable way to ascertain the future profitability of a placer mining claim, even if the determination of past profits is based on all relevant and required cost factors. (See paragraph 20, above.) These miners' descriptions of their past mining activities, however, is not even based on all relevant factors.

a. For example, they provide no accounting for their operating expenses and only a partial list of capital expenses (investment costs). They not do not account for operating expenses such as fuel, labor (by law they must account for even their own labor at the prevailing wage for hiring labor), and equipment upkeep and repairs. Thus, although they opine that they make a profit suction dredging, there is no factual costing data presented from which to form that opinion.

b. Similarly their revenue estimates for suction dredge mining are based on hypotheticals, not actual data. For example, they say that in the past they have recovered 1 to 1.5 ounces of gold per day by suction dredging somewhere on one of their three placer mining claims, and that *if* they are able to sell gold at the spot price set on October 31, 2013, and *if* they mine 90 days per year they would make enough to "recoup our investment and realize a good profit." But, there is no evidence that they could, in fact, sell the gold they recover at that spot price; in fact gold usually goes for less than spot and it is also reduced for fineness. Finally, they provide none of the geological/sampling/survey evidence necessary to determine whether this past experience somewhere on one of their three placer mining claims can be expected to continue and be extrapolated to their three mining claims generally.

c. Similarly, these miners say when they attempted to work outside the stream bed on one of the three placer mining claims their production values were low. They provide no technical information sufficient to allow a determination that the work they did with the high banker was systematic enough and properly done to be representative of all of the gravel deposits outside of the active stream channel (e.g., did they reach bedrock; were the samples large enough to be representative). The economic and technical data provided is not sufficient to be able to make a determination if there are profitable gravels outside the active stream channel.

d. Finally, their opinions, even if they were supported by adequate cost/revenue data, only compare suction dredging to extracting gold from the "out of water" deposits. So there is no way to determine, from what they provided, whether the underwater deposits on their placer mining claims can or can not be profitably mined by means other than suction dredging.

50. Edward Murphy (Buchal Decl., Exh. 2, pp. 6-7): This miner only provides a statement about how much gold he has recovered during two seasons suction dredging from some unspecified location or locations on his placer mining claim. However, he provides no cost data at all, and hence there is no provided factual basis for his opinion that, "Dredging the SGF [claim] clearly was a profitable enterprise." Moreover he provides no geological data, so there is no basis for concluding that his past experience is in any way indicative of what future mining might produce, especially in view of the information provided that the placer mining claim is "1.4 miles in length and encompasses 1.8 miles of actual active waterway." (See paragraph 20, above.) Further, although he says he has tried "other methods" for mining gold from the river gravels on his mining claim, he does not specify those methods or their operational characteristics, and whether he was working instream or bank gravels, so there is no factual basis provided for concluding that instream deposits on his mining claim cannot be profitably mined without using suction dredge equipment. Finally, he offers no evidence at all about non-submerged placer gold deposits on his mining claim, or whether those can be potentially mined at a profit.

51. Determining whether a mining claim is valid requires, among other things, evidence verifying that it is on federal land (and that land was not closed to mineral entry or otherwise encumbered at the time the claim was located), including the placer mining claim's legal description by aliquot part and complete lots using the U.S. Public Land Survey System and its rectangular subdivisions or geographic coordinates of the claim's boundaries as staked by the miner. It also requires evidence, including the information described in paragraphs 17 and 18, above, that there are valuable minerals on the mining claim that can be mined and marketed at a profit. I have reviewed all of the evidence submitted by the New 49ers plaintiffs, and they have not offered sufficient facts to show that any of their placer mining claims are valid.

52. I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Dated January 22, 2014, at Glendale, Arizona.

BURRETT W. CLAY

EXHIBIT A

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT MANUAL TRANSMITTAL SHEET	Release 3 - 317 Date 10/08/03

Subject

H-3890-3 - VALIDITY MINERAL REPORTS

1. Explanation of Material Transmitted: This release transmits an entirely revised Handbook Section H-3890-3 - Validity Mineral Reports, previously issued as Interim Guidance under Information Bulletin .

2. Reports Required: None.

3. Materials Superseded: None.

4. Filing Instructions: File immediately after Manual Section 3890 and Handbook H-3890-1.

REMOVE	Insert
None	H-3890-3 (Total: 26 Sheets)

Bob Anderson
Acting Assistant Director
Minerals, Realty & Resource Protection

H - 3890 - 3 - VALIDITY MINE. . REPORTS

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Chapter I - Introduction

A. Purpose. This handbook provides direction and guidance to certified mineral examiners preparing and reviewing mineral reports written to document the validity of mining claims and sites located under the Mining Law of 1872, as amended.

1. Reports. Validity reports are written by certified mineral examiners. BLM certified review mineral examiners technically review and approve validity reports.

2. Other Manuals and Handbooks. This handbook supplements the direction in BLM Manual Sections 3060 and 3891. This handbook should be used in conjunction with the BLM Handbook for Mineral Examiners, H-3890-1, which gives guidance for conducting field examinations of mining claims and sites. Subject to reasonable changes for special cases, the provisions and format of this handbook are required for all validity mineral reports. (See BLM Manual Section 3060.12.)

B. Authority. The authority to administer the Mining Law Administration program is delegated to the Director of the Bureau of Land Management (BLM) by the Secretary of the Interior. BLM's authority in this regard emanates from its succession to the responsibilities of the General Land Office and the Grazing Service, through Reorganization Plan No. 3 of 1946 (60 Stat. 1097) and Reorganization Plan No. 3 of 1950 (64 Stat. 1262). The Departmental Manual states that:

> "The Bureau is responsible for mineral and realty activities on all the public lands and for mineral activities on large areas of Federal land managed by other agencies. This includes the administration of the General Mining Laws." (See 135 DM 1.3B and 235 DM 1. A.)

C. Responsibilities and Professionalism

1. Ethics. The mineral examiner's role is to serve as a neutral and objective evaluator of the mining claims or sites examined. The mineral report and its conclusions therefore must reflect a professional and unbiased analysis of the mineral values, economic conditions, and case law that applies to the mining claims and sites examined.

2. Responsibility of the Examiner. The mineral examiner must verify all facts and information concerning the validity of a mining claim or site. The mineral report must document the examiner's verification of all facts and information collected during the field examination and generated through office review and analysis of that information. All information that is included in the mineral report but that does not represent the examiner's own work must be properly identified, cited, and referenced.

D. Writing Style and Standards. For guidance on and presentation of grammar and syntax; accepted style and use of abbreviations, signs, and symbols; and preparation of tables, maps, and illustrations the examiner may refer to H-3890-1 Appendix ID thru IH or Suggestions to Authors of the Reports of the United States Geological Survey, (7th Ed., 1991, or later).

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Chapter I - Introduction

1. Summary, Conclusions, and Recommendations. These must be written in nontechnical language so that the Field Office manager or Deputy State Director can clearly understand the results of the mineral examination.

2. Technical Content. The remainder of the report should contain enough technical detail to document, justify, and support the conclusions and recommendations.

3. Audience. The author should keep in mind that audience for the report may include professionals not specialized in the geosciences, such as land managers, lawyers, judges, and representatives of special interest groups. Complex geological concepts should be explained so that nongeoscientists can understand how these concepts are related to the conclusions.

E. Confidential Information. Confidential information used in the mineral report cannot be released without the written consent of the owner of such information. (See 18 U.S.C. 1905).

1. Claimant Responsibility. Confidential information must be marked by the claimant in a manner that meets the requirements at 43 CFR ' 2.13. The handling and storage of confidential information is covered in BLM Manual Sections 1278 - Access to External Information, and 3060.06 - Mineral Reports - Preparation and Review.

2. Treatment of Confidential Data in the Mineral Report. Confidential information must be summarized in the proper portion of the mineral report. The confidential data and analysis or discussion that refers directly to such data must be attached to the report as a stand-alone, detachable appendix. Confidential information provided by a claimant in support of the discovery may fall into any one or more of the following categories:

a. Sales and marketing contracts;

b. Labor contracts;

c. Individual drill hole logs and assays;

d. Subsurface geology and structure derived solely from the claimant's drilling and analysis;

e. Reserve Data. Ore reserve calculations, grades, and tonnages derived solely from the claimant's data; and

f. Capital Costs. Company-supplied capital costs not published or not supplied to a government agency for an environmental permit.

F. Government Data. Raw data collected by the Federal Government by its own personnel is not confidential unless specifically made so by statute. Geologic maps, cross-sections, ore reserves and ore deposit dimensions derived from government data are considered public information.

1. Non-confidential Data. Certain data or information provided by the claimant or applicant may not be considered confidential under the Freedom of Information Act (FOIA). Such data may include information reported to the Securities and Exchange Commission (SEC) on a company's 10-K form or information provided to other government agencies in acquiring operating permits. Proven reserves, average grades, contained metal content, summary capital, and operating costs are commonly disclosed on a company's SEC 10-K report.

2. Mineral Patents. Mineral reports for mineral patents under Departmental review (209 DM 7); except for portions containing publicly available information, are not releasable under FOIA. Until the Director signs the patent or contest issues, the report is an internal pre-decisional working document and cannot be released.

a. Use of Confidential Data in Reaching a Conclusion. If confidential information is needed to support a conclusion in a mineral report, it must be placed in a separate, detachable appendix to the report. If the report is released for public inspection, the confidential information must be removed. Line-by-line deletion may be needed.

b. Summary of Confidential Information. The report must be written so that it stands alone, and confidential data may have to be summarized. (See BLM Manual Section 1278 and 43 CFR " 2.13 and 2.79.) Information collected by Federal Government personnel for its own use in evaluating public land is usually not considered confidential.

H-3890-3 - VALIDITY MINERAL REPORTS

Chapter II - Components of a Mineral Report

A. Introduction

This chapter contains the recommended subtitles for subjects to be covered, as well as such features as the mineral report cover sheet (BLM Form 3060-1). This format is suggested to ensure coverage of needed information and for adequate documentation of the field examination as well as ease of reading by those lacking technical backgrounds. Appendix A is a sample outline for a validity examination mineral report.

B. Report Sections

1. Title Page. Use BLM Form 3060-1. Computer-generated facsimiles can be used to list multiple authors and to provide space for certification seal imprints. Facsimile cover sheets must list the proper BLM form number in the proper location, and all other information from the standard form must appear on the facsimile.

a. Serial Number. Use the serialized case number assigned to the examination. This number is a unique, alphanumeric designator to show the assigning office, case type, fiscal year, and case number. Generally, the serial case number used will be from the action that triggers the examination. In the absence of a serialized case number, use the lead mining claim recordation number and then add "et al." after it. Where multiple mining claims are involved, use only the lead file record number or lowest numbered mining claim recordation number and then add "et al." after it. (All mining claim recordation numbers involved will be listed in the body of the report.)

b. Title. The title should reveal the type of case and mining claims involved and give other unique information. Except for the lead file number, do not list mining claim recordation numbers in the title. They will be tabulated within the body of the report.

c. Lands Involved. This part of the cover sheet should briefly and concisely describe the location of the subject claims or sites and include the following information:

(1) Legal description: 33 section, lots, tracts, township, range, baseline, and meridian

(2) Mineral survey number if appropriate

(3) Surveyed, unsurveyed, or protracted survey

(4) County and state

d. Author Identification. The names of all authors MUST be printed legibly or typed below the signature line with the author's certification type and number. Each author's position title (from job description) and official duty station must be listed on the title line. Each author must sign and date the final report on the signature line.

e. Technical Approval. The BLM technical reviewer's name and review certification number must be typed or legibly printed below the signature line. The BLM technical reviewer must sign the final report on the signature line. The technical reviewer's position title (from job description) and official duty station must be listed on the title line. The signature date must be listed and becomes, for reports other than those recommending patent, the report's effective date.

f. Management Acknowledgment. The policy on management acknowledgment is presented in BLM Manual Section 3060.08E. Because the mineral report deals only with the technical geological/mining engineering aspects of a mining claim, the manager does not approve or disapprove its conclusions, recommendations, or contents. Management acknowledgment is not another level of technical review; it merely means that the manager has read the report and understands the report's conclusions and recommendations.

(1). The manager of the office initiating the examination acknowledges the report. The manager's name must be typed or legibly printed above the signature line. The manager's title and duty station must be listed on the title line. The date of management acknowledgment must be entered on the date line.

2. Table of Contents.

a. Major Sections of Report. List the title of all major sections in the report and the beginning page numbers. The table of contents will vary from report to report based on the material covered and the specifics of the examination.

b. Pagination. Each page of a mineral report, including text, illustrations, attachment, maps, and plats must be given a logical, unique, and ascending page number or alphanumeric identifier that can be portrayed in the table of contents.

c. Attachments. List all attachments to the report by title and number by the order in which they appear. Avoid calling this section "Exhibits." In an administrative hearing the mineral report will probably be introduced as "Government Exhibit 2," and confusion can result from referencing "Exhibit II-2A of Government's Exhibit 2."

d. Confidential Information. If confidential information is included in a detachable section of the report, it needs to be identified in the table of contents.

3. Summary, Conclusions, and Recommendations. Write these sections last. Use separate headings for each; summary, conclusions, recommendations. It helps the author and the reader keep the concepts separate. It also makes it easier to respond to a Freedom of Information Act (FOIA) request. These sections should be as short as possible, and must not introduce any information not covered elsewhere in the report. Usually, one or two paragraphs will suffice except in complex cases. Keep discussions of case law to a minimum, and only when they apply

to required findings. Excessive reference to case law in any section of a report opens the door for a cross-examining attorney to ask questions about the specifics of the cases cited.

a. Summary. This must fully brief the reader in the report=s findings without a detailed reading of the report. It must capture the critical aspects of the report. Remember that the audience consists of managers and attorneys. It is necessary to demystify science, engineering, and economics. Clearly summarize what was done in the examination, analysis, and the contents of the report. Make sure that the summary matches the rest of the report. Preparation of a useful summary requires considerable forethought, effort and editing.

b. Conclusions. This section contains the findings based on the examination, sampling, analyses, and economic evaluation. Conclusions must be clear, supported by the report and legally correct. Do not duplicate the summary in this section.

c. Recommendations. These must logically follow from the conclusions and must not introduce new information or raise new issues. If contest is recommended, the contest charges contained in BLM Handbook H-3870-1 should be used.

d. Bad Faith. If a charge of bad faith is to be recommended, the report must present clear and compelling evidence to that end. The content of the report must logically lead the reader to a conclusion that bad faith has taken place.

4. Introduction. Briefly state the purpose of the report. Briefly discuss the history of the case and the field examination. Be sure to include:

a. Key Dates. When the case was assigned, when the claimants were notified, when and where meetings were held with the claimants.

b. People present during the field examination. Include field examiners, claimants, claimant representatives, etc. Include the dates that each person was present. (Tabular format may improve information presentation).

c. Examination Constraints. List and describe any impediments to your examination, including weather conditions (e.g. snow, seasonal constraints), access (e.g. legal constraints, physical constraints), and threats (e.g. physical threats by claimant, surface owner).

d. Case Law. When appropriate, explain and cite an administrative or legal decision that affected your handling of the examination and report.

e. Conferences. Give the scope and extent of any meetings and conferences with the claimant or his representative, opposition groups, and representatives of other government agencies. Be sure to state what, if any, agreements were made during these meetings. Also state that the report's conclusions are limited to the validity of the mining claims for which it was prepared. The conclusions of this report are limited to the action for which the

report was written and it should not be used for any purpose other than that for which it was originally intended.

5. Land Status and Record Data. This section should provide the land status and mining claim data on record. Land status data includes the legal description of the lands involved and land classification issues such as withdrawals, encumbrances, and special acts of Congress. A partial list of these is included in Table 1.

Table 1 B Partial List of Land Status Conflicts

Withdrawals	Encumbrances
Special acts of Congress National park units National recreation areas National conservation areas Wilderness areas Wild and scenic rivers	Private surface Mineral leases, Material sites and community pits Rights-of-way and easements California Desert Conservation Area patenting clause Areas of critical environmental concern

a. Mining Claim Records. Mining claim record data includes claim names, mining claim historical information, BLM recordation numbers, location dates, and claimants of record (also see 43 CFR subpart 3833). Tabulating the data will usually improve readability. Use exact spelling from location notices, even if the spelling looks wrong. County recordation numbers are sometimes important. List any top filed mining claims and recordation numbers. If a courthouse records search was necessary, fully document the findings.

6. Physical Features and Access. In this section discuss the location of and access routes to the subject lands, the climate and vegetation of the area involved, known cultural resources in the area, and the area's general topography.

a. Location of Claims. To describe the location, give the relationship of the lands involved to towns and cities. The use of a map is helpful. In describing the access to claims, refer to an attached map. If necessary, describe the access as if giving someone directions from a nearby point, i.e. give landmarks and mileage. Describe any impediments to access, including physical, seasonal/climatic, and legal. Refer to an attached topographic map or other suitable method of locating claims on the ground, e.g. aerial photos, mineral survey plats. Explain how you knew you were on the correct claims.

b. Climate. Describe the climate, including precipitation (rain, snow in inches) and temperature ranges. Address seasonal variations, extremes, and yearly averages. Is there net rainfall or net evaporation? This is important in cost analyses of heap leach operations.

c. Biology. Describe the types of vegetation and wildlife and their distribution. Also describe the availability of trees for mine timber. Pay particular attention to any threatened and endangered species. If there are wildlife or vegetation related seasonal access/operational restrictions describe them. If an EIS or EA has been prepared for this location, cite the relevant portions for further information.

d. Cultural. Discuss the number and type of cultural sites and potential sites that may be affected by the mining operation.

e. Landforms. Describe the topography. Give the high and low elevations near and on the claim group. Describe slopes and relief; landsliding and earth movements; the presence or absence of perennial or intermittent watercourses, springs, wetlands, or flood plains. Give any other pertinent data.

7. Regional Geology and Mining History.

a. Regional Geology. This section focuses on the general geology of the mountain range, mining district, mineral belt, or other limited geologic or geographic area. A geologic discussion covering several states or even a statewide description is normally not appropriate, nor is a discussion of all the geologic events and formations from the Precambrian through the Holocene periods. Limit discussion of geologic time, events, and formations to the area of interest. After reviewing the literature and maps, select those that will best support and build the foundation for the local Geology subsection.

(1). Document your field observations of the significant geologic and tectonic features discussed in the literature. Do not rely solely on quoting or paraphrasing the literature.

(2). In your discussion include a short description of the geologic provinces (two to three sentences); a general description of geologic formations, ages, depositional or replacement environments, tectonic setting, etc. of the area of interest; and a brief description of the mineral deposits and their relationship to the geologic setting.

(3). Prepare suitable graphic data (maps, drawings, charts, panoramic photographs, etc.) for the report that portray the important features of the area. Decide if this data would be most effective placed in the text, or the appendix of the report. Cite references, including yourself, when appropriate, for all maps and cross-sections.

b. Mining History. Describe the area's mining history. Include a discussion of the time period of activities and the minerals or byproducts produced. Summarize the important parts of the history that pertain to the subject mining claims, citing the sources and correlating the history to the mineral property. Keep this summary concise, and use tables so as not to lengthen the text.

(1). Summarize early mining, milling methods, and other important activities giving production records, amounts, and dollar value. If only dollar amounts exist, estimate quantities using the historic price of the commodity. Give a brief history of the property ownership and important related events. The general discussion of the exploration/mining history needs to build and lead into a discussion of history specific to the property of interest.

8. Geology and Mineralization of the Claims.

a. Geology. Describe the formations involved, their stratigraphic relationships, the structural features, and how they relate to mineral deposits on the claims. This description should rely primarily on personal field observations. The descriptions are used to support mineral operation design, market analysis, and economic evaluation. If there are geologic factors that will impact the engineering aspects of mine design be sure to address them.

b. Geologic Units. Describe in detail the geologic units, their age, the structural and the tectonic features on the claims. Refer to geologic maps, cross-sections, and photographs as much as possible to complement this concise narrative.

(1) Rock Types. Describe the geologic characteristics of each map unit. Describe the nature of unit contacts; age relationship with other units; and distinguishing lithology, including color, composition, texture, and fabric. Features described should help the reader clearly distinguish one unit from another. Focus on those geologic features that are related to the mineralization.

(2) Structure. Describe all the evidence of the structures associated with the mineralization on the claims involved. Include in this description jointing, bedding, faulting, or rock weathering characteristics that control mineral deposition. Document discrepancies between the literature and field observations. Include veins, faults, shear zones, folds, partings, contacts, unconformities, disconformities, nonconformities, bedding, jointing, and cleavage.

(3) Alteration. Discuss weathering, diagenesis, metamorphism, and other physical or chemical changes related to emplacement of the mineral deposit.

(4) Illustrations. Prepare geologic maps, cross-sections, illustrations, and photographs to show the important geologic features of the property. Consider the proper placement of these illustrations. Place large maps and cross-sections in the appendix and photographs and other illustrations in the text. Properly label and reference all illustrations. Select a large enough scale for geologic maps and cross-sections to clearly show important geologic characteristics, physical features, and deposit boundaries and to facilitate volume calculations.

c. Mineral Deposits. Describe mineral deposit relationships observed during the field work. These relationships may include host rock type, texture, age relationships, depositional environment, tectonic and stratigraphic setting, mineralogy, structural control.

alteration, deposit control, weathering, and geochemical signature. Describe characteristics such as alteration halos, gangue minerals, associated minerals, structure, and other important aspects observed and verified in the field.

(1). Lode Deposits. Discuss the following information: attitude, shape and size of vein, lode, and altered zone. Address the kind, size, and amount of minerals in the wall rock and the mineralized zone. Describe the overburden, including type, extent, compaction, depth, and depth to ground water. Describe the physical characteristics of the deposit, including the engineering characteristics, such as specific gravity, compressive and shear strength, presence of planes of weakness, and porosity.

(2). Placer Deposits. Address the following information: type (e.g. lag, transport, residual); shape; aerial extent; depth to bedrock; thickness of overburden; composition and size range of gravels; presence of clay, or boulders; nature of the bedrock (e.g. natural riffles, joints, potholes, solution cavities); composition; angularity; and texture of rock clasts.

(3). Illustrations. Prepare mineral deposit maps, cross-sections, illustrations, and photographs to show the important features of the mineral deposit. Large maps and cross-sections may be cumbersome and should be placed in the appendix. Photographs and other illustrations may be placed in the text. Label and reference all illustrations. Choose mineral deposit maps and cross-sections of large enough scale to clearly show all important geologic and physical features.

9. Mineral Exploration and Development Work

a. Description of Completed Work. State the size, depth, and extent of workings, and the purpose, if known. Refer to the maps in the attachment section. You may take the maps and diagrams of the workings from the published geologic literature but include your own observations from the field examination. Give proper accreditation to your sources of information. Give the approximate date the work was done, if known, and who did the work. Describe the condition of the workings at the time of the examination.

(1). Access routes. Describe the size, condition, and suitability of all roads for the proposed use. If airstrips, loading docks, or other facilities are involved, describe them in detail and discuss their suitability for the proposed use.

(2). Mine workings and their condition. For underground workings, describe any shafts, adits, drifts, and stopes. For surface workings, describe any pits, cuts, and trenches. Include in the descriptions dimensions, compass bearings, and distances from some reference point; angle of inclination from horizontal (if appropriate); and materials used in construction.

(3). Drilling. Describe any drilling that has taken place, including number of holes, type (reverse circulation, cable tool, or diamond drill core), and diameter. Discuss the relevance of the drilling with respect to the mineral deposit. Attach plan maps and cross-sections showing drill hole distribution relative to mining claim boundaries and mineral deposits.

(4). Bulk Samples. Discuss any bulk sampling that has taken place and describe the location and the results, if available.

b. Patent Applications. In the case of patent applications, determine if the amount of improvements meets the $500 per claim requirement for patent. The development work must have been done after the last break in title or relocation. (See 43 CFR ' 3861.2-2.)

10. Mining, Milling, and Related Operations

a. Description of Operations. Describe the mining, milling, processing, and reclamation operations. Use flow sheets as attachments for each of these stages of operations and refer to them in the report. The design process should meet industry standards as described in the Society of Mining, Metallurgy, and Exploration (SME) Mining Engineers Handbook (1992) and Mineral Processing Handbook (1985), or the most recent editions of these handbooks.

(1). If a mine is operating, describe it. Describe the current mining, processing, and reclamation in the plan of operations and consider the existing workings and equipment available to the claimant/operator.

(2). If a mine is operating on the claims but the claimant is proposing significant changes to the plan of operations, describe the proposed operation. Refer to technical (SME) references. Describe the existing and proposed variances in the operation (the claimant's/operator's and/or the mineral examiner's) in mining, processing, and reclamation. Include details of existing and proposed workings, processing flow sheets, and equipment descriptions. If the mineral examiner's plan differs from the claimant's/operator's plan, describe in detail the logic for the differences.

(3). If the claims have no current operation or development but the claimant/operator has a proposal, describe the proposed operation. Refer to technical (SME) references. Describe the proposed operation (the claimant's/operator's and/or the mineral examiner's) by the mining, processing, and reclamation proposed. Include details of proposed

workings, processing flow sheets, and equipment descriptions. If the mineral examiner's plan differs from the claimant's/operator's plan, describe in detail the logic for the differences.

(4). If no mine is operating or proposed by the claimant, design the most cost-effective mining, processing, and reclamation operation and describe in detail this designed operation.

(5). In all scenarios the mining, processing, and reclamation design must be based on reasonable geotechnical assumptions, such as proper placement of waste dumps and tailings and enough land for the processing plant and ancillary facilities. In all cases, describe your estimate of the most cost-effective operation for the property.

(6). Models may adequately describe mine or mill methods that could be appropriate to the mineral property being examined. If models are used, they must be applicable. Describe the model, and its relevance to the mineral property. Most models can be adjusted to meet local conditions, and doing so will usually be necessary. Describe any adjustments made to the model.

b. Production Equipment and Rates. For each proposal, cover mine production, mill feed rates, and concentration ratios. Be sure to discuss quantity, types, and capacity of equipment. Discuss the ownership and condition of equipment. Make sure that the equipment is suitable for the proposed operation. For example, is the reach of the loader matched with the height of the truck?

c. Facilities Location. Address the location of facilities and the hauling of materials and supplies as well as haul profiles for ore, concentrates, and waste.

d. Ancillary Facilities. Discuss ancillary facilities such as shops, change rooms, offices, power and water sources, and treatment facilities.

e. Reclamation of Project Area. Discuss the reclamation of the project area and the relationship of reclamation to the mining operation. Include such items as location of soil stockpiles and settling ponds. State if the mine=s reclamation will be a part of the mining sequence or scheduled after the mine has ceased operation. Ensure the reclamation plan conforms to State and local requirements if permissible under 43 CFR 3809.

11. Field Work, Sampling Procedures and Analytical Work.

a. Field work. Document the field examination. Describe what you did and observed. There is no need to repeat information previously described in the report. It is helpful to work from your field notes to ensure accuracy.

b. Sampling. The purpose of the sampling program is to verify, or establish a basis for estimating, the tonnage and grade of a mineral deposit. Sampling is the most important aspect of the field work. Because it is the basis around which the report=s economic evaluation

is developed, it must be clearly documented. The documentation must show that the sampling was representative of the mineralization existing on the claims. Therefore, a complete account of the sampling techniques and accurate and complete sample descriptions are critical parts of the mineral report.

(1). Sample Collection Procedures. Describe the protocol you followed for collection and handling of samples during the examination. Include details such as sample surface preparation, sample type, security procedures, chain of custody, etc. You can then describe any deviation from this protocol for specific samples in the individual sample descriptions. Describe and justify any variance from the sampling procedures as outlined in BLM Handbook H-3890-1.

(2). Sample Description. Accurately and completely describe each sample and explain the rationale for selecting the sample site e.g. claimant selected, professional judgement. Explain the relationship of the samples to the site-specific geologic setting (e.g. vein, structure, country rock, mineralized zone, alteration zone). Describe the mineralogy/petrology of the sample. List sample dimensions and weight (or volume). Use tables and photographs whenever reasonable to ensure a complete sample description. It is not necessary to include a before and after photograph of each sample in the report.

(3). Sample Distribution. Describe sample distribution and how it relates to the deposit. Use maps, cross-sections, and photographs to explain this information.

c. Analytical Work

(1). Testing Laboratory. Name the laboratory used and explain why you used it.

(2). Sample Preparation. Describe both your and the laboratory=s preparation of the samples.

(3). Laboratory Method. Name the laboratory testing method used (atomic absorption, neutron activation, wet chemical, fire assay) and explain why it was used. For unusual analysis programs, such as for many industrial minerals, you will need a more extensive description and background. Explain detection limits of the method used and the limits of error inherent to such a method.

(4). Laboratory Procedures. Explain any unusual or nonstandard procedures or test protocols used. Explain in detail any American Society of Testing Materials (ASTM) tests and the protocols used on samples.

d. Results of Testing and Analysis. Describe the results of the analytical and testing work in a clear and easily understandable manner. It may be desirable to use tables to

summarize the sample results. If necessary, convert the raw data from laboratory reports and show the results in appropriate units.

12. Economic Evaluation

a. Tonnage and Grade. The methods used to portray grade and tonnage estimates will vary with the type of deposit, deposit model, and sampling techniques. Describe the methods used to estimate grade and tonnage (e.g., underground block, kriging, triangles, polygons, etc.). Fully explain the methods used to define the mining blocks. For clarity, compile tables complete with sample numbers, computations, and units of measure, that show the tonnage and grade for the various blocks.

(1). For alluvial placer deposits, the report must fully describe each appropriate geologic unit, its extent, and its influence on value. The methods used to assign volumes and grades for each unit or subunit must be fully explained, and refer to maps and sections, as appropriate. Tabulate information where it will improve readability.

(2). For industrial mineral deposits, the report must fully describe each appropriate geologic or production unit, its extent, and its influence on value. The methods used to assign volumes and grades for each unit must be fully explained, and refer to maps and sections, as appropriate. Tabulate information where it will improve readability. The report must fully explain the criteria used for determining the characteristics on which grade is based. Reference ASTM standards, market requirements, contract requirements and other necessary factors.

(3). Ensure that all units of measure are shown in computations, tables, and illustrations and that they are compatible with accepted industry practice for the type of deposit and commodity under investigation.

b. Mining Methods. Describe the mining methods evaluated, and select the most cost effective one. Occasionally, several methods may be cost-effective, and they will all need to be considered. Capital and operating costs must be estimated and documented for each. The documentation must include the cost estimating methods used and the sources of the cost information. All cost estimates require that some assumptions be made, and they must be clearly stated. Local health and safety codes should be taken into account.

c. Beneficiation and Refining. Document and itemize costs of beneficiation, transportation, material handling, smelting, leaching, refining and marketing, as appropriate. Capital and operating costs must be documented for each. All cost estimates require that some assumptions be made, and they must be clearly stated.

(1). Do not duplicate costs. For example, when using a suitable cost model that has a cost of overburden removal built in, it is not appropriate to later add a separate line item cost for overburden removal.

d. Markets and Marketing. Describe markets and marketing. This is necessary even for precious metals, especially placer gold. Marketing and market entry are significant factors for industrial minerals. Few industrial minerals trade in an open market, and most operate in a competitive environment. Many industrial mineral markets are vertically integrated. In such cases, the mineral report must describe the nature of the vertically integrated market and establish the reference point of sale for the mineral commodity that is to be mined. In some cases, a premium is paid for specimen grades of some mineral commodities. This needs to be well documented.

e. Mitigation and Reclamation. Document the necessary environmental and cultural permitting, mitigation, reclamation and rehabilitation costs. Ensure that these costs are only included once. Do not double calculate concurrent reclamation costs already built into the mining plan.

f. Projected Revenues. Document the projected revenues that will result from sale of the mineral commodity. The revenues must reflect the effects of dilution of ores, mill recovery, smelter costs and the potential for fluctuating commodity values. Where the commodity at question is traded on a commodity exchange, the Bureau=s commodity pricing policy established in 65 FR 41725 (July 6, 2000) is to be used, and the sources of the information documented.

g. Costs vs. Revenues. Carefully document the comparison of the costs with the projected returns and document the result. If the results are to be portrayed in a spread sheet, all entries must be labeled and explained. This is the ultimate bottom line of the report and it needs to be clear and concise. This will form the basis for writing the conclusions and recommendations sections of the report.

13. Selected References

a. Listing of References. List all pertinent references, cited or otherwise.

b. Format. Use either the USGS format (See U.S.G.S. Suggestions to Authors, pages 234-241), or as shown in the Handbook For Mineral Examiners (H-3890-1).

14. Illustrations. Place illustrations in the body of the report or include them with the attachments. The purpose of illustrations is to more effectively portray the data in the report. The proper use of them will enhance the report. Illustrations included in the report must be referenced in the text of the report.

a. Maps and Plats. All maps must have a title, scale (both graphic and written), north arrow, and legend/explanation of symbols used. (See U.S.G.S. Suggestions to Authors, 7th Edition, page 210 and Illustrations 6, 7, and 10-13.) When items are referred to in the text as being located on a map, they should be listed on the legend of the map using the same

terminology as was used in the text, for example: "the waste rock bank" of the report should not become the "mine dump" of the map. Include the following maps and plats when appropriate.

(1). A location map drawn at a suitable scale.

(2). A legible topographic map, not a 5th or 6th generation xerox copy.

(3). Suitable geologic maps, including regional maps, site-specific maps, underground geologic maps, and cross-sections.

(4). Mine maps at suitable scales with mineralization, workings, and sample sites. These maps may occasionally be combined with the geologic maps.

(5). A map of the claims or sites. This map must have the workings on it as well as the sample locations. It may be combined with the geologic or mine maps.

(6). A mineral survey plat, if one exists.

(7). A master title plat.

b. Photographs.

(1). Photographs are an excellent source of documentation of the mineral examiner=s activities and observations on the claim. Included photographs should be representative of activities and features such as claim monuments, site geology, sample sites, sample collecting procedures, surface improvements, mining and milling operations, ancillary facilities, and other pertinent features. It is not necessary nor desirable to include in the report a copy of every photograph taken during the course of the examination, i.e. every claim corner for a group of 365 claims. Sufficient photographs need to be included to adequately document the work and the situation on the claims. The remainder should be retained with the examiner=s field notes in their working file in case they may be needed in the future.

(2). All photographs must be properly captioned including at least the subject, date, and photographer.

c. Flow Charts and Process Sheets. These must be clearly labeled, pertinent, and explicit. They need to be big enough to be legible without the use of a hand lens.

15. Attachments

a. All attachments. These must be correctly and clearly labeled and referenced in the text of the report. They need to be big enough to be legible without the use of a hand lens.

b. Source. Give the source of all attachments and properly cite them in the Selected References.

c. Common examples of attachments. These include, but are not limited to the following:

(1). assay sheets, analytical reports, and consultant reports;

(2). spread sheets developed for items such as mine modeling, cost estimating and economic evaluation;

(3). location notices and affidavits of assessment work, if necessary;

(4). correspondence, if essential to the report; and

(5). smelter schedules and other pertinent documents

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Chapter III - Finalizing the Report

A. Report Review. The mineral report must be technically reviewed by a certified review mineral examiner appointed by the State Director (Deputy State Director, Mineral Resources) before being considered a final report approved by BLM. After this review is successfully completed the technical reviewer will sign the "technical approval" block on the mineral report cover sheet. Following technical approval, the Field Office manager or Deputy State Director acknowledges reading and understanding the conclusions and recommendations of the report by signing the "management acknowledgment" block on the mineral report cover sheet (see BLM Manual 3060.3).

1. Reviewer Consultation. After completing the draft mineral report, the examiner should send a copy of it to and schedule a meeting/conference with the technical reviewer. The reviewer and the author can discuss the contents of the report, any problems that need to be resolved, and needed corrections can be identified. Most of the reviewer's concerns can be worked out at this stage.

2. Revisions. Revise the mineral report in response to the technical reviewer's comments. Make all the revisions requested by the technical reviewer during the consultation process. Cooperation between the reviewer and examiner will facilitate the technical review.

B. Appeal of Technical Review. If the author cannot agree with the technical reviewer and the reviewer refuses to sign the report, the author may submit a written appeal to the Deputy State Director (DSD), Mineral Resources. The appeal must provide the technical issues of the disagreement.

1. Review of Appeal. The DSD will forward the appeal, the report, and both the reviewer's and examiner's comments to the BLM Mineral Examiners Certification Panel for review. The panel will prepare a written decision to be sent to the DSD. If the panel, by a majority "yes" vote, agrees with the author, the panel chairperson will sign the report for the panel and return the report to the DSD. If the panel does not sign off on the report, it will provide the mineral examiner with a list of changes that need to be made prior to the report being approved.

2. Final Panel Review. When the changes required by the Panel review are made, the report will be returned to the Panel for final review. If the panel required changes to the report and the examiner is unwilling to make those changes, the matter shall be referred to the DSD to assign a new mineral examiner. If the panel believes an untested legal issue is involved, it may recommend a request for a Solicitor's opinion.

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Chapter IV - Technical Review

A. Authority and Direction. BLM Manual 3895, Certification of Mineral Examiners, requires that a certified review mineral examiner sign the technical review block of the validity examination report cover sheet (BLM Form 3060-1). Before being presented to management for acknowledgment, all validity related mineral reports must be reviewed and approved by a certified review mineral examiner (see BLM Manuals 3060.41.A and 3895). Only a BLM certified review mineral examiner is authorized to perform final technical review of validity mineral reports for the BLM and other government agencies, including the U.S. Forest Service and National Park Service.

B. Goals. A technical reviewer's goals are to assure that:

1. The report. It must clearly state and meet its purpose.

2. Adequacy. The report must adequately state any assumptions and limiting conditions.

3. Data presentation. All legal, technical, and economic data must be accurate, adequate, and support the conclusions and recommendations of the report.

4. Documents. All necessary supporting documents are included.

5. Supporting material. All illustrations, attachments, and tables must be appropriate and complete.

6. Extraneous material. Not to be included. If it is, have it removed.

7. Confidential data. Must be safeguarded and treated correctly in the report.

8. Reviewer Checklist. Overall, the report must address the items in subpart F., Reviewer Checklist, given below.

C. Technical Reviewer/Author Relationship. Technical reviewers should make helpful, constructive, and appropriate comments with a positive attitude. The primary purpose of the technical reviewer is to ensure that the document is clear, concise, and technically correct. The review process is an iterative process so the reviewer and the author will benefit by informal consultations before, during, and after the review. Part of the reviewer's job is to serve as a mentor and enhance the skills of the mineral examiner. This can be done through positive constructive recommendations.

D. Technical Review and Editing. The terms "review" and "edit" are often applied loosely and interchangeably but have distinct connotations. In commonly accepted practice, reviewing a manuscript means to critically evaluate its subject matter and basic organization, whereas the editing of a manuscript, a later step, consists of correcting grammar, style, and formatting details. The reviewer's first responsibility is to evaluate the technical aspects of the report. A reviewer is

required to thoroughly edit for grammar and is expected to make as many grammatical corrections as are needed. The reviewer can also edit for style if it is necessary for clarity.

E. Review Techniques

1. General. Whenever possible, the reviewer should work early on with the author in the field and in the office to work out procedures and concepts to be used in the field examination and the report. A technical reviewer should see that reports are objective, complete, accurate, clear and concise. A reviewer must ensure that the report is based on accepted professional standards and complies with all current Departmental legal and technical standards, guidance, and procedures.

2. Process. The reviewer should first read the entire report to gain a proper perspective. The reviewer should then reexamine the report concentrating on areas of concern. Written comments are to be specific to the issue, clearly explained, and prepared in a positive and appropriate manner. Avoid such comments as "really (?)," "awkward," "not clear," "explain," "expand," and "evidence" which do not fully explain the necessary corrective measures.

3. Comments and Suggestions. These should be written on a copy of the report. An overall summary and explanation of any major deficiencies should be prepared in narrative form on separate pages, with the page number and paragraph needing attention clearly identified. When deemed necessary, the reviewer and the author should meet to discuss the issues and their resolution. If they cannot meet, they will have to communicate through correspondence and by telephone.

F. Reviewer Checklist.

1. Complete

a. Information. Does the report give all needed information?

b. Factual Matters. Does the report answer all the questions concerning the factual matters that determine the validity of the mining claim or site?

c. Omissions. Does the report contain any holes or missing material?

2. Concise

a. Essential Facts. Does the report contain only essential facts?

b. Essential Words. Does the report include only essential words and phrases?

c. Maps and Attachments. Does the report contain only the necessary maps and attachments?

d. Case Law. Are discussions of case law and citations limited to only those necessary to buttress the report?

3. Clearness

a. Language. Is the language adapted to the audience; are the words the simplest that carry the thought?

b. Expression. Do the words exactly express the thought?

c. Sentence Structure. Is the sentence structure clear?

d. Paragraph Contents. Does each paragraph contain only one main idea?

e. Information Presentation. Is there an orderly flow of information in the report?

4. Correctness

a. Accuracy. Is the information presented accurate?

b. Current Policies. Do the statements conform with current laws and regulations?

c. Grammar. Is the text free from grammatical errors?

5. Critical eve

a. Objectivity. Is the report objective and unbiased?

b. Tone. Is the text free from invective, insulting, or inflammatory language?

c. Jargon. Is the text free from unnecessary jargon and legalistic phrases?

d. Claimant Data. Did the examiner look objectively at all the data the claimant provided?

e. Independent Verification. Does the examiner seem to be relying too heavily on the claimant's data and failing to do enough independent verification of facts and figures?

G. Section Specific Comments. A reviewer must check the mineral report against the standards in Chapter II of this handbook. The following are key points to remember:

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Chapter IV - Technical Review

1. Title page. Is the title page complete? Are the serial number(s) and title correct? Is the legal description correct? Is the title page signed, dated, and stamped?

2. Table of Contents. Do the headings and the page numbers of the text match those in the table of contents? Are all the attachments, maps and illustrations listed?

3. Summary, Conclusions, and Recommendations. The target audience for this section is primarily management and attorneys. Is the summary clear and generally free of technical jargon? Does it fully capture the critical aspects of the report? Is the summary short and to the point? Does it include a synopsis of the work and the findings? Check to make sure that the summary matches the rest of the report. Are the conclusions clear and supported by the report? Are the conclusions legally correct? Do the recommendations logically follow from the conclusions and not introduce new information or raise new issues? If contest is recommended, are the standard contest charges contained in BLM Handbook H-3870-1 used?

4. Introduction. Is the purpose of the report clearly stated? Is the case history clear? Are all key participants listed? Were there any impediments to the examination that should be addressed? Is the standard report disclaimer statement included?

5. Land Status and Record Data. Are the lands involved clearly described? Are the legal description(s) correct? If a mineral survey covered the lands involved, is it referenced and included as an attachment? Are any legal restrictions, such as withdrawals or Wilderness Study Areas addressed? Is the appropriate mining claim recordation information included?

6. Physical Features and Access. Is the access route's location to the subject lands clearly described? Are any physical or legal impediments to access adequately addressed? Has the mineral examiner adequately established their location on the claims? Does the report describe the climate and vegetation of the area involved? Are T & E species addressed? Are cultural issues identified and addressed? Are the topographic features adequately addressed?

7. Regional Geology and Mining History.

a. Geologic Setting. Is the geologic setting focused, i.e. limited to the mountain range, mining district, or other localized area? Is the discussion too broad or unrelated to the purposes of the report? Does this section properly set the stage for the discussion of the site geology?

b. Maps and Illustrations. Do the geologic maps, illustrations, and photographs portray the important geologic features? Are they properly and adequately labeled? Are the maps at a proper scale to show important relationships? Are the illustrations relevant? Are they pertinent and if so, are they referenced in the text?

c. Past History. Has relevant information about past mining, milling, and production been provided for the property?

8. Geology and Mineralization of the Claims.

a. Site Geology. Did the mineral examiner describe the geology on the claims involved? Is the discussion of the site geology specific to the mineral property and the immediate area? Did the mineral examiner describe his or her observations about the geology? Is the information presented clearly and concisely? Does this discussion focus on the features that are controlling the mineralization? Does this section set the stage for the mineral deposit discussion?

b. Map Scales and Labels. Are the geologic maps, cross-sections, illustrations, and photographs adequately and property labeled, and do they show the important geologic features of the properly? Are the maps at a proper scale to show important relationships? Are the illustrations relevant, pertinent, and referenced in the text?

c. Structure, Alteration, and Mineralogy. Is there enough detailed information about the mineral deposit, i.e. host rock type, mineralogy, structural control, alteration to make reasonable tonnage/grade estimates? Do the maps, cross-sections, illustrations, and photographs, support, clarify, and build on the narrative? Are the maps, cross-sections, and other illustrations pertinent and properly labeled at the correct scale?

9. Mineral Exploration and Development Work. Do the maps and narrative adequately describe the access and exploration work? Are all of the accessible mine workings adequately described and mapped at a suitable level of detail? Has existing drilling been adequately described and analyzed? For patent applications, are the statutory improvements necessary for patent met, is the work of a qualifying nature, and the amount of qualifying expenditures equal to at least $500 per claim?

10. Mining, Milling, and Related Operations. Are all operations associated with the mining, milling, and reclamation described in detail appropriate for the property? Is a detailed cost estimate necessary and if so did it consider all of the following items:

a. Production and Milling. Have mine production rates, mill feed rates, and concentration ratios for each proposal been included? Is there a flow chart of the milling process? If necessary, is the metallurgical balance prepared?

b. Equipment. Is ownership and condition of equipment addressed? Is the equipment suitable and properly sized for the proposed operation?

c. Facilities and Transportation. Does the report address the location of facilities and hauling of materials and supplies as well as the transportation of ore, concentrates, and waste?

d. Reclamation and Mitigation. Is the necessary environmental mitigation and reclamation properly addressed?

11. Field work, Sampling Procedures and Analytical Work.

a. Field Examination. Have all aspects of the field examination been documented? Check for overlap and inconsistencies with previous sections.

b. Sampling Procedures. Are the sampling procedures described in adequate detail? Is any deviation from the sampling procedures outlined in BLM Handbook H-3890-1 described and justified? Are the sample points adequately described and clearly marked on the correct maps? Are the chain of custody and sample security procedures clearly described and are they appropriate? Is the rationale for sample site selection and sample distribution explained in the text? Is there an appropriate correlation between the size and weight of the samples?

c. Laboratory and Analytical Work. Have the samples been tested for the proper minerals? Are proper analytical methods used? Did the laboratory have the correct ISO certification? If not, is the laboratory appropriate for the analytical work performed and is it properly justified in the report? Are any unusual or nonstandard procedures or test protocols explained? Are the results of the analytical and testing work described in a clear and easily understandable manner? If analytical results are given in more than one place, are they consistently reported?

12. Economic Evaluation

a. Grade and Tonnage Verification. Is the method selected to portray grade and tonnage estimates reasonable for the type of deposit, deposit model, and sampling techniques employed? Is the work fully explained? Do the estimates of tonnage and grade seem reasonable? Are the calculations correct? Are the proper density factors used? Is information presented in tables, charts, or spreadsheets clearly labeled, useful and does it include appropriate units? Do the units of measure utilized throughout the report comport with accepted industry practice for the type of deposit and commodity under investigation?

(1). Criteria. Does the mineral report fully explain the criteria used for determining the characteristics on which grade is based? Does it reference ASTM standards, market requirements, contract requirements and other factors if necessary? Are the methods used to assign volumes and grades for each geologic or mining unit fully explained, referenced to maps and sections, and appropriate? Is the swell factor properly determined and utilized?

b. Mining and Cost Estimation Methods. Is the mining method selected the most cost effective? Is it thoroughly described and evaluated? Is it realistic for the deposit in question? Is the equipment properly sized? Are capital and operating costs properly estimated and clearly documented? Are all the necessary costs included under the appropriate categories?

Are the cost estimating methods used and the sources of the cost information sufficiently documented?

c. Transportation, Beneficiation, Marketing. Are all beneficiation, transportation, and marketing costs appropriately considered and documented? Are all cost estimating assumptions reasonable and clearly stated? Check to see that costs are not double counted. For example when using a suitable cost model that has a cost of overburden removal built in, it is not appropriate to later add a separate line item cost for overburden removal.

d. Market Studies. Is the issue of marketing properly addressed? Is a market study necessary and was it properly done? Does the report address the point of sale in vertically integrated markets and select the appropriate one for the commodity involved?

e. Permitting and Mitigation. Are the necessary environmental and cultural permitting, mitigation, reclamation and rehabilitation costs clearly identified and addressed?

f. Pricing Policy. Is the Bureau's commodity pricing policy properly used and the sources of the information documented?

g. Calculation Verification. Did the mineral examiner add and subtract correctly to get the bottom line? Is the comparison of the costs with the projected returns carefully documented?

13. Selected References. Are all the references used in the report and the attachments properly cited?

14. Illustrations. Do all the maps have titles, scales, legends, and north arrows? Are all photographs properly captioned? Are all the illustrations referenced in the text, and are they relevant? Are the flow charts and process sheets clearly labeled, pertinent, and explicit?

15. Attachments. Are all the attachments correctly and clearly labeled? Are they relevant and referenced in the text of the report?

H. Confidential Information. Verify that any confidential information in the report has been clearly identified and handled in a manner that allows it to be easily located and detached or deleted.

I. Reports That Meet All Technical or Legal Standards. If all is in order, the reviewer will sign on the form 3060-1 in the space provided for the technical reviewer's signature. The date and reviewer's job title are also entered here.

J. Reports That Fail Technical or Legal Standards. Authors are to make changes requested by reviewers. If the author(s) refuse to make the changes and major points of difference develop, the reviewer and the author(s) must document these. If there is a disagreement with the author(s)

that cannot be resolved, the report will be sent to the Deputy State Director (DSD), Mineral Resources along with appropriate comments from all parties.

1. Forward the Report to the Panel. The DSD will forward the report and the comments to the BLM Mineral Examiners Certification Panel for review.

2. Panel Review. After panel review, a written decision will be sent to the DSD. If the panel, by a majority "yes" vote, agrees with the author(s), the panel chairperson will sign the report for the panel and return the report to the DSD. If the panel does not sign off on the report, it will provide the author(s) with a list of changes that need to be made prior to the report being approved. Once those changes are made, the report will be returned to the panel for final review.

3. Required Changes by The Panel. If the panel requires changes to the report and the author(s) are unwilling to make those changes, the matter shall be referred to the DSD to assign a new mineral examiner. If the panel believes an untested legal issue is involved, it may recommend the DSD request a Solicitor's opinion.

K. After Technical Approval

1. Management Acknowledgment. According to BLM Manual 3060.4, once reviewed and approved by a certified review mineral examiner, the conclusions in a mineral report are not subject to revision by management. The conclusions are the professional opinion of the mineral examiner. The mineral report's recommendations are advisory. The manager's signature on the mineral report cover sheet means that the report has been read and that the conclusions and recommendations presented are acknowledged (see BLM Manual 3060.08.E).

2. Public Review and Disclosure. The controlling regulations are 43 CFR § 3862.9 and 43 CFR § 2.13(c)(4) & (9) and § 2.13(d). Prior to case disposition, the mineral report is an internal working document, pre-decisional in nature, and as a whole is not releasable. The exception to this is that DOI's Office of General Law (FOIA Appeals Office) has held that after technical review, we can release limited portions of the mineral report: table of contents, introduction, land status, regional geology, and BLM obtained raw sample data (the sample locations and assay sheets). We may not release the site geology (geology and mineralization of the claims), the cost analysis, economic analysis, market analysis, reserve and grade data, or any deliberative analysis or statements including the summary, conclusions, and recommendations. We may not release any claimant submitted data without the claimant's written consent (18 U.S.C. § 1905). After case disposition, with the exception of proprietary or confidential information, the report is releasable under standard FOIA procedures.

3. Case disposition means:

a. Patents. In case of a patent application, the patent is issued.

b. Contests. In the case of a contest, the contest complaint is issued.

c. Valid Existing Rights. In the case of a valid existing right determination (where no contest will issue), when the management acknowledgment is signed or refused.

d. Patent and Contest Combined. In the case of patent in part and contest in part, when the patent has been signed and the complaint issued.

L. Suggested References for the Reviewer.

The following references are helpful in giving suggestions for review of mineral reports:

Freidman, Morris, 1963, The seven sins of technical writing, IN Technical and professional writing-a practical anthology; Estrin, Herman A., ed. 1963; Harcourt, Brace, & World, Inc., New York, N.Y., p. 139-148.

Hansen, Wallace R., ed. 1991; Suggestions to authors of the reports of the United States Geological Survey, 7th ed.; U.S. Geological Survey, U.S. Government Printing Office, Washington, D.C.

Hartman, Howard L., ed, 1992; SME Mining Engineering Handbook, 2 Vols., Society for Mining, Metallurgy, and Exploration, Inc., Littleton, Colorado.

Weiss, Norman L., senior ed., 1985; SME Mineral Processing Handbook, 2 Vols., Society of Mining Engineers, American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc., New York, New York.

H-3890-3 - VALIDITY MINERAL REPORTS

Appendix 1 - Technical Report Outline

I. Cover Sheet.

A. Use Form 3060-1.

B. Serial number

C. Case Title.

D. Lands involved

1. Legal description

2. County, State

3. Approximate acreage involved.

4. Preparer's name. LEGIBLY print your name where it says "Prepared by," sign your name on line provided, your job title which must include your normal duty station, even if you are someplace on detail; and date.

5. Technical Review

6. Management Acknowledgment

II. Table of Contents.

A. Each section used in the report, and beginning page numbers.

B. List of all Attachments

1. List attachment names and numbers, and print names and numbers on each attachment.

C. Each and every page must have some sort of numeric or alphanumeric identifier that will allow the reader, who may be a judge, to find it more than once. That includes pages that contain attachments, appendices, and photographs.

III. Summary, Conclusion, Recommendations.

A. Must fully brief reader on your findings without a detailed reading of your report. Write these sections last. Remember that your audience consists of managers and attorneys. It is your job to demystify science, engineering, and economics.

H-3890-3 - VALIDITY MINERAL REPORTS

Appendix I - Technical Report Outline

1. Using separate headings for each (summary, conclusions, recommendations) will usually help you organize your thoughts and avoid redundancy. Separate headings are preferred. They help you and the reader keep the concepts separate. It also makes it easier for your office coordinator to respond to a Freedom of Information Act request.

a. The 1994 edition of BLM Manual Section 3060 can be interpreted to require that the report contain two sets of conclusions, buried somewhere in the body of the report. Don't do that. Use one set, only, at the front.

2. Clearly summarize what you did in the examination, your analysis, and the report.

3. Briefly state your conclusions based on the results of the report (discovery present or absent, mineral in character, etc.).

4. Your recommendations (i.e., issue patent; initiate contest with specified charges).

B. Place Summary, Conclusion, and Recommendations on separate pages so they can be easily removed from the body of the report (See BLM Manual section 3060.18 A 4 for the reason).

IV. Introduction.

A. Purpose of the report: Reason for management action.

1. Patent exam

2. Validity exam

3. Realty Action

4. Determination of Valid Existing Rights

5. Alleged Mineral Trespass

B. Brief history of the case.

1. Date case assigned, and by whom.

2. Date of notification of claimants and interested parties for the examination.

3. Impediments (if any) to your examination.

a. Weather.

b. Access.

c. Threats.

4. Dates of examination.

5. People present during examination, and when.

a. Field personnel.

b. Claimants.

c. Claimants' representatives.

F. State that conclusions of report are limited to the management action prompting the report. State that the report will not serve as an appraisal of value.

V. Lands Involved.

A. Description of lands.

1. Legal Subdivision.

2. Metes and bounds.

3. Protracted survey.

4. Mineral survey number

5. Acreage.

VI. Land Status and Record Data.

(Use tabular format for portions of this section if it will add clarity and save space).

A. Status of land involved.

1. Public land.

2. National Forest.

3. National Park, Monument, Preserve, or other Unit.

4. Split Estate

5. Encumbrances.

a. Withdrawals.

b. Land classifications.

c. Valid existing rights.

d. Mineral leases (serial numbers).

e. Mining claims (serial numbers).

f. Material sites (serial numbers).

g. Rights-of-way

6. Pertinent data from BLM Historical Index.

B. Mining claims involved.

1. Names (verbatim from records--do not correct "misspellings" on the claimants' location notice) and BLM serial numbers.

2. Location notice data

3. Assessment work affidavit data.

4. Chain of title data from BLM and/or county records.

5. Names of claimants.

VII. Physical Features and Access.

A. Geographic location.

B. Physical features, topography.

C. Access.

H-3890-3 - VALIDITY MINERAL REPORTS

Appendix I - Technical Report Outline

1. Describe generally, and refer to a useful map in your attachments.

D. Availability of water, power, etc.

E. Method of identification of claims on ground.

1. U.S.G.S. topographic map.

2. Aerial photographs.

3. Mineral survey plat and survey markers.

4. Location and corner monuments.

VIII. Regional Geology and Mining History.

A. Concise description of regional geology. (Your purpose is NOT to present the definitive, comprehensive geologic work on the physiographic province.)

1. Cite published information.

2. Refer to the geologic map in your attachment section.

B. Mining history of the region.

1. General exploration and mining interest.

a. Subject mineral commodities.

b. Other mineral commodities.

2. Adjacent or previous mining history at site.

IX. Geology and Mineralization of Claims.

A. Describe local geology.

1. Structure.

2. Alteration.

3. Lithology.

B. Describe mineralization and associate with geology.

1. How does mineralization occur? (i.e., disseminated, ore shoots, veins, placer, volcanic ash altered to zeolites, etc.)

2. Describe size, shape, and attitude of mineralized structure.

3. Identify valuable minerals, associated minerals, and gangue minerals.

4. Identify potential sulfide problems, and other potential deleterious material or conditions.

X. Mineral Exploration and Development Work.

A. Describe work done. Indicate size, depth, length, and purpose if known, and refer to map in attachment section.

1. Access.

a. Roads.

b. Tramways.

c. Rail transport.

d. Waterways.

2. Mine workings and their condition.

a. Shafts, adits, drifts.

b. Pits, cuts, trenches

XI. Mining, Milling, and Related Operations.

A. Describe equipment and process (if any) claimant uses or plans to use to process ore.

1. Include descriptions of Mills and/or Plants.

B. Attach a flow chart if available. If not available, create one.

H-3890-3 - VALIDITY MINERAL REPORTS

Appendix I - Technical Report Outline

XII. Field Work, Sampling Procedures and Analytical Work.

A. Describe each sample point in relation to:

1. Type and number of samples collected.

2. Sample dimension and weight.
3. Relationship to structure or country rock.

4. Reason for sampling at each location.

a. Requested by claimant.

b. Discovery point.

c. Evaluation based on your reconnaissance.

B. Explain sample representation.

1. Area of influence of sample.

2. What does sample represent?

C. Chain of custody and security of samples.

1. There are legal reasons for this.

2. If you collected core splits, explain how you know that core splits were not tampered with.

D. Company Data

1. If used, show how you determined that results are reliable.

a. Examined random core. State core size.

b. Core splits. Describe condition & recovery.

2. Did you witness sampling? If not, explain.

3. Twinned drilling?

E. Assay results

H-3890-3 - VALIDITY MINERAL REPORTS

Appendix I - Technical Report Outline

1. Analytical method(s) chosen and reason.

2. Laboratory used.

3. Describe any unusual problems.

4. Describe correlation between assays or company core splits and your core splits.

5. Tabulate results for easy reading and result comparison.

XIII. Economic Evaluation.

A. Calculate best estimate of tonnage and grade of mineralization.

1. Calculating an average grade may be the wrong approach.

2. Look also at smaller, high-grade bodies and their economic potential.

B. Describe appropriate mining method.

1. If different from claimants' proposed method, explain.

2. Determine minimum mining width and/or rate if appropriate.

C. Determine and itemize costs of mining, beneficiation, smelting, leaching, as appropriate. Do not "double index" costs.

D. Describe markets and marketing. This is necessary even for precious metals, especially placer gold.

1. This section may be extensive for industrial minerals, usually nonmetallic.

2. Consider effects of secondary, scrap, and recycling markets.

3. Is market open or vertically integrated?

4. Is there a futures market?

5. Is there a discount from spot price to account for testing or refining?

6. Is there a premium paid for specimen grades and if present, are they in sufficient quantities to be significant.

E. Calculate reclamation and rehabilitation costs. Consider all that are appropriate. You may need to research state laws. Document research in your case file. Do not double calculate concurrent reclamation costs already built into the mining plan. If not included in the mining plan, calculate reclamation costs in a separately headed section.

F. Analyze and compare above costs in relation to value of mineralization. Consider:

1. Percent recovery.

2. Dilution.

3. Potential for fluctuating commodity value.

G. Determine probable economic viability of the property based on your analysis.

XIV. References.

A. List all references cited.

B. Use U.S.G.S. format, or as shown in Handbook For Mineral Examiners.

XV. Attachments or Appendices.

Do not call this section "Exhibits." Use the word "Attachments" or "Appendices." In an administrative hearing, your mineral report will probably be introduced as "Government Exhibit 2." This will become confusing as you refer to your geologic map as "Exhibit 2 of Government Exhibit 2.

A. Maps and plats.

1. Location index map.

2. Topographic map.

3. Geologic Maps (as appropriate)

a. Regional.

b. Site specific.

4. Master Title Plat.

5. Mineral Survey Plat.

6. Mine maps.

a. Surface.

b. Underground.

B. Documents, as needed.

1. Location notices

2. Assessment work affidavits, if significant.

3. Correspondence as appropriate.

4. Smelter schedules.

5. Other pertinent documents.

6. DO NOT attach a document unless you refer to it in the text.

C. Flow Charts and Process Sheets.

D. Photographs.

1. Site information.

2. Sampling sites, before and after. (Use a low-reflectance photo sign in the picture.)

3. Surface improvements and facilities.

4. Photographs must be affixed to pages.

5. All photographs must be clearly captioned, i.e., "**View of Sunset Lode Mining Claim looking west showing portal to main adit. Photographed by A. P. Fomswick, 12/26/52.**" Generally, two photographs will fit on a standard page. A simple way to do this is locate the captions on each page using a word processor or typewriter. Affix the photographs in

the appropriate locations with tape or cement. Modern photocopiers will reproduce photographs with good resolution for noncritical copies of your report. Duplicate photographs can be affixed over the photocopies, if needed.

6. Photographs used as stand-alone evidence in criminal or civil trials are usually introduced independent of reports. Some attorneys prefer to introduce unmounted photographs. An exact copy of the page's printed caption should be typed on a pressure-sensitive ("sticky") label and affixed to the back of each photograph. Doing so assures that the caption will accompany the photograph if it is removed from the report page.

7. Digital photographs may be acceptable. However, a complete, detailed caption becomes even more critical if digital photographs are to be used.

Points to Note

This Appendix replaces the validity report format given in Manual Section 3060, Illustration 3.

Your report must be internally consistent. Your conclusions must be supported by the body of the report. It is best to write your conclusions section last. Your report should read almost like a novel. **The reader must be able to read the report, from front to back, without ever referring to an attachment**, and still understand what you did, your conclusions, and your rationale. Attachments are to be used to document or to further explain portions of your work. Any document or item which is appended to the report as an attachment must be referred to in the text. If you do not refer to an attachment in the text, you don't need the attachment.

If your examination resulted in a lengthy or complicated economic analysis, it is generally acceptable to append that analysis as an attachment. However, the economic evaluation needs to be summarized in the text. That text summary needs to include the assumptions, rationale, your approach to the analysis and the results. Do not leave the reader hanging. The main text must contain the "bottom line".

If you choose to include your economic analysis as an attachment, it is essential that the appended economic analysis be as readable as the main report.

Your target audience is not geologists and mining engineers. Your audience will consist of managers and attorneys. However, geologists and engineers will read and rely upon your report. It is your job to demystify science, engineering, and economics. You must strike a balance.

Do not make legal conclusions unless you are a judge. Let your attorney cite case law in court and in briefs. Avoid quoting case law unless it is an absolute necessity, and even then, think twice about it. Consider writing a separate memo for your attorney that contains the case law citations that you relied upon. Remember that your report is a piece of a case. It is a large, important piece, but it is not the whole case.

Appendix I - Technical Report Outline

It is common to use a spreadsheet in the preparation of an economic analysis. Be sure that you fully understand what the spreadsheet does. You will almost never have your computer available on the witness stand. If you do, anything contained on the hard drive may be subject to examination by the opposition's attorney. You must be fully prepared to make changes to your calculations while on the witness stand, using only a pencil and a calculator. Bring your own calculator to court.

If you use spreadsheets in your calculations, do not append page after page of numbers in columns. Anything that you append to your report must be understandable. If you must append copies of a spread sheet, each line and entry must be captioned as to what it means and what it does. Portray the information in such a way that it can become a crib "note" to yourself, in the event that you are directed to make recalculations on the witness stand. (Some judges will call this "recasting" your calculations.) Be ready for it. It's normal, and you can't prevent it. If you can't do it, your credibility will be diminished.

Your report must make sense without having to consult any additional source. Your target audience normally won't have the opportunity to visit the claim.

KAMALA D. HARRIS
Attorney General of California
ROBERT W. BYRNE
Senior Assistant Attorney General
ANNADEL A. ALMENDRAS
Supervising Deputy Attorney General
BRADLEY SOLOMON, SBN 140625
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E-mail: Bradley.Solomon@doj.ca.gov
Attorneys for Defendants
Department of Fish & Wildlife

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF SAN BERNARDINO

Coordination Proceeding Special Title (Rule 1550(b) **SUCTION DREDGE MINING CASES**	Coordinated Case No. JCCP4720 **STIPULATION AND [PROPOSED] ORDER SETTING BRIEFING AND HEARING DATES FOR (1) MINERS' MOTION(S) FOR AN INJUNCTION (2) CEQA/APA HEARING** Dept: S36 Judge: The Honorable Gilbert G. Ochoa Trial Date: None Set

At the Court's direction, the parties in these coordinated proceedings wish to schedule the consideration of two items on the Court's calendar.

First, the plaintiffs in *The New 49'ers Inc. v. California Department of Fish and Game* have indicated they wish to file a motion for an injunction based on the Court's May 1, 2015 ruling on the cross-motions for summary adjudication. The Court has tentatively scheduled a hearing on this motion for June 23, 2015, at 8:30 a.m. The other miner plaintiffs have indicated they may file a companion motion for injunction.

All parties to these coordinated proceedings **DO HEREBY STIPULATE** to the following briefing and hearing schedule, and request that the Court order this schedule:

(a) Plaintiffs', represented by Mr. Buchal, Motion to be e-mailed to the parties and dispatched by overnight delivery for filing and service on May 18, 2015;

(b) Plaintiffs', represented by Mr. Young, companion filing to be e-mailed to the parties and dispatched by overnight delivery for filing and service on May 20, 2015;

(c) Responses by Defendants and *Karuk Tribe* plaintiffs to be e-mailed to the parties and dispatched by overnight delivery for filing and service by June 10, 2015;

(d) Replies to be e-mailed to the parties and dispatched by overnight delivery for filing and service by June 17, 2015; and

(e) Hearing to be held at 8:30 a.m. on June 23, 2015.

Service shall be by email and/or overnight mail. Briefs shall be limited as follows: opening, twenty (20) pages each; response briefs, twenty (20) page each; reply briefs, ten (10) pages each.

Second, the Court has indicated it wishes to schedule briefing and hearing on the record-based matters challenging the actions in 2012 by the California Department of Fish and Wildlife in adopting new suction dredge mining regulations (at California Code of Regulations, title 14, sections 228 and 228.5) and certifying its environmental impact report on the Department's suction dredge permitting program. These matters raise issues under the Fish and Game Code, the Administrative Procedure Act, and the California Environmental Quality Act. This briefing and hearing is to resolve the entire *Karuk Tribe* case, the fourth cause of action in *The New 49ers* case, and the first, second, and third causes of action in the *Public Lands for the People* case. An administrative record for these matters has been lodged with the Court.

All parties to these coordinated proceedings **DO HEREBY STIPULATE** to the following briefing and hearing schedule for these record-based matters:

(a) Opening briefing to be e-mailed to the parties and dispatched by overnight delivery for filing and service by August 31, 2015;

(b) Responses to be e-mailed to the parties and dispatched by overnight delivery for filing and service by November 17, 2015;

(c) Replies to be e-mailed to the parties and dispatched by overnight delivery for filing and service by December 22, 2015;

(d) Hearing to he held the week of January 18, 2016, or as otherwise set by the Court.

The following briefing limitations shall apply:

In the *Karuk Tribe* case,

(1) Plaintiffs' Opening Brief shall be limited to forty (40) pages;

(2) Defendants' Response Brief shall be limited to forty (40) pages;

(3) Plaintiffs', in *The New 49ers* and *Public Lands for the People*, Response Brief(s) shall be limited to forty (40) pages total (to be shared between all of those plaintiffs);

(4) Plaintiffs in *Karuk Tribe* and defendants' Reply Briefs are limited to twenty (20) pages each. Plaintiffs', in *The New 49ers* and *Public Lands for the People*, Reply Brief(s) are limited to twenty (20) pages total (to be shared between all of those plaintiffs).

In *The New 49ers*, and *Public Lands for the People* cases,

(1) Plaintiffs', in *The New 49ers* and *Public Lands for the People*, Opening Brief(s) are limited to fifty (50) pages total (to be shared between all of those plaintiffs);

(2) Defendants' Response Brief shall be limited to fifty (50) pages;

(3) Plaintiffs', in *Karuk Tribe*, Response Brief shall be limited to fifty (50) pages;

(4) Plaintiffs', in *The New 49ers* and *Public Land for the People*, Reply Brief(s) are limited to twenty-five (25) pages total (to be shared between all of those plaintiffs). Defendants and Plaintiffs', in *Karuk Tribe*, Reply Briefs are limited to twenty-five (25) pages each.

Should a party choose to respond or reply to multiple briefs in a single brief, the party will be allowed the same number of pages that would have been allowed had the party chosen to respond or reply to the briefs separately.

Service shall be by email and/or overnight mail.

///

///

///

///

IT IS SO STIPULATED.

Dated: _____

LYNNE R. SAXTON
Attorney for Plaintiffs in the *Karuk Tribe* Action

Dated: 5/13/15

DAVID YOUNG
Attorney for Plaintiffs in *Kimble* and Petitioners/Plaintiffs *Public Lands for the People, Inc.* Actions

Dated: _____

JAMES BUCHAL
Attorney for Plaintiffs/Petitioners in *New 49'ers, Inc.* Action

Dated: _____

JONATHAN EVANS
Attorney for Plaintiffs in the *Karuk Tribe* Action

Dated: _____

BRADLEY SOLOMON
Deputy Attorney General for
Defendant/Respondent California Department of Fish and Wildlife

ORDER

IT IS SO ORDERED. The motion(s) for an injunction will be heard at 8:30 a.m. on June 23, 2015, and that the matter be briefed as scheduled in the stipulation herein. The parties' record-based claims hearing will be held at _____ a.m. on January _____, 2016, and that the matter be briefed as scheduled in the stipulation herein.

Dated: _____

GILBERT G. OCHOA
Judge of the Superior Court

SF2010202278
41291658.doc

IT IS SO STIPULATED.

Dated: 5/13/15

Lynne R. Saxton

LYNNE R. SAXTON
Attorney for Plaintiffs in the *Karuk Tribe* Action

Dated: _____

DAVID YOUNG
Attorney for Plaintiffs in *Kimble* and Petitioners/Plaintiffs *Public Lands for the People, Inc.* Actions

Dated: _____

JAMES BUCHAL
Attorney for Plaintiffs/Petitioners in *New 49'ers, Inc.* Action

Dated: 5/13/15

Jonathan Evans

JONATHAN EVANS
Attorney for Plaintiffs in the *Karuk Tribe* Action

Dated: _____

BRADLEY SOLOMON
Deputy Attorney General for Defendant/Respondent California Department of Fish and Wildlife

ORDER

IT IS SO ORDERED. The motion(s) for an injunction will be heard at 8:30 a.m. on June 23, 2015, and that the matter be briefed as scheduled in the stipulation herein. The parties' record-based claims hearing will be held at _____ a.m. on January _____, 2016, and that the matter be briefed as scheduled in the stipulation herein.

Dated: _____

GILBERT G. OCHOA
Judge of the Superior Court

SF2010202278
41291658.doc

IT IS SO STIPULATED.

Dated: _____

LYNNE R. SAXTON
Attorney for Plaintiffs in the *Karuk Tribe* Action

Dated: _____

DAVID YOUNG
Attorney for Plaintiffs in *Kimble* and Petitioners/Plaintiffs *Public Lands for the People, Inc.* Actions

Dated: 5/13/15

JAMES BUCHAL
Attorney for Plaintiffs/Petitioners in *New 49'ers, Inc.* Action

Dated: _____

JONATHAN EVANS
Attorney for Plaintiffs in the *Karuk Tribe* Action

Dated: _____

BRADLEY SOLOMON
Deputy Attorney General for Defendant/Respondent California Department of Fish and Wildlife

ORDER

IT IS SO ORDERED. The motion(s) for an injunction will be heard at 8:30 a.m. on June 23, 2015, and that the matter be briefed as scheduled in the stipulation herein. The parties' record-based claims hearing will be held at _____ a.m. on January _____, 2016, and that the matter be briefed as scheduled in the stipulation herein.

Dated: _____

GILBERT G. OCHOA
Judge of the Superior Court

SF2010202278
41291658.doc

IT IS SO STIPULATED.

Dated: _____

LYNNE R. SAXTON
Attorney for Plaintiffs in the *Karuk Tribe* Action

Dated: _____

DAVID YOUNG
Attorney for Plaintiffs in *Kimble* and Petitioners/Plaintiffs *Public Lands for the People, Inc.* Actions

Dated: _____

JAMES BUCHAL
Attorney for Plaintiffs/Petitioners in *New 49'ers, Inc.* Action

Dated: _____

JONATHAN EVANS
Attorney for Plaintiffs in the *Karuk Tribe* Action

Dated: May 14, 2015

/s/ Bradley Solomon
BRADLEY SOLOMON
Deputy Attorney General for
Defendant/Respondent California Department of Fish and Wildlife

ORDER

IT IS SO ORDERED. The motion(s) for an injunction will be heard at 8:30 a.m. on June 23, 2015, and that the matter be briefed as scheduled in the stipulation herein. The parties' record-based claims hearing will be held at _____ a.m. on January _____, 2016, and that the matter be briefed as scheduled in the stipulation herein.

Dated: _____

GILBERT G. OCHOA
Judge of the Superior Court

SF2010202278
41291658.doc

DECLARATION OF SERVICE BY U.S. MAIL

Case Name: **People v. Rhinehart**
No.: **S222620**

I declare:

I am employed in the Office of the Attorney General, which is the office of a member of the California State Bar, at which member's direction this service is made. I am 18 years of age or older and not a party to this matter. I am familiar with the business practice at the Office of the Attorney General for collection and processing of correspondence for mailing with the United States Postal Service. In accordance with that practice, correspondence placed in the internal mail collection system at the Office of the Attorney General is deposited with the United States Postal Service with postage thereon fully prepaid that same day in the ordinary course of business.

On June 11, 2015, I served the attached

PEOPLE'S SUPPLEMENTAL REQUEST FOR JUDICIAL NOTICE

by placing a true copy thereof enclosed in a sealed envelope in the internal mail collection system at the Office of the Attorney General at 1515 Clay Street, 20th Floor, Oakland, CA 94612-0550, addressed as follows:

Please see attached list.

I declare under penalty of perjury under the laws of the State of California the foregoing is true and correct and that this declaration was executed on June 11, 2015, at Oakland, California.

Ida Martinac
Declarant

Signature

SA2015101156
90507980.doc

People v. Rinehart Supreme Court Case No. S222620

Clerk, Court of Appeal of the State of California
Third Appellate District
Stanley Mosk Library and Courts Building
914 Capitol Mall, 4th Floor
Sacramento, CA 95814

Clerk, Plumas County Superior Court
Main Courthouse
520 Main Street, Room 404
Quincy, CA 95971

Matthew K. Carr
Plumas County District Attorney's Office
520 Main Street, Room 404
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Department of Fish and Wildlife
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Sacramento, CA 95814
Counsel for Amici Curiae