No. S222620

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.

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

DEFENDANT AND APPELLANT'S SECOND CONDITIONAL SUPPLEMENTAL REQUEST FOR JUDICIAL NOTICE

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September 25, 2015

Appellant hereby moves, pursuant to Evidence Code §§ 452 & 459, and California Rules of Court 8.252(a) and 8.520(g), for judicial notice of the following attached documents:

Exhibit 13 are true copies of excerpts from the certified Administrative Record for the Suction Dredge Permitting Program Final Subsequent Environmental Impact Report issued by the California Department of Fish and Game in March 2012 (FSEIR), filed in the *Suction Dredge Mining Cases*, No. JCCP4720 (San Bernardino).

Exhibit 14 is a true copy of the Brief for the United States as *Amicus Curiae* Supporting Appellee in *California Coast Commission v. Granite Rock Co.*, 480 U.S. 572 (1987), filed by the Solicitor General of the United States, now Harvard Law Professor Charles Fried.

Exhibit 15 is a true copy of materials generated by the U.S. Forest Service in the course of reviewing suction dredging operations on the Oro Grande Placer Mining Claim in the Klamath National Forest.

As to Exhibits 13 & 15, this Second Conditional Supplemental Request for Judicial Notice is conditioned upon the Court's determination to permit the parties *amicus curiae* (or indeed any party) to make a record in this Court concerning environmental impacts of suction dredging and the feasibility of alternative mining techniques—which the Court should not do. Exhibit 14 is presented to provide a complete version of the Attachment to Defendant and Appellant's Answer to the Brief *Amicus Curiae* Filed by the United States.

Dated: September 25, 2015.

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MR-GEN-12: Comments that Disagree with the DSEIR Determination that a Limited Number of Impacts are Significant and Unavoidable

The Department received several comments disagreeing with its determination in the DSEIR that suction dredging under the Proposed Program would have significant and unavoidable impacts, specifically related to water quality, cultural resources, noise, and a single biological resource issue. Comments critical of the Department's determination are based generally on one of two assertions: (1) the Department should have mitigated these significant impacts to below a level of significance, and (2) the Department's determination are overly conservative, erring on the side of finding related impacts significant.

As to the first assertion, please see MR-GEN-6 for a discussion of the Department's legal obligation and authority to mitigate significant environmental impacts in the present context. Against this backdrop, the Department properly concluded in the DSEIR that certain impacts would remain significant and unavoidable.

As to whether the Department made overly conservative significance determinations, several points bear emphasis. First, the Department's conclusions are based on a combination of the probability of an impact occurring and the consequence should the impact occur. For instance, an impact with a low probability of occurring, but a high consequence if it were to occur, was characterized as significant in the DSEIR. This was the case in the DSEIR for Impact BIO-WILD-2, which concerns potential disturbance by suction dredgers of special-status passerines associated with riparian habitat. While the likelihood of disturbance is considered relatively low, several of these species (e.g., Least Bell's Vireo) are sufficiently rare that even a small disturbance would be substantial considering the restricted population and/or range of the species. The Department employed similar rationale for Impacts CUL-1 and CUL-2, where damage to any significant cultural resource would be considered significant, even though that the Department expects the frequency and magnitude of any related disturbance to be low. In other cases, the Department found impacts to be significant because related activities under the Proposed Program have the clear potential to exceed the identified threshold of significance on a regular basis (Impacts WQ-4, WQ-5, and NZ-1).

Whether the Department's significance determinations are overly conservative depends to some degree on the eye of the beholder. In the present context, however, the Department itself as lead agency is charged by law to determine whether suction dredging impacts authorized under the Proposed Program will be significant. (Pub. Resources Code, §§ 21082.2, subd. (a), 21100, subd. (b)(1); CEQA Guidelines, § 15064, subds. (c), (f).) In exercising its discretion in that regard, the Department recognizes significance determinations required by CEQA call for careful judgment based to the extent possible on scientific and factual information. The same is true of the thresholds of significance that the Department used in the DSEIR to gauge the significance of project-related changes to the existing environmental baseline. (*Citizens for Responsible and Equitable Environmental Development v. City of Chula Vista* (2011) 197 Cal.App.4th 327, 334 [upholding agency's discretion to set its own thresholds of significance, supported by substantial evidence].) Consistent with these principles, the analysis in the DSEIR and related significance determinations reflect the Department's independent review and judgment of relevant proposed regulations would not result in any significant impacts relative to geomorphic effects.

Water Quality

MR-WQ-1: Suction Dredgers Remove More Mercury than They Discharge.

See MR-WQ-10 for comments regarding removal of mercury in a suction dredge.

The Department agrees that suction dredgers do remove some elemental mercury and mercury combined with gold (amalgam) from the sediment and the stream. That said, no studies were found to document how suction dredge miners handle, store, and dispose of mercury recovered. Similarly, no studies were found that document the extent to which elemental mercury is available for transport by winter storms or other natural processes; consequently, it remains unclear whether elemental mercury removal by suction dredgers reduces its potential for methylation. However, at least some of the mercury that dredgers encounter and dredge is unavailable for transport by winter storms and other natural processes (see also MR-WQ-6) because it is deeply buried by stream sediment. While extremely high-flow/flooding events may scour all sediment within specific reaches of a channel, these events are rare and certainly do not occur on an annual basis. Removal of such mercury by suction dredges will likely be site-specific and, regardless of how much is removed, the amount of mercury discharged remains the most relevant factor when conducting the water-quality impact assessment. This is because some of the mercury would not have been available for transport by winter storms or other natural processes, at least during many years in which significant flooding events do not occur. Moreover, comments by suction dredge miners and analysis by USGS indicate that it is easy to find elemental mercury in watersheds affected by gold mining. This indicates that all the large storms that have occurred since 1910 (by then, discharging both hydraulic mining debris and hard-rock mill tailing was prohibited) did not scour all the elemental mercury from those watersheds.

Finally, the total mass of elemental mercury removed from the stream by dredge operators is likely insignificant relative to the total amount of mercury remaining in watersheds affected by gold mining. Results of the Suction Dredger Survey (DSEIR, Appendix F) suggest that total annual removal of mercury by suction dredge miners is approximately 50 kilograms (kg). It is estimated that 2.3–2.6 million kg of mercury were lost to watersheds of the Sierra Nevada Geomorphic Province during the Gold Rush era (Churchill 2000). It is not clear how much remains in foothill streams, but it is unlikely that the mass recovered per year substantially reduces the amount remaining.

MR-WQ-2: Fish Tissue Mercury Levels Are Low in California Compared with the U.S. as a Whole.

Available literature suggests that fish-tissue mercury levels in California are within the range of levels seen in other parts of the United States. Comparisons between Table 4.2-3 in the DSEIR and values in Scudder et al. 2009 (which represents the most recent and comprehensive nationwide survey of mercury levels in fish) indicate levels similar to the nation as a whole. Regardless of the specific levels in California relative to elsewhere, levels contained high levels of elemental mercury, which dominated concentration measurements. Elemental mercury is expected to be more effectively removed in a suction dredge sluice box because it is heavy and thus settles effectively. At other sites, mercury contained in the sediment is mostly attached to fine particles (e.g., Pit #2:BC), and thus would not be expected to be removed effectively in a suction dredge sluice box.

MR-WQ-11: Assumed Sediment Movement and Discharge Rates of Suction Dredges Are Unrealistically High.

It is acknowledged that uncertainty exists regarding the sediment movement and discharge rates of a suction dredge. The original estimates were based on performance specifications provided in a suction dredge manufacturer's catalog (Keene Engineering 2008). The manufacturer provided revised estimates during the public comment period, but did not provide a description of how the data were derived. Keene's revised numbers were within 50–150% of what was assumed initially on an hourly basis. Revision of the estimates to these updated rates would not result in substantially different conclusions. Results of the Suction Dredger Survey (Appendix F) generally corroborated estimates provided by the suction dredge manufacturer. Using the average number of hours dredged per dredger per year and the total volume of material moved, approximately 0.70 cubic yards of material (about 1 ton) were dredged per hour, on average. This falls between estimates used in the assessment for 4-inch and 5-inch dredges, the 4-inch dredge being the most commonly used in California.

Furthermore, the Department acknowledges that some of the time spent operating a dredge is spent moving large rocks, refueling, ensuring safety, and doing other things besides actually dredging. This time could have been included in survey responses to the question—"On average, how many hours per day were you in the water operating your suction dredge on your typical trip in California in 2008?"—which was the basis of estimates used for the assessment. The quantitative extent to which operating time estimates should be reduced to account for these types of activities is unknown. However, assuming one-half or even one-tenth the material movement rate estimates (or, equivalently, the number of hours dredged per dredger per year estimates) would not have substantially affected the results of the assessment. Under assumptions of one-half and one-tenth of the previously used rates, the assessment would find that within areas of highly elevated sediment mercury concentrations, two and 11 suction dredge operators, respectively, using an average size (4-inch) dredge, could discharge approximately 10% of the entire South Yuba River watershed's mercury loading in a dry year, during an average suction-dredging time of 160 hours. This number of suction dredgers is still within an amount that could reasonably be expected to dredge in mercury-enriched sediment in a dry year. Therefore, it is not expected that any reasonable reduction of the sediment discharge rate used in the assessment would have reached a different conclusion regarding the potential impacts on mercury of suction dredging.

mention suction dredges in the publication yet somehow this is cited as an "expert source" as required by CEQA?

DSEIR, page 4.2-36 lines 26-27, *"Furthermore it is not clear from the study whether Hg droplets were floured prior to being dredged or were floured as a result of dredging."* See above comments on the Humphrey report that states nearly all the mercury in the sample prior to dredging passed through a 30 mesh screen and the same for after. It certainly appears to me it was both floured before AND after.

DSEIR, page 4.2-36, lines 28-32, ***"Consequently, it is unlikely that suction dredges would recover either floured mercury in sediment dredged, or mercury floured by the suction and turbulence of the dredge."*** This is an extreme leap of logic. This conclusion can't be based on fact. Clearly the **ONLY** report to have studied this determined that **ALL** mercury in the incoming gravel **WAS** floured, the dredge recovered 98% of the floured mercury. This is completely unsupported by fact and the facts show exactly the opposite. What is the definition of flouring – wouldn't passing through a 30 mesh screen achieve that threshold?

Neither the Humphreys report nor the Fleck report which the DSEIR mercury discussion is based on evaluated the particle dimensions of the existing mercury prior to being dredged to after being dredged. **Flouring by a suction dredge is conjecture and should be discarded lacking proof.**

Re-circulating Tank Experiment [Fleck page 56]

The re-circulating tank experiment conducted by Dr. Alpers is key to the later assumptions and analysis used in developing mercury emissions and THg for TSS in the DSEIR. If the data the results were derived from are flawed then all of the resulting analysis must be discarded. An analysis of the Alpers study shows clear flaws in using this data as any kind of an estimation of the amount of particulated mercury that would be emitted from a dredge – these flaws include:

- Using a dredge suction system without a sluice box which captures heavy material
- Recycling suspended mercury through the impeller of the pump (not how a dredge operates)
- Re-circulating the contaminated water back onto the bedrock ensured the mercury was fragmented and the source material was equally contaminated (normalized the material)
- Using a calm, still water collection device (no current) to simulate a river, then repeatedly re-fragmenting the mercury into smaller and smaller particles by running it through the pump impeller, then testing the tank sediments as if they were common dredge tailings and concluding this would simulate a running river with a flow of 2,000 cfs

In this experiment (Fleck et al) Dr. Alpers used concentrated material from the bedrock that was collected using a suction dredge pump and hose – not a dredge. Figure 4 below shows the setup used to collect the sample:

Graphically this is shown in Figure 10.

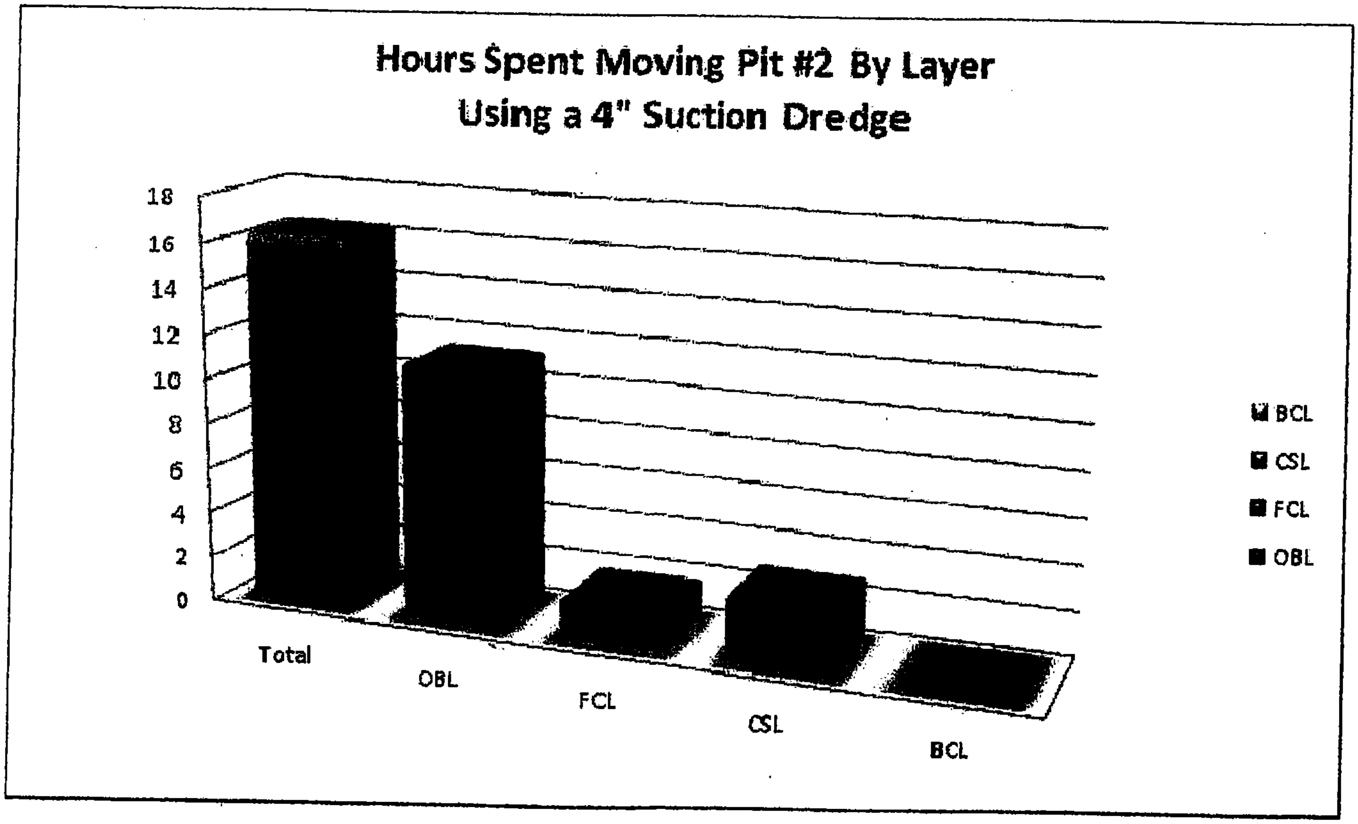

Figure 10. Time Spent Dredging Pit #2

The basis for the follow on discussion in this paper is provided in Figures 9-10 the time required to move the material. The DSEIR assumes that all material moved is <.063 but does not account for the total material or time required to reach that layer. As is clearly shown from the data provided from Fleck, and using the Keene provided dredge material movement rates (unmodified) the time spent moving material on the bedrock would be approximately 20 minutes out of 16 total hours spent dredging.

A second factor that any experienced dredger would confirm is the high percentage of holes that you just quit on before ever reaching the bedrock layer. Dave McCracken reports that the maximum depth reach of a 4" dredge is 4', the maximum of a 5" is 5' and so forth [Dave McCracken written comments to CDFG dated 10 April 2011]. I have found through experience this to be the case. Often you begin a hole without knowledge of the level of overburden on the bedrock (sample pit). I would assume that at least 30% of the holes I begin on – I abandon because they exceed the depth reach of my 4" dredge. In other words the time consumed to reach the pay layer exceeds the potential payoff because as shown above the amount of material is exponential, not linear. This quirk of gold dredging isn't accounted for in the

- Processing of materials collected using a suction dredge, in upland areas outside the current water level of a river, stream or lake;
- Panning for gold;
- Use of a suction dredge equipment (e.g. pontoons, water pump or sluice box) on a river, stream, or lake where the vacuum hose and nozzle have been removed;
- Sluicing or power sluicing for gold when no vacuum hose or nozzle is used to remove aggregate from the river, stream or lake; and
- Use of vacuums (i.e. shop vacs) and hand tools above the current water level.

There may be other methods of placer mining, or other activities related to suction dredging that are not captured by the above list, but are nevertheless not considered suction dredging by CDFG. In addition, the use of a suction dredge for the purposes of infrastructure maintenance, flood control, or navigational purposes (e.g., a cutterhead dredge) is not considered suction dredging for the purposes of this Program, since it is not used for mineral extraction.

Activities Requiring Additional Notification under Fish and Game Code Section 1602

Some methods of suction dredging, or activities performed to facilitate suction dredging, require notification to CDFG as specified in Fish and Game Code section 1602, subdivision (a)(1). Note that in these cases, both a valid suction dredge permit and notification and compliance with Fish and Game Code section 1602, subdivision (a) are required. These activities include any of the following:

- Use of motorized winches or other motorized equipment 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 or reservoirs; and
- Use of a dredge with an intake nozzle greater than 4 inches in diameter.

2.2.2 Definition of "Deleterious to Fish"

In developing the proposed amendments to the previous regulations CDFG considered what types and under what circumstances suction dredging activities may be deleterious to fish, as that term is used in the authorizing statute. This is guided by, among other things, the definition of "fish" set forth in the Fish and Game Code. Section 45 of the Code defines fish to mean wild fish, mollusks, crustaceans, invertebrates, or amphibians, including any part, spawn, or ova thereof. For the purposes of this chapter, the word "fish" when written as *Fish* refers to the definition set forth in the Fish and Game Code. References to fin fish are written without italics and in appropriate grammatical context.

Against this backdrop and as highlighted below, CDFG believes section 5653 is intended to assure that the individual and cumulative impacts of permitted suction dredge operations do not substantially affect any species of fish as defined by Fish and Game Code section 45.

This approach is consistent with existing State policy to maintain sustainable populations of fish and wildlife resources. (See, e.g., Fish & G. Code, §§ 1700, subd. (a), 1801, subd. (a).) Generally, CDFG concludes that an effect which is deleterious to *Fish*, for purposes of section 5653, is one which manifests at the community or population level and persists for longer than one reproductive or migration cycle. The approach is also consistent with the legislative history of section 5653. The history establishes that, in enacting section 5653, the Legislature was focused principally on protecting specific fish species from suction dredging during particularly vulnerable times of those species' spawning life cycle.

2.2.3 Development of Regulations

CDFG developed the draft proposed amendments to the existing regulations to ensure that suction dredging would not result in deleterious effects to *Fish*. The development of the draft proposed amendments included analysis of life history, habitat requirements and distribution of the all *Fish* species in the state. Temporal and spatial restrictions on suction dredging were developed to protect select *Fish* species. These species are hereafter are referred to as *Fish* "action" species, and are listed in Chapter 4.3, Table 4.3-1. Other *Fish* species were determined to be adequately protected by the general (non-spatial or temporal) suction dredging requirements, or to receive adequate surrogate protection as a result of temporal and spatial restrictions developed for *Fish* action species.

CDFG developed a series of "use classifications" that were assigned to each *Fish* action species based on the species population viability, abundance and/or reproductive biology. Each use classification stipulates the period of time in the year that streams are proposed to be open to dredging. The use classifications are as shown on Table 2-1.

TABLE 2-1. SUCTION DREDGE USE CLASSIFICATIONS ASSIGNED TO *FISH* ACTION SPECIES

Use Classification	Open Dates
A	No dredging permitted at any time
B	Open to dredging from July 1 through August 31
C	Open to dredging from June 1 through September 30
D	Open to dredging from July 1 through January 31
E	Open to dredging from September 1 through January 31

In general, use classifications were assigned to each species to protect critical life stages (e.g., spawning, incubation, early emergence/development) (See Chapter 4.3, Table 4.3-1). For certain species, CDFG determined that any level of dredging activity in suitable or occupied habitat would have the potential to result in a deleterious effect to the species. For these species, occupied or suitable habitat is proposed to be closed to dredging (i.e., Class A).

The use classes assigned to each of the *Fish* action species were then applied to streams within the species range or known distribution. There is a broad range of data that provide information on species distribution in the state. The quality and accuracy of these data resources vary. In all cases, CDFG has attempted to use the best available data on species

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.

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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.

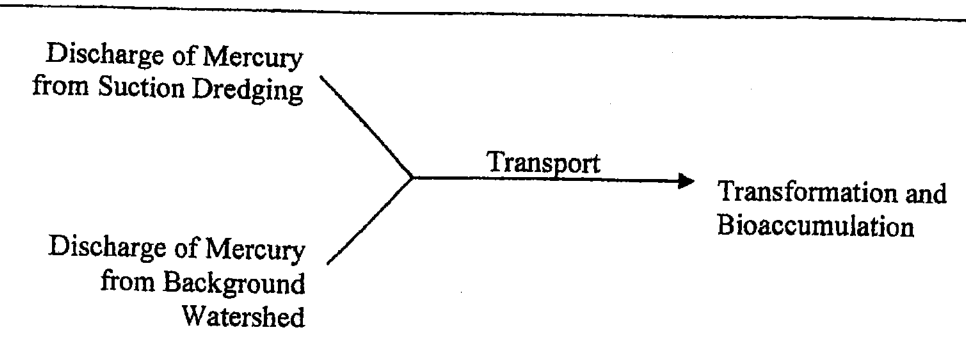

FIGURE 4.2-3. CONCEPTUAL MODEL FOR THE MERCURY IMPACT ASSESSMENT

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.

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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.

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.

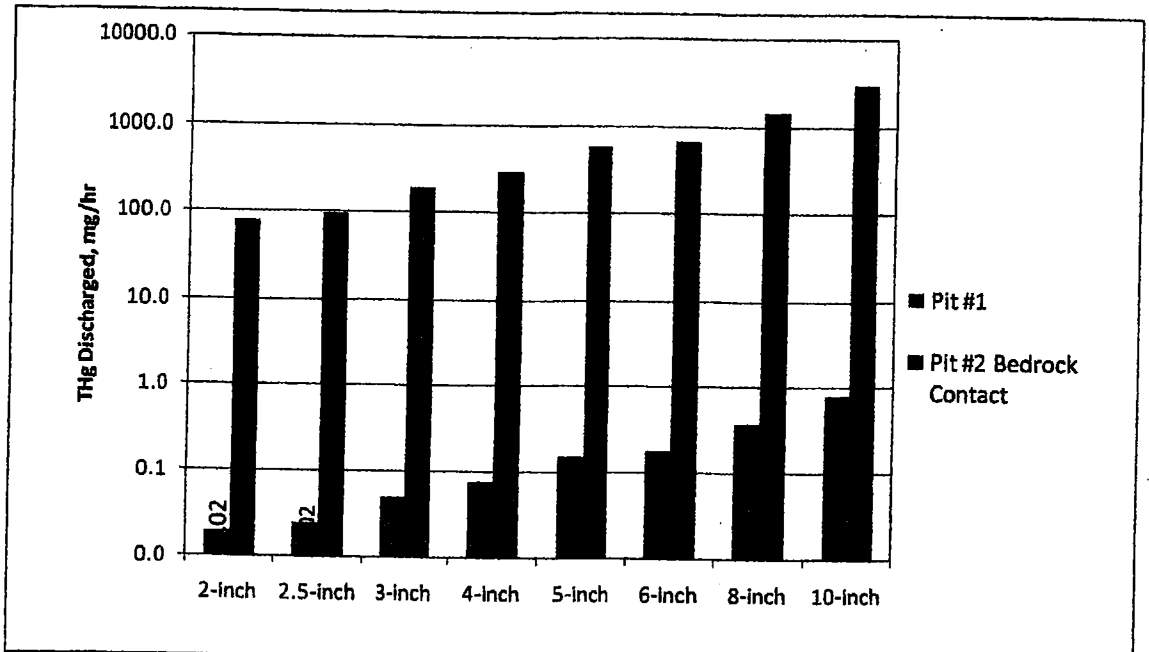

FIGURE 4.2-7. MERCURY DISCHARGE RATE FROM SUCTION DREDGING FOR DIFFERENT SUCTION DREDGE NOZZLE SIZES AND LOCATIONS WITHIN THE SOUTH YUBA RIVER

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.

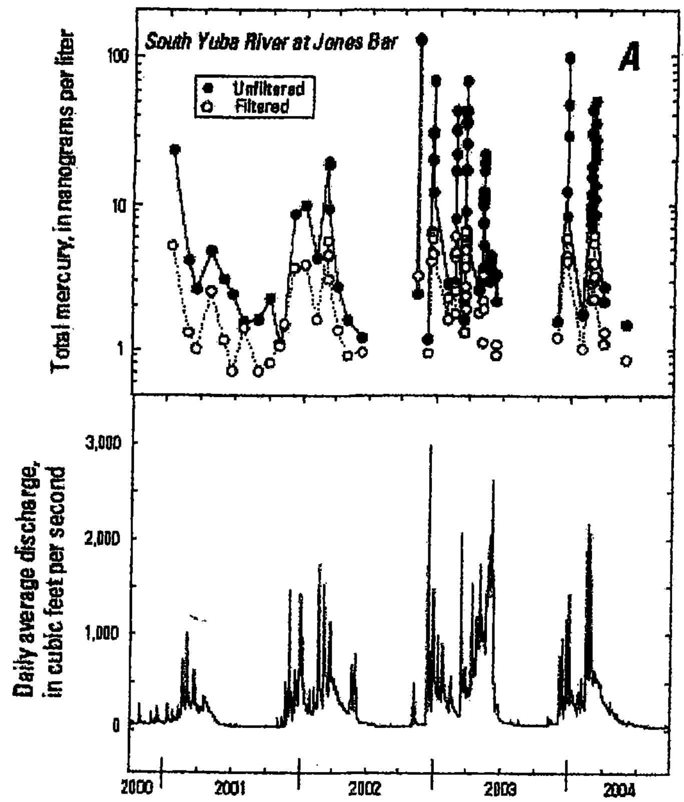

FIGURE 4.2-8. MEASURED MERCURY AND DISCHARGE IN THE SOUTH YUBA RIVER AT JONES BAR DURING WATER YEARS 2001-2004

(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.

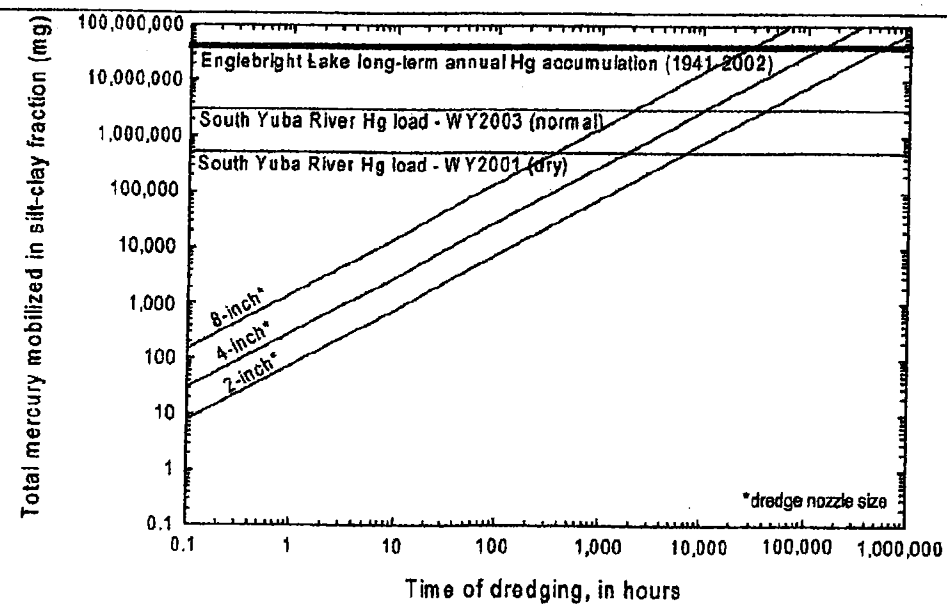

FIGURE 4.2-9. TOTAL MERCURY DISCHARGED IN <63 μM SIZE FRACTION VS. HOURS DREDGED IN PIT #2:BC SEDIMENT AND COMPARISON TO WATERSHED LOADS

(Fleck et al., 2011)

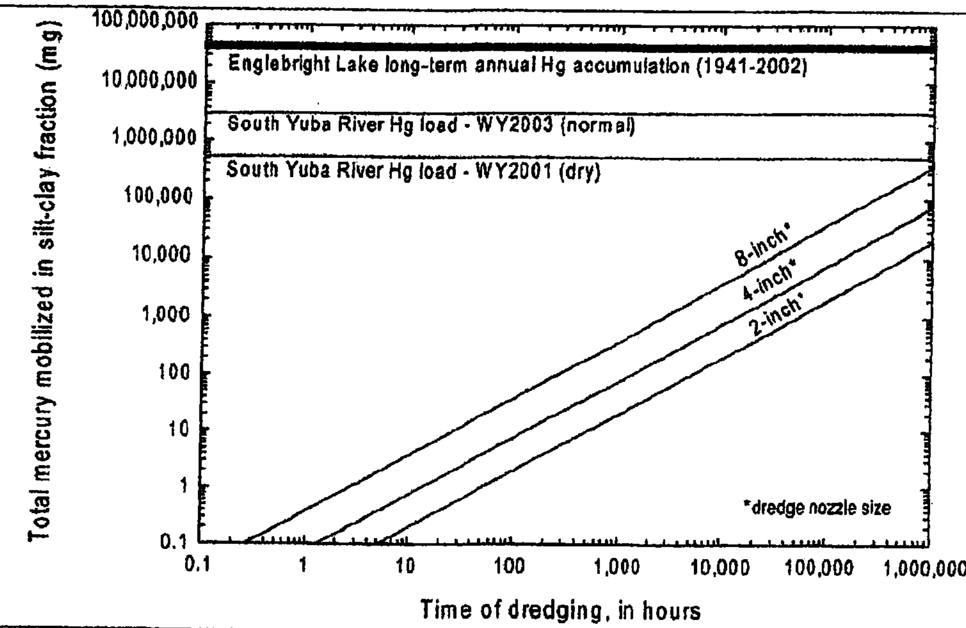

FIGURE 4.2-10. TOTAL MERCURY DISCHARGED IN <63 μM SIZE FRACTION VS. HOURS DREDGED IN PIT #1 AND COMPARISON TO WATERSHED LOADS

(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.

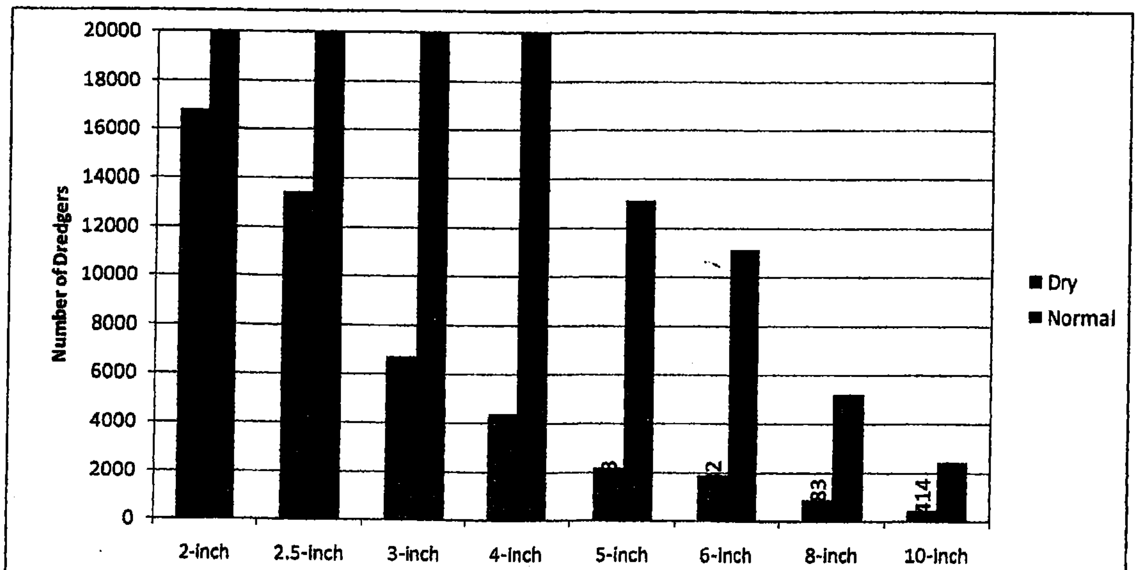

FIGURE 4.2-11. NUMBER OF DREDGERS REQUIRED TO DISCHARGE 10% OF ANNUAL BACKGROUND WATERSHED THg LOAD DURING DRY AND NORMAL WATER YEARS BASED ON PIT #1 SEDIMENT IN THE SOUTH YUBA RIVER.

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).

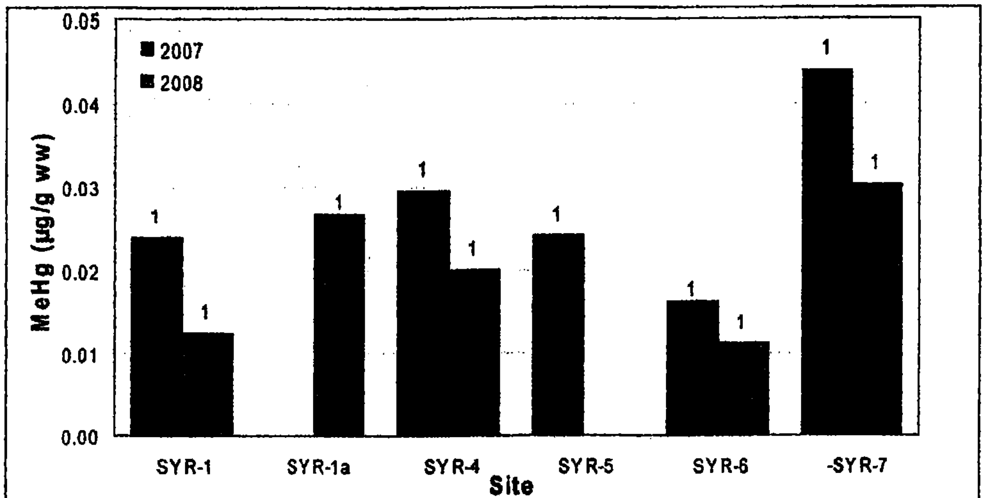

FIGURE 4.2-16. METHYLMERCURY (MeHg, µg/g, WW [WET WEIGHT]) CONCENTRATIONS IN INDIVIDUAL COMPOSITE SAMPLES OF LARVAL CADDISFLIES (ORDER TRICHOPTERA, FAMILY HYDROPSYCHIDAE) COLLECTED FROM THE HUMBUG CREEK/SOUTH YUBA STUDY AREA IN SEPTEMBER 2007 AND SEPTEMBER 2008

(Fleck et al., 2011)

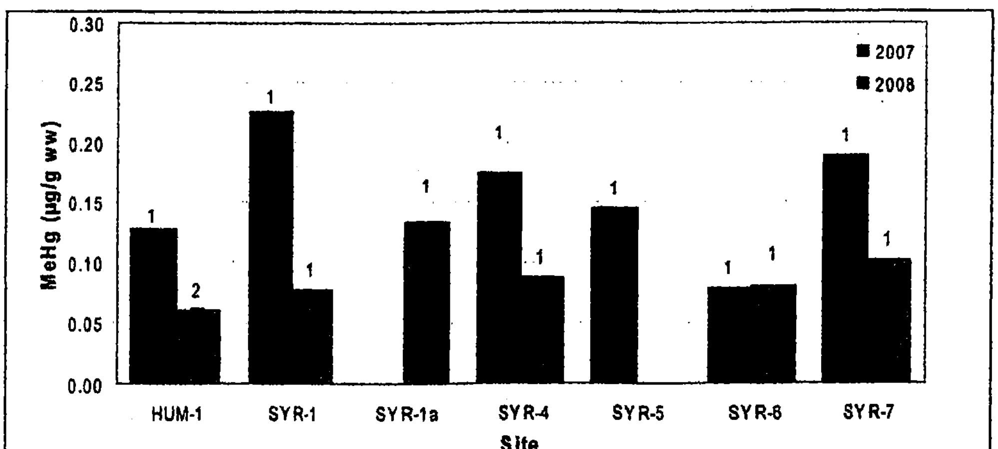

FIGURE4.2-17. METHYLMERCURY (MeHg, µg/g, WW) IN COMPOSITE SAMPLES OF WATER STRIDERS (ORDER HEMIPTERA, FAMILY GERRIDAE) (N = 1-2) COLLECTED FROM THE HUMBUG CREEK/SOUTH YUBA STUDY AREA IN SEPTEMBER 2007 AND SEPTEMBER 2008

(Fleck et al., 2011)

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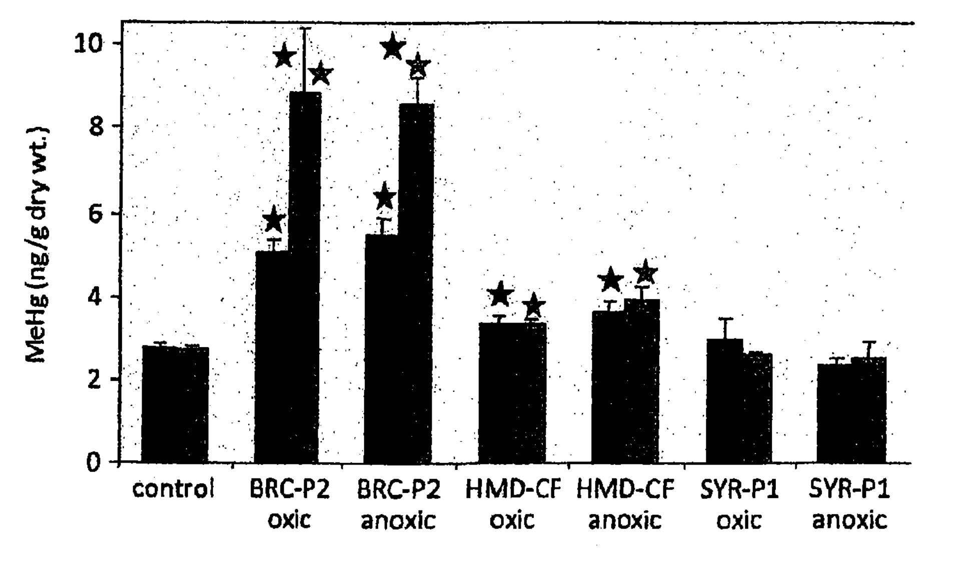

FIGURE 4.2-20. IMPACT OF PREVIOUSLY SUSPENDED SOUTH YUBA RIVER SEDIMENTS ON METHYLMERCURY PRODUCTION IN RECEIVING SEDIMENTS OF DELTA MEADOWS

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 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.

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.

Watanabe, C. 2002. *Modification of mercury toxicity by selenium: practical importance?* Tohoku J. Exp. Med. 196:71-77. [[Ref#:828]]

Wetzel, R.G. 1983. Limnology. 2nd Ed. (pp.45-59).Saunders College Publishing. New York, N.Y. [[Ref#: 829]]

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Yeardley, R.B.; J.M. Lazorchak; S.G. Paulsen. 1998. *Elemental fish tissue contamination in northeastern U.S. lakes: evaluation of an approach to regional assessment.* Environmental Toxicology and Chemistry. 17(9):1875-1884. [[Ref#:830]]

4.3 Biological Resources

Anderson, N. H., J. R. Sedell & F. J. Triska, 1978. The role of aquatic invertebrates in processing of wood in coniferous forest streams. Am. Midl. Nat. 100: 64–82. [[Ref#: 691]]

Barbour, M.T. 1991. Stream Surveys — The Importance Of The Relation Between Habitat Quality And Biological Condition. *Sediment and Stream Water Quality in a Changing Environment: Trends and Explanation* (Proceedings of the Vienna Symposium, August 1991) IAHS Publ. no. 203 [[Ref#: 831]]

Beebee, T., and R. Griffiths. 2005. The amphibian decline crisis: A watershed for conservation biology? Biological Conservation, Volume 125 (3): 271-285. [[Ref#: 832]]

Bell M. 1990. Fisheries Handbook of Engineering Requirements and Biological Criteria. Third. US Army Corps of Engineers, North Pacific Division. Portland, Oregon. pp.1~1-35~7. [[Ref#:833]]

Bell, M. C. (1986). Fisheries handbook of engineering requirements and biological criteria. U.S. Army Corps of Engineers, North Pacific Division, Fish Passage Development and Evaluation Program Report . [[Ref#: 1059]]

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Bergerud A. T., R.D. Jakimchuk , D.R. Carruthers. 1984. The buffalo of the north: caribou (*Rangifer tarandus*) and human developments. Arctic. 37: 7–22. [[Ref#:835]

Bernell, D , et al. 2003. Recreational Placer Mining in the Oregon Scenic Waterway System. Oregon Parks and Recreation Department [[Ref#:101]]

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

A006179

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Table J-1. List of Animal Species Considered in this SEIR

Santa Cruz long-toed salamander	Endangered	Endangered	DFG-Fully Protected	Wet meadows near sea level in a few restricted locales in Santa Cruz and Monterey counties.	Aquatic larvae prefer shallow (<12 inches) water, using clumps of vegetation or debris for cover. Adults use mammal burrows.
California condor	Endangered	Endangered	ABC-Watch List of Birds of Conservation Concern; CDF-Sensitive; IUCN-Critically Endangered	Require vast expanses of open savannah, grasslands, and foothill chaparral in mountain ranges of moderate altitude.	Deep canyons containing clefts in the rocky walls provide nesting sites. forages up to 100 miles from roost/nest.
light-footed clapper rail	Endangered	Endangered	ABC-Watch List of Birds of Conservation Concern; DFG-Fully Protected	Found in salt marshes traversed by tidal sloughs, where cordgrass and pickleweed are the dominant vegetation.	Requires dense growth of either pickleweed or cordgrass for nesting or escape cover; feeds on molluscs and crustaceans.
California clapper rail	Endangered	Endangered	ABC-Watch List of Birds of Conservation Concern; DFG-Fully Protected	Salt-water & brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay.	Associated with abundant growths of pickleweed, but feeds away from cover on invertebrates from mud-bottomed sloughs.
California least tern	Endangered	Endangered	ABC-Watch List of Birds of Conservation Concern; DFG-Fully Protected	Nests along the coast from San Francisco Bay south to northern Baja California.	Colonial breeder on bare or sparsely vegetated, flat substrates: sand beaches, alkali flats, land fills, or paved areas.
southwestern willow flycatcher	Endangered	Endangered	ABC-Watch List of Birds of Conservation Concern	Riparian woodlands in Southern California.	
least Bell's vireo	Endangered	Endangered	ABC-Watch List of Birds of Conservation Concern; IUCN-Near Threatened	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft.	Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.
coho salmon - central California coast ESU	Endangered	Endangered	AFS-Endangered	Federal listing = pops between Punta Gorda & San Lorenzo River. State listing = pops south of Punta Gorda.	Require beds of loose, silt-free, coarse gravel for spawning. Also need cover, cool water & sufficient dissolved oxygen.
chinook salmon - Sacramento River winter-run ES	Endangered	Endangered	AFS-Endangered	Sacramento River below Keswick Dam. Spawns in the Sacramento River but not in tributary streams.	Requires clean, cold water over gravel beds with water temperatures between 6 & 14 C for spawning.
Mohave tui chub	Endangered	Endangered	AFS-Endangered; DFG-Fully Protected	Endemic to the Mojave River basin, adapted to alkaline, mineralized waters.	Needs deep pools, ponds, or slough-like areas. Needs vegetation for spawning.
Owens tui chub	Endangered	Endangered	AFS-Endangered	Endemic to the Owens River basin in a variety of habitats.	Needs clear, clean water, adequate cover, and aquatic vegetation.
bonytail	Endangered	Endangered	AFS-Endangered; IUCN-Endangered	Found in the Colorado River bordering California.	Adapted for swimming in swift water, but both adults & young need backwaters & eddies. Needs gravel riffles for spawning
Modoc sucker	Endangered	Endangered	AFS-Endangered; DFG-Fully Protected; IUCN-Endangered	Found in tributary streams of the upper Pit River.	Found in large, shallow, muddy-bottomed pools. They are even found in intermittent streams. Spawn in riffle areas.
shortnose sucker	Endangered	Endangered	AFS-Endangered; DFG-Fully Protected; IUCN-Endangered	Native to the Klamath and Lost River systems in California & Oregon.	Spend most of year in open waters of large lakes. They feed on plankton. Spawn in tributary streams.
razorback sucker	Endangered	Endangered	AFS-Endangered; DFG-Fully Protected; IUCN-Endangered	Found in the Colorado River bordering California.	Adapted for swimming in swift currents but also need quiet waters. Spawn in areas of sand/gravel/rocks in shallow water.
Lost River sucker	Endangered	Endangered	AFS-Endangered; DFG-Fully Protected; IUCN-Endangered	Native to the Lost River system in California & Oregon.	Primarily a lake species found in fairly deep water. Adults run up tributary streams to spawn in the spring.
desert pupfish	Endangered	Endangered	AFS-Endangered	Desert ponds, springs, marshes and streams in Southern California.	Can live in salinities from fresh water to 68 ppt, can withstand temps from 9 - 45 C & dissolved oxygen levels down to 0.1 ppm.
Owens pupfish	Endangered	Endangered	AFS-Endangered; DFG-Fully Protected; IUCN-Endangered	Shallow water habitats in the Owens Valley.	Prefers warm, clear, shallow water free of exotic fishes. Needs areas of firm substrate for spawning.
unarmored threespine stickleback	Endangered	Endangered	AFS-Endangered; DFG-Fully Protected	Weedy pools, backwaters, and among emergent vegetation at the stream edge in small Southern California streams.	Cool (<24 C), clear water with abundant vegetation.
riparian brush rabbit	Endangered	Endangered		Riparian areas on the San Joaquin River in northern Stanislaus County.	Dense thickets of wild rose, willows, and blackberries.

green sturgeon	Threatened	None	AFS-Vulnerable; DFG-Species of Special Concern; IUCN-Near Threatened; NMFS-Species of	These are the most marine species of sturgeon. Abundance increases northward of Point Conception. Spawns in the Sacramentor, Klamath, & Trinity Rivers.	Spawns at temps between 8-14 C. Preferred spawning substrate is large cobble, but can range from clean sand to bedrock.
chinook salmon - California coastal ESU	Threatened	None	AFS-Threatened	Federal listing refers to wild spawned, coastal, spring & fall runs between Redwood Cr, Humboldt Co & Russian River, Sonoma Co	
Lahontan cutthroat trout	Threatened	None	AFS-Threatened	Historically in all accessible cold waters of the Lahonton Basin in a wide variety of water temps & conditions.	Cannot tolerate presence of other salmonids. Requires gravel riffles in streams for spawning.
Paiute cutthroat trout	Threatened	None	AFS-Endangered	Cool, well-oxygenated waters	Cannot tolerate presence of other salmonids, requires clean gravel for spawning.
Little Kern golden trout	Threatened	None	AFS-Endangered	Native to the Little Kern River in Tulare County. Found in clear, cold mountain streams & lakes at 5,000 to 9,000 ft.	Need well-oxygenated, gravel-bottomed shallows for spawning.
steelhead - central California coast ESU	Threatened	None	AFS-Threatened	From Russian River, south to Soquel Cr & to, but not including, Pajaro River. Also San Francisco & San Pablo Bay basins.	
steelhead - south/central California coast ESU	Threatened	None	AFS-Threatened; DFG-Species of Special Concern	Fed listing refers to runs in coastal basins from the Pajaro River south to, but not including, the Santa Maria River.	
steelhead - Central Valley ESU	Threatened	None	AFS-Threatened	Populations in the Sacramento and San Joaquin rivers and their tributaries.	
steelhead - northern California ESU	Threatened	None	AFS-Threatened; DFG-Species of Special Concern	Coastal basins from Redwood Creek south to the Gualala River, inclusive. Does not include summer-run steelhead.	
eulachon	Threatened	None	DFG-Species of Special Concern	Found in Klamath River, Mad River, Redwood Creek & in small numbers in Smith River & Humboldt Bay tributaries.	Spawn in lower reaches of coastal rivers w/ moderate water velocities & bottom of pea-sized gravel, sand & woody debris
Santa Ana sucker	Threatened	None	AFS-Threatened; DFG-Species of Special Concern; IUCN-Vulnerable	Endemic to Los Angeles Basin south coastal streams.	Habitat generalists, but prefer sand-rubble-boulder bottoms, cool, clear water, & algae.
vernal pool fairy shrimp	Threatened	None	IUCN-Vulnerable	Endemic to the grasslands of the Central Valley, Central Coast mtns, and South Coast mtns, in astatic rain-filled pools.	Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.
Delta green ground beetle	Threatened	None	IUCN-Critically Endangered	Restricted to the margins of vernal pools in the grassland area between Jepson Prairie and Travis AFB.	Prefers the sandy mud substrate where it slopes gently into the water, with low-growing vegetation, 25-100% cover.
valley elderberry longhorn beetle	Threatened	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.
Hippolyta frittilary	Threatened	None	XERCES-Critically imperiled	Coastal meadows in Del Norte County.	The larvae feed only on the foliage of the western dog violet (Viola adunca).
Bay checkerspot butterfly	Threatened	None	XERCES-Critically imperiled	Restricted to native grasslands on outcrops of serpentine soil in the vicinity of San Francisco Bay.	Plantago erecta is the primary host plant; Orthocarpus densiflorus & O. purpurscens are the secondary host plants.
Kern primrose sphinx moth	Threatened	None	XERCES-Critically Imperiled	Found in the Walker Basin, Kern Co., and several other scattered locations (Carrizo Plain, Pinnacles NM).	Host plant is Camissonia contorta epilobioides (evening primrose).
mountain plover	Proposed Threatened	None	ABC-Watch List of Birds of Conservation Concern; BLM-Sensitive; DFG-Species of	Short grasslands, freshly plowed fields, newly sprouting grain fields, & sometimes sod farms	Short vegetation, bare ground & flat topography. Prefers grazed areas & areas with burrowing rodents.
western yellow-billed cuckoo	Candidate	Endangered	USFS-Sensitive; USFWS-Birds of Conservation Concern	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.
Yosemite toad	Candidate	None	DFG-Species of Special Concern; IUCN-Endangered; USFS-Sensitive	Vicinity of wet meadows in central High Sierra, 6400 to 11,300 feet in elevation.	Primarily montane wet meadows; also in seasonal ponds associated with lodgepole pine and subalpine conifer forest.

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Table J-1. List of Animal Species Considered in this SEIR

Shasta salamander	None	Threatened	BLM-Sensitive; IUCN-Vulnerable; USFS-Sensitive	Cool, wet ravines and valleys; dominant vegetation is oak woodland or chaparral, also pine and fir, 100 to 2550 ft elevation.	Seeks cover under surface objects such as logs, rocks, and limestone slabs or talus, near limestone fissures or caves.
Siskiyou Mountains salamander	None	Threatened	IUCN-Endangered; USFS-Sensitive	Mixed conifer habitat of dense, pole-to-mature size, trees. Active above ground only during spring & fall rains.	Found under loose rock rubble at the base of talus slopes or under surface objects.
Scott Bar salamander	None	Threatened	IUCN-Vulnerable	Found only in the vicinity of the Scott River in Siskiyou County	
black toad	None	Threatened	DFG-Fully Protected; IUCN-Vulnerable	Found only in Deep Springs Valley, between the White and Inyo mountains, Inyo County, 5000-5200 feet in elevation.	Near springs, watercourses, marshes, & wet meadows. Seeks cover under & between clumps of vegetation or surface objects.
Swainson's hawk	None	Threatened	ABC-Watch List of Birds of Conservation Concern; IUCN-Least Concern; USFS-Sensitive;	Breeds in grasslands with 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.
California black rail	None	Threatened	ABC-Watch List of Birds of Conservation Concern; DFG-Fully Protected; IUCN-Near	Inhabits freshwater marshes, wet meadows & shallow margins of saltwater marshes bordering larger bays.	Needs water depths of about 1 inch that does not fluctuate during the year & dense vegetation for nesting habitat.
greater sandhill crane	None	Threatened	DFG-Fully Protected; USFS-Sensitive	Nests in wetland habitats in northeastern California; winters in the Central Valley.	Prefers grain fields within 4 mi of a shallow body of water used as a communal roost site; irrigated pasture used as loafing sites
bank swallow	None	Threatened	IUCN-Least Concern	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.
rough sculpin	None	Threatened	AFS-Vulnerable; DFG-Fully Protected; IUCN-Vulnerable	Restricted to the Pit River above and below the falls at Burney, & the Hat Creek & Fall River subdrainages.	Found mostly on the muddy bottoms of large streams.
longfin smelt	None	Threatened	DFG-Species of Special Concern	Euryhaline, nektonic & anadromous. Found in open waters of estuaries, mostly in middle or bottom of water column.	Prefer salinities of 15-30 ppt, but can be found in completely freshwater to almost pure seawater.
Cottonball Marsh pupfish	None	Threatened	AFS-Threatened	Two joined marshy areas in the northwest portion of Death Valley National Park.	Shallow pools with salinities from 14 to 160 ppt.
Nelson's antelope squirrel	None	Threatened	IUCN-Endangered	Western San Joaquin Valley from 200-1200 ft elev. On dry, sparsely vegetated loam soils.	Dig burrows or use k-rat burrows. Need widely scattered shrubs, forbs & grasses in broken terrain with gullies & washes
Mohave ground squirrel	None	Threatened	IUCN-Vulnerable	Open desert scrub, alkali scrub & Joshua tree woodland. Also feeds in annual grasslands. Restricted to Mojave Desert.	Prefers sandy to gravelly soils, avoids rocky areas. Uses burrows at base of shrubs for cover. Nests are in burrows.
Sierra Nevada red fox	None	Threatened	USFS-Sensitive	Found from the Cascades down to the Sierra Nevada. Found in a variety of habitats from wet meadows to forested areas.	Use dense vegetation & rocky areas for cover & den sites. Prefer forests interspersed w/ meadows or alpine fell-fields.
California wolverine	None	Threatened	DFG-Fully Protected; IUCN-Near Threatened; USFS-Sensitive	Found in the north coast mountains and the Sierra Nevada. Found in a wide variety of high elevation habitats.	Needs water source. uses caves, logs, burrows for cover & den area. Hunts in more open areas. Can travel long distances
southern rubber boa	None	Threatened	USFS-Sensitive	Restricted to the San Bernardino and San Jacinto mtns; found in a variety of montane forest habitats.	Found in vicinity of streams or wet meadows; requires loose, moist soil for burrowing; seeks cover in rotting logs.
Trinity bristle snail	None	Threatened	IUCN-Vulnerable	Known only from along a few streams in the Trinity River drainage.	Juveniles are found under bark of standing dead broadleaf trees, and the species may require this habitat.
Inyo Mountains slender salamander	None	None	BLM-Sensitive; DFG-Species of Special Concern; IUCN-Endangered; USFS-Sensitive	Moist canyons on the west & east slopes of the Inyo Mountains, where surface water is present.	Takes cover under rocks on moist sandy loam in steep-walled canyons with permanent springs. Also in underground crevices.
relictual slender salamander	None	None	DFG-Species of Special Concern; IUCN-Data Deficient; USFS-Sensitive	Mixed coniferous forest on the western slope of southern Sierra Nevada between Kings River drainage & Kern River Canyon.	Usually found under boards, rotting logs, rocks & surface litter. Surface activity limited to rainy winter months.
San Gabriel slender salamander	None	None	IUCN-Data Deficient; USFS-Sensitive	Known only from the San Gabriel Mtns. Found under rocks, wood, fern fronds & on soil at the base of talus slopes.	Most active on the surface in winter and early spring.

specific direct impact". (NOP at 7.) Here, however, it is important to recognize that the project involves no specific direct impact on any fish species of any practical importance, with direct impacts only upon benthic invertebrates. The Department should reject the notion that a "deleterious impact" might involve any impact whatsoever upon species listed under the state or federal Endangered Species Act, insofar as those statutes merely impose a duty upon the State to avoid jeopardizing the continued existence of the listed species. Rather, the Department should require, consistent with regulatory guidance issued under those statutes, that "deleterious effects" mean an appreciable and negative impact on populations of listed species, similar to the language proposed for non-listed fish species: "a substantial reduction in the range of any species, and/or extirpation of a population". In focusing upon population-level effects, the Department should not address effects on units of protected species which are any smaller than the management units defined for purposes of the state or federal Endangered Species Act.

Issues Concerning Land Use and Planning

Other commentators have provided the Department with substantial information concerning the federal regulatory scheme for mining on federal land, which describes most suction dredge mining in California. The Appendix G Guidelines ask, among other things, whether the project would "conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project . . .". The present claim of no conflict with such regulations (NOP at 76) does not appear to take account of federal land management agencies and their mining regulations.

Scope of Literature Reviewed

We understand that the CEQA documents at this stage might necessarily contain more speculative, subjective and qualitative information, to be refined in the course of the study. However, in assessing the significance of asserted impacts, it will be important to have a *quantitative* sense of whether or not suction dredge mining has appreciable impacts on fish populations.

The U.S. Forest Service commissioned such as study, engaging Professor Peter B. Bayley, of the Department of Fish & Wildlife at Oregon State University, to conduct a comprehensive study to assess asserted cumulative impacts on fish populations in the Siskiyou National Forest. His Final Report was issued in April 2003, and represents the only scientific study of which we are presently aware that has attempted to *measure* the asserted cumulative impacts of suction dredge mining (as opposed to merely speculating about possible effects in a qualitative manner). He concluded:

> "Localized, short-term effects of suction dredge mining have been documented in a qualitative sense. However, on the scales occupied by fish populations such local disturbances would need a strong cumulative intensity of many operations to have a measurable effect. Local information reveals that most suction dredge miners adhere more or less to guidelines that have recently been formalized by the Forest Service and generally in . . . Oregon, but there are

individual cases where egregious mismanagement of the immediate environment has occurred, particularly with respect to damaging river banks in various ways. This analysis cannot account for individual transgressions, and a study to do so at the appropriate scale would be very expensive if feasible.

"Given that this analysis could not detect an effect averaged over good and bad miners and that a more powerful study would be very expensive, it would seem that public money would be better spent on encouraging compliance with current guidelines than on further study".

This study corroborated the findings of numerous prior cumulative impact studies, all of which have previously been submitted to the Department in response to its October 2007 request for information. We trust that by the time the draft SEIR is issued, the Bayley study and other submitted materials will find their place above the more speculative references presently cited by the Department. *Cf., e.g.,* NOP at 95 (referencing "invertebrate productivity in subtropical black-water rivers"), 101 (fish behavior on "tropical reef").

Table 2. Summary of Suction Dredge Mining Effort

	MINERS SURVEYED	DREDGE SIZE	HOURS EFFORT
RECREATIONAL	154 (49%)	74% ≤ 4"	14,734 (20%)
PROFESSIONAL	163 (51%)	80% ≥ 4"	59,882 (80%)
TOTAL	317		74,616

Subjective aquatic and riparian assessments revealed that relatively few suction dredge miners are causing negative impacts. The majority of the miners (88%) were dredging according to DFG regulations. However, due to the large amount of dredging effort occurring in California streams annually (Table 3), there is the potential for significant environmental impacts that were not measured or quantified in this subjective and limited study. The dredging violations noted in this study revealed that 7% of the dredges were observed to have undercut the stream bank, 6% had channelized the stream to some degree, and 4% were responsible for riparian damage. These statistics also reflect the physical characteristics of the streams surveyed. Streams receiving the most dredging pressure, the north forks of the Yuba and American rivers for example, had relatively little riparian along the streambank. These rivers, *Heavy Metals*

For the unfiltered samples, two metals, copper and zinc, showed distinct increases downstream of the dredge (Fig. 8). Total copper increased approximately 5-fold and zinc approximately 9-fold at the transect immediately downstream of the dredge, relative to the concentrations measured upstream of the dredge. For both metals, the concentrations declined to near upstream values by 80 m downstream of the dredge. The pattern observed for total copper and zinc concentration is similar to that for turbidity and TFS (see Fig. 4), suggesting that the metals were in particulate form, or associated with other sediment particles. The results of sampling for dissolved heavy metals area are shown in Table 1. Zinc, arsenic, and copper displayed an average value downstream of the dredge that was greater than the average value measured upstream of the dredge (note that samples sizes are low, particularly upstream of the dredge). Copper displayed the greatest change, increasing by approximately 3-fold downstream of the dredge. Dissolved lead concentrations did not appear to be affected by operation of the dredge. Values of dissolved mercury actually were greater upstream of the dredge, suggesting that any effect of the dredge was likely within the range of natural variation. (The operator reported observing deposits of liquid mercury within the sediments he was working.) For both dissolved and total concentrations, budgetary limitations precluded multiple sampling across either space or time, thus the results of heavy metal sampling are only indicative of likely conditions.

Due to the low densities of macroinvertebrates in the dredge plume (and in the Fortymile in general) and the short exposure times, no macroinvertebrates were collected for heavy metal tissue analysis downstream of the suction dredge. However, results from the 1998 analysis of macroinvertebrate tissues suggest that these organisms are capable of concentrating heavy metals at least under conditions of chronic exposure. Although the data are preliminary in nature, several metals showed substantially greater concentration in the invertebrates from Polly Creek (mined) than from Alder Creek (reference), including mercury, zinc, molybdenum, and arsenic (Table 2). Other metals, such as copper and nickel, did not exhibit substantial differences between the two sites. The upwelling area identified by the USGS as a potential source of metals in the NF Fortymile did not appear to be influencing metal concentrations in macroinvertebrates.

EPA United States Environmental Protection Agency

Mercury Recovery from Recreational Gold Miners

The Challenge:

Looking for gold in California streams and rivers is a recreational activity for thousands of state residents. Many gold enthusiasts simply pan gravels and sediments. More serious recreational miners may have small sluice boxes or suction dredges to recover gold bearing sediments. As these miners remove sediments, sands, and gravel from streams and former mine sites to separate out the gold, they are also removing mercury.

This mercury is the remnant of millions of pounds of pure mercury that was added to sluice boxes used by historic mining operations between 1850 and 1890. Mercury is a toxic, persistent, and bioaccumulative pollutant that affects the nervous system and has long been known to be toxic to humans, fish, and wildlife.

The Solution:

Taking mercury out of streams benefits the environment. Efforts to collect mercury from recreational gold miners in the past however, have been stymied due to perceived regulatory barriers. Disposal of mercury is normally subject to all regulations applicable to hazardous waste.

In 2000, EPA and California's Division of Toxic Substance Control worked in concert with other State and local agencies to find the regulatory flexibility needed to collect mercury in a simple and effective manner. One approach was to add mercury to the list of materials that are collected at regularly scheduled or periodic household hazardous waste collection events sponsored by local county agencies.

Another mercury collection approach was to set up collection stations in areas where mercury is being found by recreational miners.

The Results:

In August and September, 2000 the first mercury "milk runs" collected 230 pounds of mercury. Not only was mercury received from recreational gold miners, but others such as retired dentists. The total amount of mercury collected was equivalent to the mercury load in 47 years worth of wastewater discharge from the city of Sacramento's sewage treatment plant or the mercury in a million mercury thermometers. This successful pilot program demonstrates how recreational gold miners and government agencies can work together to protect the environment

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December 17, 2007

BY EXPRESS MAIL AND E-MAIL

California Department of Fish and Game
Attn: Suction Dredge Mining Program
1416 Ninth Street. 12th Floor
Sacramento, CA 95814

Re: *October 19, 2007, Public Notice Soliciting Information Regarding Suction Dredge Mining*

Dear Sir or Madam:

Pursuant to the California Regulatory Notice Register 2007, Volume No. 42-Z at 1783, I am enclosing a set of pertinent studies and other materials on CD for your consideration in connection with issues pertaining to suction dredge mining. Also enclosed is a hard copy of the index to the materials on the CD.

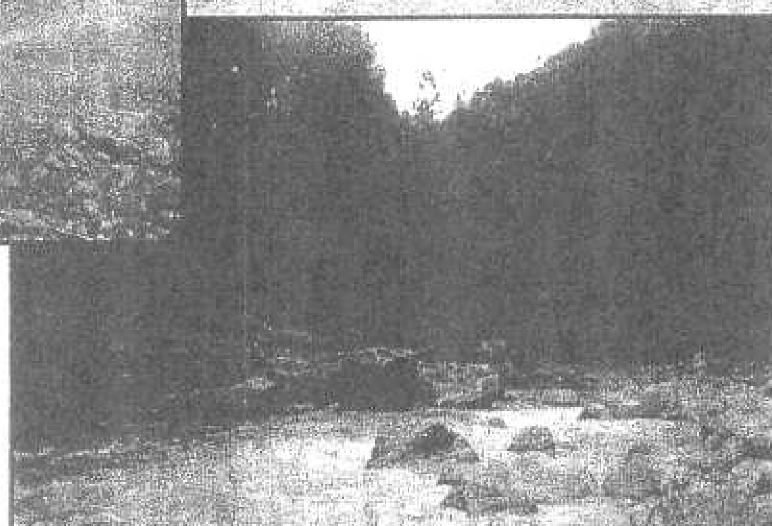
Sincerely,

James L. Buchal

USGS
science for a changing world

Prepared in cooperation with the Bureau of Land Management and the California State Water Resources Control Board

The Effects of Sediment and Mercury Mobilization in the South Yuba River and Humbug Creek Confluence Area, Nevada County, California: Concentrations, Speciation, and Environmental Fate—Part 1: Field Characterization



Open-File Report 2010–1325A

U.S. Department of the Interior
U.S. Geological Survey

In 1884, the Sawyer Decision halted most major hydraulic mining operations in the Sierra Nevada (Sawyer, 1884). However, additional mining took place after that time. After the Caminetti Act of 1893, hydraulic mining was allowed in the Sierra Nevada, provided that HMD was kept out of navigable waterways and off other people's property by containing it behind debris dams. In the SYR-HC confluence area, at the height of hydraulic mining activity, there was up to 30 vertical meters of HMD filling the original steep-walled canyons of the South Yuba River and Humbug Creek. Since 1884, much of the HMD has been eroded away in the river channel, leaving relic cliffs composed of HMD exposed along the canyon walls. Conditions at the confluence site are currently still subject to erosion because of the instability of HMD that makes up a large portion of the canyon walls in this reach of the South Yuba River. The bed of Humbug Creek is predominantly bedrock, whereas the bed of the South Yuba River is largely armored with cobbles and boulders, with finer sediment in the deeper pools. According to some suction-dredge miners, the cobble layer overlays deeper, relic fine-grained "slickens" layers from the hydraulic mining era that are rich in Au, amalgam, and Hg. The extent and distribution of the historical "slickens" layer are unknown, but this layer has been the focus of previous suction dredge operations and continues to be sought out because it often contains substantial Au and Hg-Au amalgam.

Field Methods: Sample Collection and Processing

The breadth of field methodology used in this study is in part because of the change in the project scope brought about by concern from the CRWQCB-CVR that the planned full-scale dredge test would negatively affect water quality and violate regulatory statutes. The resulting complex set of study elements refocused the study efforts toward a multidisciplinary characterization of the SYR-HC confluence area. Because the resulting study contains a diverse range of methods, specific methods and results for each study element are presented in separate, parallel subsections of the report.

Preliminary Dredge Test

Sample collection methods and experiment logistics were tested in a preliminary test on October 11, 2007, prior to a larger suction-dredge test scheduled for 2008. A standard 3-in. (7.6-cm) diameter suction dredge operated for a total of 3 hours in the South Yuba River about 500 m downstream from the SYR-HC confluence (fig. 2). Two transects across the South Yuba River were established approximately 30 and 60 m downstream from the first dredging location, by using taglines (fig. 2, table 1). These transects were used as the locations for sampling of water quality and suspended sediment throughout the test. During the first 2 hours of the test, the riverbed was dredged at a location at the upstream end of a pool, just below a riffle zone. During the third hour of the test, the dredge was moved to a second location approximately 10 m downstream from the first location to increase the amount of suspended sediment at the sampling transects.

instruments in similar environments (mid-channel, near the bed), some of the spatial differences in TSS concentration observed during non-dredging periods may reflect hydrologic variability within the cross section and along the stream reach studied.

The proportion of suspended sediment in the clay-size fraction (<0.002 mm) measured in-situ by the LISST increased dramatically during the dredge test at both the mid-pool and end-pool tagline locations (fig. 16). The proportion of suspended sediment in the clay-sized fraction (<0.002 mm) reached maxima around 27% at the mid-pool location and 47% at the end-pool location (fig. 16). It should be noted that the LISST measures any particle in suspension that diffracts light, including microbubbles that may have been introduced during the dredging activities. Thus, while it is likely that the reported spikes represent suspended particles because they were measured by both instruments, the composition of these very fine particles is unknown.

Concentrations of pTHg increased in a similar manner as TSS, with concentrations during the suction dredging two times the pre-dredging concentration and three to four times the concentration of the samples collected the following day (fig. 17). The consistency of the relation is because of the similar Hg concentration in the suspended sediment across samples. The dry-mass-normalized Hg content of the suspended material (Hg_{SS}) remained at approximately 300 ng/g throughout the test (fig. 18). This concentration is similar to that measured in sediment from the San Francisco Bay estuary (Bouse and others, 2010) and the fine-grained (<0.063 mm fraction) sediment excavated from Pit 1, a gravel-cobble bar on the South Yuba River, during September 2008 (discussed in a later section of this report).

Concentrations of fTHg in the South Yuba River during the dredge test were similar to those in the field blanks (table 4). The elevated concentration of the field blank compared to the laboratory blank water may have been caused by multiple sources of background contamination affecting field equipment and the filtration process. Efforts were made to keep equipment and blank water clean by using multiple layers of plastic bags, but the difficulty of site access and exposure to the weather increased the potential for equipment and blank-water contamination.

Dredging appeared to have no major effect on pMeHg concentrations in the South Yuba River during the dredge operations. Concentrations of pMeHg in environmental samples were approximately twice those in the field blanks (table 4) but did not change over time at the end-pool site (approximately 0.006 ng/L). Only one sample collected at the mid-pool site was analyzed for pMeHg as part of this methods-testing exercise, so no trend could be evaluated at that site. Concentrations of fMeHg were all below the method detection limit (MDL) of 0.040 ng/L except for one sample that was just above the MDL at 0.041 ng/L; however, this variation may not have been directly attributable to the dredge operations. Similarly, all samples for $pHg(II)_R$ analysis were below the MDL (table 4).

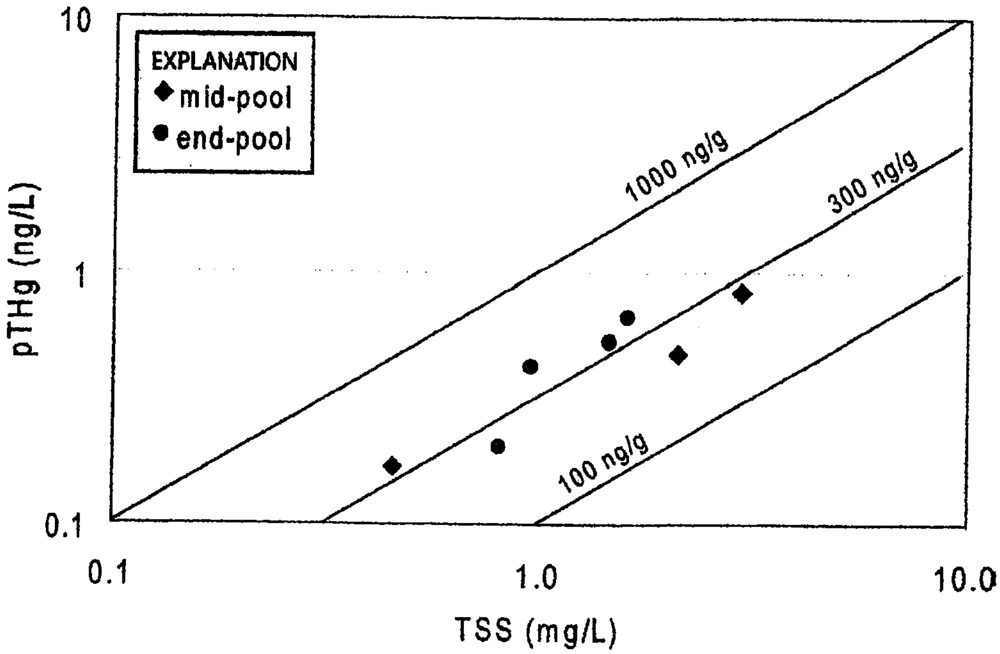


Figure 18. Log-log plot showing the relation between concentrations of total suspended sediment (TSS) and particulate total mercury (pTHg) at the mid-pool (blue symbols) and end-pool (pink symbols) sites during the October 2007 dredge test on the South Yuba River, California. Lines represent mass-based pTHg concentration.

Table 4. Mercury concentrations in water samples collected during the October 2007 dredge test, South Yuba River, California.

[MP, mid-pool; EP, end-pool; hrs, hours; µm, micrometer; THg, total mercury; MeHg, methylmercury, $Hg(II)_R$, reactive mercury (II); $Hg(II)_{R\text{-}ss}$, reactive mercury concentration of suspended sediment; TSS, total suspended sediment; p, particulate; f, filtered; ng/g, nanogram per gram (or part per billion); %, percentage; ng/L, nanogram per liter; mg/L, milligram per liter; $MeHg_{ss}$, methylmercury concentration of suspended sediment; MDL, method detection limit; <, less than; nd, not determined]

Site	Collection Date	Time relative to start of dredging (hours)	THg_{ss} (ng/g)	pTHg (ng/L)	fTHg (ng/L)	$MeHg_{ss}$ (ng/g)	pMeHg (ng/L)	fMeHg (ng/L)	$Hg(II)_{R\text{-}ss}$ (ng/g)	% $MeHg_{ss}$	% $Hg(II)_{R\text{-}ss}$	TSS (mg/L)
Field blank	11-Oct-07	-1	<MDL	<MDL	0.67	nd	nd	<MDL	<MDL	nd	nd	0.1
Field blank	12-Oct-07	24	<MDL	<MDL	0.38	nd	nd	<MDL	<MDL	nd	nd	0.0
SYR-MP	11-Oct-07	1.5	421	0.84	nd	nd	nd	0.015	<MDL	nd	nd	3.0
SYR-MP	11-Oct-07	3	440	0.48	0.57	5.2	0.012	0.021	<MDL	1.2	nd	2.1
SYR-MP	12-Oct-07	24	670	0.17	nd	nd	nd	0.041	<MDL	nd	nd	0.5
SYR-EP	11-Oct-07	-1	717	0.43	0.53	14.2	<MDL	<MDL	<MDL	2.0	nd	1.0
SYR-EP	11-Oct-07	1	338	0.54	0.47	8.4	<MDL	0.012	<MDL	2.5	nd	1.5
SYR-EP	11-Oct-07	3	510	0.68	0.53	5.9	<MDL	0.011	<MDL	1.2	nd	1.6
SYR-EP	12-Oct-07	24	410	0.20	1.08	13.3	<MDL	0.008	<MDL	3.2	nd	0.8

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Sediment Excavations

All sediment excavated from Pit 1, Pit 2, and the HMD-CF were dominated by coarse-grained material (table 2). For most samples, more than 60% of the mass was greater than 6.3 mm in diameter (fig. 22A). For the sediment <6.3 mm, only 0.03 to 5% was composed of silt-clay (<0.063 mm size fraction) (fig. 22B). Twenty to 35% of the sediment particles smaller than 1 mm were in the <0.25 mm fraction (fig. 22C). Overall, the HMD material from the actively eroding cliff was similar in particle-size distribution to sediment from the bottom two layers of Pit 2, especially with respect to the material <6.3 mm (fig. 22B) and material <1 mm (fig. 22C).

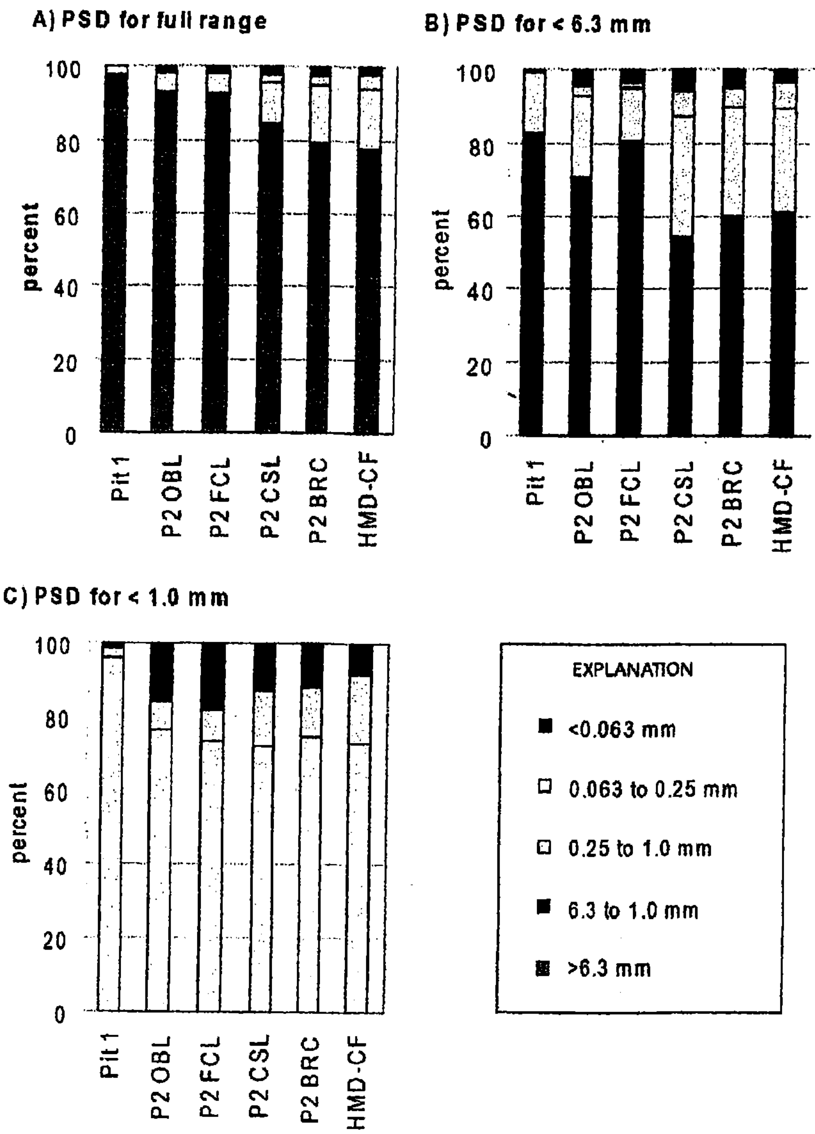

Figure 22. Stacked bar graphs showing the particle-size distribution for excavated sediment collected during September 2008 in the South Yuba River, California, for the following initial size ranges of material: (A) Full size range (non-sieved), (B) material less than 6.3 millimeters (1/4 inch), and (C) material less than 1 millimeter. Sample information is provided in table 2. Site names are abbreviated as follows: P2, pit 2; OBL, overburden layer; FCZ, first contact zone; CSL, compact sediment layer; BRC, bedrock contact; and HMD-CF, hydraulic mining debris cliff face.

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Additional information on particle-size distribution for excavated samples was provided by the laser-scattering analytical approach. Results indicate that Pit 1 sediment was coarser than that from the Pit 2 bedrock contact layer and from the eroding cliff HMD for material < 1.0 mm (fig. 23A). The laser-scattering approach further showed that the three samples analyzed had similar size distributions, although a slightly higher proportion of very fine-grained material was present in the HMD material for material <0.063 mm. For example, about 20% of the HMD sediment <0.063 mm was in the clay-size range (<0.002 mm) compared with about 14 to 18% of the material from Pit 1 and the Pit 2 bedrock contact, respectively (fig. 23B).

Concentrations of THg, $Hg(II)_R$, and organic content (loss on ignition) all increased with decreasing particle size (fig. 24, table 6). The concentration of THg in the coarsest size fraction (0.25 to 1.0 mm) ranged from 16 to 515 ng/g for Pit 1 and Pit 2-BRC, respectively. The concentration of THg in the intermediate size fraction (0.063 to 0.25 mm) ranged from 41 to 1,630 ng/g for Pit 1 and Pit 2 CSL, respectively. The THg concentration in samples from the finest size fraction (silt-clay, <0.063 mm) ranged from 147 ng/g in the Pit 2 OBL to 11,100 ng/g in the Pit 2 BRC. The percentage of $Hg(II)_R$ as a function of THg was somewhat variable across the sediment fractions. The highest values of $\%Hg(II)_R$ (17 to 27%) were observed in samples from the 0.063 to 0.25 mm size fraction of the Pit 2 CSL and BRC and in the <0.063 mm size fraction of the Pit 2 BRC (fig. 24D).

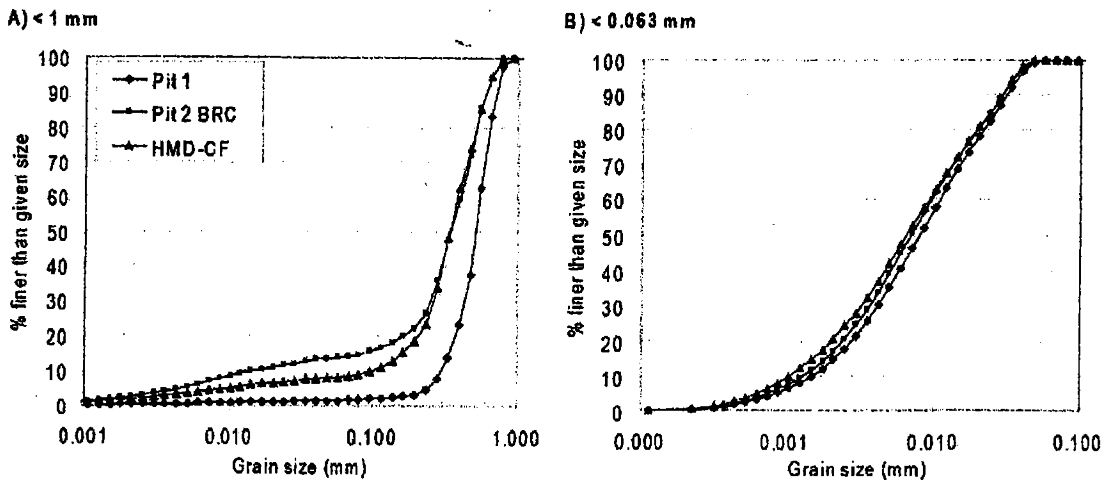

Figure 23. Cumulative particle-size-distribution plots of fine-grained material from three excavated sediment samples (Pit 1, Pit 2 bedrock contact, and cliff face of hydraulic mining debris) collected during September 2008 in the South Yuba River–Humbug Creek, California, confluence area, based on laser scattering. (A) Sand-silt-clay fraction (< 1.0 mm), and (B) silt-clay fraction (< 0.063 mm).

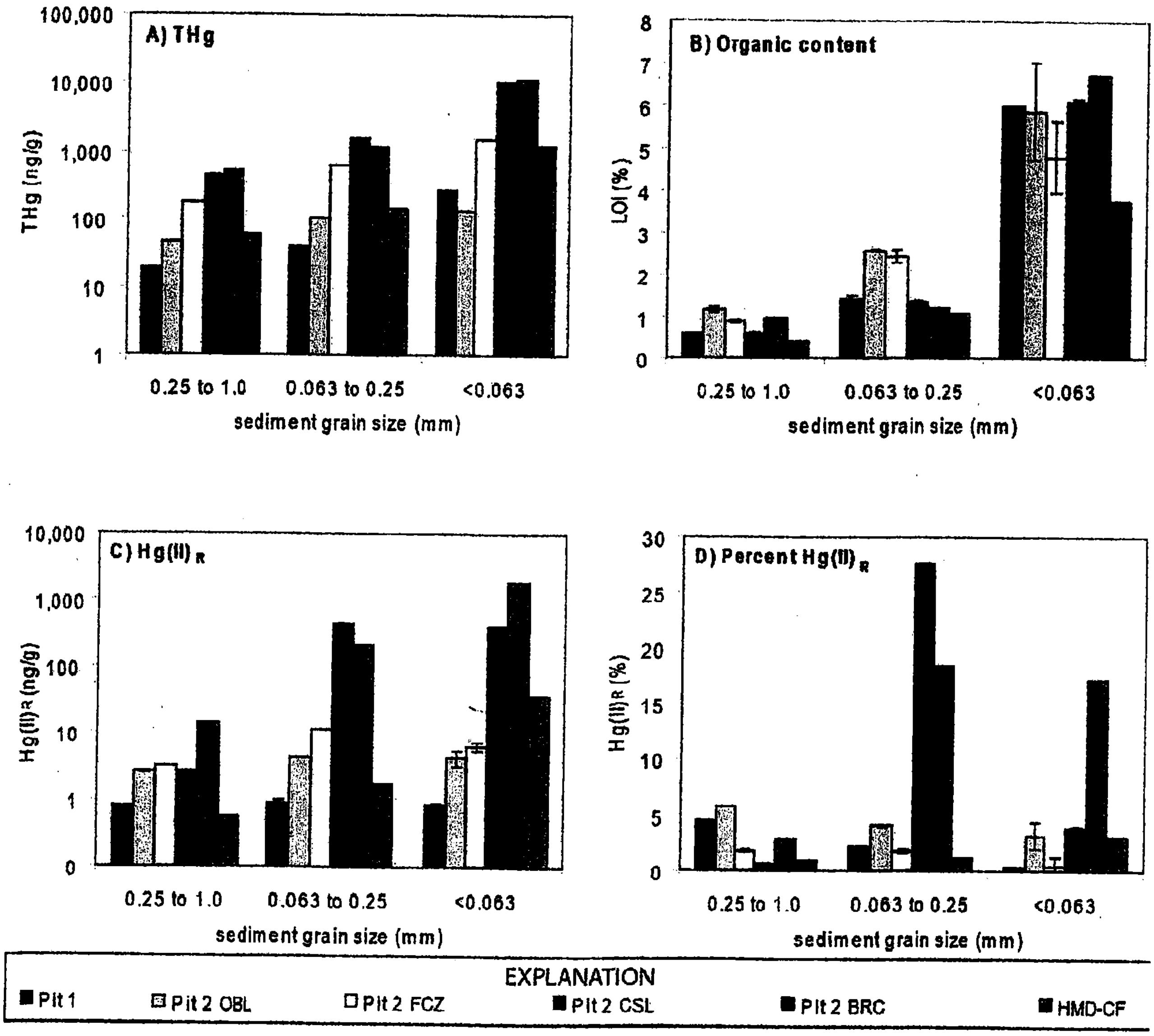

Figure 24. Bar graphs showing sediment concentrations of mercury species and organic content in three size fractions of excavated sediment collected during September 2008 in the South Yuba River-Humbug Creek, California, confluence area: (A) Total mercury (THg), (B) loss on ignition (LOI), (C) reactive mercury ($Hg(II)_R$), and (D) the percentage of THg as $Hg(II)_R$.

environments, particularly if material similar to the compact sediment (slickens) layer and bedrock contact zones are dredged. If the dredging activity is located in river-bar materials, the enhanced loads are based solely on the increase in fine-grained sediment mobilized. Under the latter scenario, approximately 100,000 to 1,000,000 hours of dredging with an 8-in.-diameter (20-cm) nozzle would be required to equal the THg load associated with natural particulate transport processes during an average dry year in the South Yuba River (figs. 38A and 38B, table 10). However, if material similar to the compact sediment and bedrock contact materials are dredged, sediment with much higher THg content would be mobilized, and only approximately 100 to 1,000 hours of dredging would be required to exceed an average dry year's natural watershed THg load (figs. 38C and 38D, table 10). These buried layers also correspond to the zones specifically targeted by the suction-dredging community because they are the zones most likely to contain recoverable grains of Au and Hg-Au amalgam.

Suction-dredging activity would have to increase to 10,000 to 100,000 hours to equal the long-term Hg accumulation rate in Englebright Lake (North, Middle, and South Yuba River watersheds combined with multiple large storm events). Although this represents a large amount of time, records from the California Department of Fish and Game indicate approximately 3,650 suction-dredge permits (3,200 resident and 447 non-resident) were issued statewide per year on average over the past 15 years (Horizon Water and Environment, 2009), implying only about 270 hours of dredging per permit per year are required to reach the 1,000,000 hour mark. This estimate of dredge time is reasonable for a statewide assessment but would be unlikely for only the South Yuba River. Furthermore, this estimate accounts for the dredging of the Hg-rich layers exclusively, a situation that is unlikely given the variable spatial distribution of these Hg-rich layers.

After the extensive characterization of the sediment and Hg contamination associated with the SYR-HC confluence area, the largest source of uncertainty in the calculated Hg mobilization rates are the actual dredging rates. Initial estimates (figs. 38A and 38B) were performed with published dredge rates (Keene Engineering, Inc., 2008). Revised calculations (figs. 38C and 38D) were based on dredge performance rates updated by Keene (P. Keene, Keene Engineering, Inc., written commun., 2010). Unfortunately, the rate at which sediment was moved during the dredge test was not quantified during this study, therefore this evaluation is based on qualitative observation only. However, actual dredge mobilization rates likely fall between the wide range of calculated rates. Future efforts to quantify sediment mobilization caused by recreational suction dredging should include the quantification of the dredge rate so that a more accurate assessment of Hg mobilization through dredging can be determined.

Another approach to comparing suction dredging to natural loading rates on a greater watershed scale can be derived from previous estimates of the contribution of suction dredging to natural suspended-sediment loads. The USFS estimated the contribution of suction dredging in the Siskiyou National Forest at 0.7% of the overall sediment load (Cooley, 1995). On the basis of the elevated concentrations of THg and $Hg(II)_R$ in the contaminated layers of the SYR-HC confluence area, the contribution of THg and $Hg(II)_R$ from dredging in hydraulic-mining affected sites increases approximately 100- to 500-fold, respectively. This amounts to a 70% contribution of THg and 350% of $Hg(II)_R$ from dredging relative to natural loads. However, this assumes that all the sediments mobilized in the watershed are contaminated to the same degree as the relic sediment layers at the SYR-HC confluence (Pit 2, CSL and BRC). A more conservative estimate of the proportion of relic sediment layers at a hydraulic-mining affected site (10%) still yields a 7% contribution of THg and 35% contribution of $Hg(II)_R$ relative to natural loads in watersheds where relic layers persist. These estimates are, like the previous analysis, dependent on numerous assumptions and estimates and thus possess a high degree of uncertainty.

Conclusions

Concentrations of Hg in surficial riverbed sediment, suspended sediment during storm events and a dredge test were in the range of concentrations observed in sediment elsewhere in the Yuba River watershed and in other Sierra Nevada watersheds affected by historical Au mining. However, buried sediment deposits had more elevated concentrations of Hg, especially in fine-grained fraction (<0.063 mm). The highest concentrations of Hg in sediment were in the bottom of a pit excavated near the mouth of Humbug Creek (Pit 2 compact sediment and bedrock contact zones), an area that appeared to have remained undisturbed for many decades, perhaps since the days of active hydraulic mining that ended in the late 1800s. These sediment layers were apparently protected from erosion during stormflows by boulders and the geometry of their location.

A closed-circuit tank experiment with a venturi pump at the base of a hand-excavated pit (Pit 1) in a gravel bar within the South Yuba River resulted in fine-grained suspended sediment remaining in suspension more than 40 hours following the disturbance simulation. Although the concentration of Hg in the water column declined over time as particles settled out, the concentration of THg and $Hg(II)_R$ on the suspended particles increased over time as coarser particles lower in Hg settled.

Concentrations of MeHg in invertebrates collected from Humbug Creek and the reach of the South Yuba River studied in this project were elevated compared with a control site (on the nearby Bear River) that was relatively unaffected by historical mining. Invertebrate MeHg concentrations were lower in 2008 than in 2007 in at least two of three sampled taxa at each of the five sites with comparable data in the South Yuba River and in Humbug Creek. One factor in the reduction in MeHg bioaccumulation in this area may have been a local moratorium on suction dredging that started in 2008. However, the data contained in this report are insufficient to determine the cause for this inter-annual variation. Further monitoring of MeHg in biota where previous data exist during the statewide suction-dredging moratorium that began in 2009 would be helpful in evaluating this possibility.

The removal of the protected, Hg-rich sediment layers by activities such as suction dredging or high-banking would likely result in increased loads of THg and $Hg(II)_R$ mobilized downstream in the fine-sediment fraction, which would likely not be caught with standard recovery equipment (such as the sluice box on a standard suction dredge). Mobilizing this Hg-rich sediment would increase downstream loads for long distances; fine particles would not settle until they reach quiescent environments such as Englebright Lake or downstream wetlands of the Sacramento River and San Francisco Estuary where the Hg-rich particles of silt and clay size may be deposited. Development and testing of enhanced recovery technologies for fine-grained sediment and Hg may be of interest for developing more effective Hg-removal techniques in remote locations such as the SYR-HC confluence area. In addition to the disturbance of buried sediment, an eroding cliff face composed of hydraulic mining debris may also be contributing a substantial load of THg and $Hg(II)_R$ to the South Yuba River though stream bank erosion.

as hosts, it is not possible to evaluate the risk that non-native fish pose. Based on an extensive survey of thousands of sites in the Intermountain west, Hovingh (2004) notes that *A. californiensis* now occupies streams and springs that are not actively managed for introduced sport fish.

CONSERVATION STATUS

A. californiensis / A. nuttalliana are highly vulnerable, and this clade has been extirpated from much of their historic range in Arizona, southern California, and Utah. This clade is probably also imperiled in Nevada, and populations sampled from multiple U.S. states in its historic range show evidence of inbreeding (Mock *et al.* 2010). Under the U.S. Endangered Species Act, distinct population segments of invertebrates cannot be listed as threatened or endangered. Thus, because *A. californiensis / A. nuttalliana* are a widespread clade and populations in Pacific Northwest states appear to be relatively stable, these animals are unlikely to receive protection under the U.S. Endangered Species Act until their taxonomy is resolved and new species names are given to genetically distinct populations.

A. californiensis was petitioned to be listed as threatened or endangered under the U.S. Endangered Species Act (ESA) in 1989 by Thomas Hulen of the Pueblo Grande Museum in Phoenix, AZ (Hulen 1989). In 1990, the U.S. Fish and Wildlife Service (FWS) determined that the petition did not present substantial information to indicate that listing *A. californiensis* as endangered or threatened was warranted, as it focused on the species status in Arizona, and did not include any information on status in the majority of the range of *A. californiensis* (USDI Fish and Wildlife Service 1990, Federal Register 55(209):43389). In this same finding, the Service added *A. californiensis* to their list of candidates for federal listing as a Category 2 candidate species (Federal Register 55(209):43389). In 1993, *A. californiensis* was again petitioned for listing under the ESA by the Oregon Natural Resources Council as part of a petition to list 83 mollusc species as endangered. In 1994, the FWS made a positive 90-day finding, but made a not-warranted 12 month finding in response to the petition to list *A. californiensis* as endangered (USDI Fish and Wildlife Service 1994, Federal Register 59(131):35305-35307). In that same Federal Register notice, the FWS stated that they lacked evidence of specific threats throughout the ranges of all 83 petitioned taxa, especially any threat associated with a population decline. They also noted that the taxonomic distinctiveness or validity of many of the 83 species had not yet been determined. *A. californiensis* was dropped as a candidate species when the FWS eliminated all Category 2 candidate species in 1996 (USDI Fish and Wildlife Service 1996, 59 FR 58982, 61 FR 7595-7613). *A. californiensis* remains a Federal Species of Concern (U.S. EPA 2002), although that designation provides no formal protection. In 2006, NatureServe assigned *A. californiensis* a global status of G3Q, meaning that this species is vulnerable and its taxonomy is in question (NatureServe 2010). In 2009 NatureServe assigned *A. nuttalliana* a global status of G4Q, meaning that it is apparently secure and its taxonomy is in question (NatureServe 2010).

To the best of the authors' knowledge, the winged floater (*Anodonta nuttalliana*) has never been petitioned for listing under the U.S. Endangered Species Act.

The conservation status of *A. californiensis / A. nuttalliana* in each U.S. and Mexican state and Canadian province where one or both species is known to occur is detailed below.

United States

Arizona

Arizona ranks *A. californiensis* as S1 or Critically Imperiled within the state (NatureServe explorer 2010). Freshwater mussels that occur in Arizona are all considered to be *Anodonta californiensis* (Culver *et al.* 2007). Historically, *A. californiensis* occurred in most of the major drainages of Arizona, including the Colorado River Basin (Black, Colorado, Gila, Little Colorado, Salt, San Pedro, Santa Cruz and Verde Rivers) and the Rio Yaqui Basin (San Bernadino River) (Culver *et al.* 2007). Currently, *A. californiensis* is only known from a few miles of perennially flowing waters in the Upper Black River of the Colorado River system (Culver *et al.* 2007, Myers 2005 unpublished) and Chevelon Creek in the Little Colorado River system (J. Sorensen, pers. comm. 2009).

In an unpublished document, T. Myers (2005) documents numerous *Anodonta* records from Arizona in recent and archeological history. From these records and his experience in the field (although he did not conduct systematic surveys), T. Myers suggests that *Anodonta* have likely been extirpated from the following places in Arizona: the lower mainstem of the Colorado River, the lower Gila River watershed, the Arizona portion of the Santa Cruz River watershed, the Tonto Basin, Phoenix Basin and New River in the Salt River watershed, the Verde River watershed, the west fork of the Black River in the Black River watershed, and the San Pedro River system in the San Pedro watershed.

Bequart and Miller (1973) document the extirpation of *A. californiensis* from numerous locations with historical records in Arizona: the Colorado River, the Little Santa Cruz River outside of Tucson, San Bernardino Ranch (Cochise County), Oak Creek Canyon (Cococino County), and the Little Colorado River near Springerville (Apache County). They note the considerable alterations that the Colorado River has undergone and doubt that *A. californiensis* still exists in the Colorado River. *A. californiensis* was apparently common and abundant in the Little Santa Cruz River outside Tucson, AZ in the late 1800's; but had been extirpated by the early 1900s (Bequart and Miller 1973). Bequart and Miller (1973) note that *A. californiensis* was widespread in Arizona a century ago and now is near extinction and suggest that the change is likely due to loss of host fish.

Although Bequart and Miller (1973) suggested that *A. californiensis* were extirpated from the entire Little Colorado River system, *Anodonta* valves were collected from Chevelon Creek in the Little Colorado River watershed and photographed by T. Myers in June of 2007 (J. Sorensen, pers. comm., 2009). T. Myers (2005) notes that in the Black River watershed, *Anodonta* are extant in the North Fork and East Fork of the Black River and Boneyard Creek. T. Myers (2005) suggests that *Anodonta* are 'apparently extant' in the upper tributaries of the Upper Rio Yaqui Watershed (which spans the Arizona, Sonora and Chihuahua in the U.S. and Mexico), at least in Rio Papigochic, Chihuahua (based on reports of local individuals in Chihuahua).

T. Myers notes that the status of *Anodonta* in Cibecue Creek, Canyon Creek and other drainages on Ft. Apache Indian reservation in the Salt River watershed and in the mainstem of the Black River in the Black River watershed is unknown (T. Myers 2005).

Preliminary genetic studies indicate that *Anodonta* collected from Arizona and Chihuahua, Mexico are different than the *Anodonta* collected from Jalisco, Mexico (Culver *et al.* 2007).

California

A. californiensis is ranked as S2 or Imperiled in California, whereas *A. nuttalliana* has not been ranked in the state (NatureServe 2010).

Southern California

Jeanette Howard conducted surveys at 42 historic (pre-1995) *Anodonta* sites in northern and southern California, and did not find *Anodonta* at any of the southern California sites searched. She found *Anodonta* at only nine of historic sites searched, all of which are in northern California, and concludes that *A. californiensis* has been extirpated from southern California. (Howard 2010).

In a 1981 publication, D. Taylor stated that *A. californiensis* is "probably extinct in most of the Central Valley and southern California. [...] Probably most natural populations in the state have been eradicated." A decade later, in a California Department of Fish and Game report, Coney compared specimens from the Los Angeles County Museum that were collected between 1912 and 1945 to his own collections made between 1984 and 1992, and concluded that *A. californiensis* had been extirpated from "all of southern California" (Coney 1993, C-7). He documented historical records of *A. californiensis* from the Los Angeles River, Arroyo Seco, East Park/Lincoln Park Lake, Silver Lake and Hollenbeck Park, and noted that in eight years of active searching, he has not turned up any *A. californiensis* (Coney 1993). Coney states that "Anodonta californiensis Lea, 1852, should be investigated for qualification of endangered species status" (Coney 1993, C-8).

Bequart and Miller (1973) note the considerable alterations that the Colorado River has undergone and doubt that *A. californiensis* still exists in the Colorado River.

Northern California

In 1981, D.W. Taylor published a distributional checklist of freshwater mollusks in California. He speculated that *A. californiensis, Gonidea angulata* and *Margaritifera falcata* had been extirpated from most of their original ranges in the state (Taylor 1981). Frest (1999) suggested that *A. californiensis* is apparently extinct in the upper Sacramento River.

More recently, Jeanette Howard conducted a systematic survey of 42 historic (pre-1995) *Anodonta* sites in California and found *Anodonta* at only nine of those sites searched, all of which are in northern California (Howard 2010). In 2008, J. Howard surveyed 115 sites in northern California, in the following National Forests: Plumas, Tahoe, El Dorado and Lake Tahoe Basin Management Unit. No live *Anodonta* were found during that survey, although *Anodonta* shells were found in Donner Lake. Howard notes that the Feather, Yuba, American, Truckee and Consumnes Rivers, and Lake Tahoe are impacted by some or all of the same factors that are implicated in the decline of freshwater mussels in eastern North America: damming, channel modification, agriculture and forestry (Western Mollusk Sciences 2008).

Response of fish to cumulative effects of suction dredge and hydraulic mining in the Illinois subbasin, Siskiyou National Forest, Oregon*

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April, 2003

* Final report from a study, Cumulative effects of mining activities on the Siskiyou National Forest, based on a Cost-Reimbursable agreement between the USDA Forest Service, Siskiyou National Forest and Oregon State University under the provisions of the National Agricultural Research, Extension and Teaching Policy Act of 1977 (Pub.L. 95-113), as amended by the Food Security Act of 1985 (7 U.S.C., 3319a Pub. L. 99-198).

Contents

P = 0.03) among the main effects. It's sign was negative, indicating that the greater the severity of this activity had been, the greater the reduction in salmonids over 1 year old.

Model diagnostics are critical to assess the appropriateness of the statistical procedure and assumptions. Theoretically, deviance residuals are expected to be approximately normal (Pierce and Schafer 1986), so models producing large departures should be viewed with suspicion. A normal probability plot of the deviance residuals suggested reasonable conformity (Fig. 20). A second issue is the independence of the data used. Although the inverse distance weighting effect gave more emphasis to land-uses occurring closer to the sample site, drainage areas of several sample points overlapped to varying degrees. Also the longitudinal movement of fish populations among adjacent sites sampled in the same year may be sufficient to render the samples non-independent statistically. Therefore, spatial autocorrelation among samples could occur to a degree that the key assumption of independence of samples would be questioned. To this end, the SMART samples were ordered according to proximity 'as the fish swims' and the corresponding deviance residuals from the model (Fig. 19C) tested for spatial autocorrelation. The mean correlation among the consecutively placed samples was 0.14 with a standard error of 0.13, so autocorrelation was not close to being significant.

As a matter of interest, Fig. 21 indicates through examples the predicted increase in salmonid density in summer pools that would be expected to occur if the prevailing negative effects on habitat of hydraulic mining did not exist.

Testing the Salmonid young-of-the year (YOY) response with similar models did not produce any significant coefficients of explanatory variables or their interactions. Similarly the stream width-to-depth ratio response using simple linear models produced no significant effects. In both cases SDM coefficients were in fact positive but not remotely significant at P>0.5.

6. Discussion and Conclusions

Analyses of observational field data sets can never be expected to produce strong results compared with laboratory or field experiments (Diamond 1986; Rose 2000). This is particularly true when the sampling study has not been designed to test the specific variable of interest. However, there are not realistic alternatives because this variable, suction dredge mining, cannot be controlled or easily measured over a sufficiently larger number of drainages to provide a design robust enough to account for confounding factors and provide enough statistical power.

The statistical analyses did not indicate that suction dredge mining has no effect on the three responses measured, but rather any effect that may exist could not be detected at the commonly used Type I error rate of 0.05. The fact that the analysis was able to detect a negative effect of another mining process, HM, on native salmonids, is an indication of the long-lasting effect that hydraulic mining has had on the environment, particularly on riparian zones and floodplain sections in geomorphically unconstrained reaches (Fig. 8).

The reader is reminded of the effect of scale. Localized, short-term effects of suction dredge mining have been documented in a qualitative sense. However, on the scales occupied by fish populations such local disturbances would need a strong cumulative intensity of many operations to have a measurable effect. Local information reveals that most suction dredge miners more or less adhere to guidelines that have recently been formalized by the Forest Service (Kevin L. Johnson and John Nolan, pers. comm.) and generally in the Oregon (Bernell et al. 2003), but there are individual cases where egregious mismanagement of the immediate environment has occurred, particularly with respect to damaging river banks in various ways. This analysis cannot account for individual transgressions, and a study to do so at an appropriate scale would be very expensive if feasible.

Given that this analysis could not detect an effect averaged over good and bad miners and that a more powerful study would be very expensive, it would seem that public money would be better spent on encouraging compliance with current guidelines than on further study.

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No. 85-1200

In the Supreme Court of the United States

OCTOBER TERM, 1986

CALIFORNIA COASTAL COMMISSION, ET AL., APPELLANTS

v.

GRANITE ROCK COMPANY

ON APPEAL FROM THE UNITED STATES COURT OF APPEALS FOR THE NINTH CIRCUIT

BRIEF FOR THE UNITED STATES AS AMICUS CURIAE SUPPORTING APPELLEE

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QUESTION PRESENTED

Whether the California Coastal Commission can require a quarry operator that conducts federally authorized mining activities on federal land to obtain a state coastal development permit under California's coastal zone management plan.

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INTEREST OF THE UNITED STATES

The United States encourages state development of coastal zone management programs through the Coastal Zone Management Act of 1972, 16 U.S.C. (& Supp. II) 1451 *et seq.* In addition, the United States manages federal lands through various statutes, including the Federal Land Policy and Management Act of 1976, 43 U.S.C. (& Supp. II) 1701 *et seq.*, the National Forest Management Act of 1976, 16 U.S.C. 1600 *et seq.*, and the Forest and Rangeland Renewable Resources Planning Act of 1974, 16 U.S.C. 1600 *et seq.* It specifically encourages hardrock mining on federal lands through the Mining Act of 1872, 30 U.S.C. 22 *et seq.*

STATEMENT

Congress enacted the Coastal Zone Management Act of 1972 (CZMA), 16 U.S.C. (& Supp. II) 1451 *et seq.*, to encourage state development of coastal zone management programs. California later enacted the California Coastal Act of 1976 (Coastal Act), Cal. Pub. Res. Code §§ 30000 *et seq.* (West 1977 & Supp. 1986), which "shall constitute California's coastal zone management program within the coastal zone for purposes of the [CZMA]" (§ 30008 (Supp. 1986)). The issue in this case is whether Granite Rock Company, a quarry operator that conducts limestone mining operations within the Los Padres National Forest in accordance with the Mining Act of 1872, 30 U.S.C. 22 *et seq.*, and Forest Service regulations, 36 C.F.R. Pt. 228, is subject to the California Coastal Act's permitting requirements. The district court concluded that it is. The court of appeals reversed, holding that federal law precludes the application of state permitting requirements.

1. a. The CZMA was enacted to encourage prudent use of coastal resources through the development and implementation of state management programs for the "coastal zone" (§ 303, 16 U.S.C. 1452). Section 304(a) of the CZMA defines the "coastal zone" to include coastal waters and submerged lands extending "seaward to the outer limit of the United States territorial sea" and shorelands extending "inland from the shorelines only to the extent necessary to control shorelands, the uses of which have a direct and significant impact on the coastal waters" (16 U.S.C. 1453(1)). Section 304(a) further states (*ibid.*):

> Excluded from the coastal zone are lands the use of which is by law subject solely to the discretion of or which is held in trust by the Federal Government, its officers or agents.

Department of Commerce regulations interpreting Section 304(a) require the states to exclude all federally-owned land from their coastal management programs.[1]

The CZMA authorizes the Secretary of Commerce to provide financial assistance to the states for development of their coastal zone management programs (§ 305, 16 U.S.C. 1454). The state program must be submitted for approval to the Secretary of Commerce (§ 305(h), 306(c), 16 U.S.C. 1454(h), 1455(c)), who assures that the views of the federal agencies principally affected have been adequately considered (§ 307(b), 16 U.S.C. 1456(b)). Once the state management program is approved, federal activities "affecting" the coastal zone are subject to vari-

[1] The pertinent regulation provides (15 C.F.R. 923.33(a)):

> *Requirement.* States must exclude from their coastal management zone those lands owned, leased, held in trust or whose use is otherwise by law subject solely to the discretion of the Federal Government, its officers or agents.

ous CZMA consistency requirements (§ 307(c), 16 U.S.C. 1456(c)).[3]

b. The California Coastal Act represents, in part, a response to the CZMA's coastal management incentives. The Coastal Act is intended to protect, enhance, and ensure orderly development of California's coastal zone resources (Coastal Act §§ 30001-30002). It specifically requires that, "[i]n addition to obtaining any other permit required by law * * *, any person wishing to perform or undertake any development in the coastal zone [other than certain facilities], shall obtain a coastal development permit" (§ 30600 (Supp. 1986)).

The Act creates the California Coastal Commission and six regional coastal commissions that implement the coastal management provisions (Coastal Act §§ 30300-30305). Each local government within the coastal zone must prepare a "local coastal program" (§§ 30510-30525) which consists of the "local government's (a) land use plans, (b) zoning ordinances, (c) zoning district maps, and (d) within sensitive coastal resources areas, other implementing actions, which, when taken together,

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[3] Section 307(c)(1) of the CZMA specifically provides that federal agencies "conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with approved state management programs" (16 U.S.C. 1456(c)(1)). Department of Commerce regulations implementing this provision require federal agencies to prepare a "consistency determination" identifying the direct effects of the federal activity and explaining how the agency has tailored its activity to achieve consistency with the state program. See 15 C.F.R. Pt. 930.

Section 307(c)(3)(A) imposes consistency requirements on most federal licensees and permittees. Applicants for federal licenses or permits are required to supply consistency certifications for any "activity affecting land or water uses in the coastal zone" (16 U.S.C. 1456(c)(3)(A)). The state is then given an opportunity to concur in the certification. If the appropriate state authorities decline to concur, the federal agency from whom the license or permit is sought must reject the application (*ibid.*). The state's veto can be overridden by the Secretary of Commerce, however, if the Secretary finds that the applicant's proposed activity is consistent with the CZMA or is otherwise necessary to support national security (*ibid.*).

meet the requirements of" the Coastal Act at the local level (§ 30108.6 (Supp. 1986)). Once the California Coastal Commission certifies the local coastal program, the local government is responsible for issuing (or declining to issue) coastal development permits (§ 30600(d) (Supp. 1986)). The local government may issue a permit only if "the proposed development is in conformity with the certified local coastal program" (§ 30604(b) (Supp. 1986). A permit is not required for developments that lie outside the coastal zone (§ 30604(d) (Supp. 1986)).

The California legislature specified that the Coastal Act "shall constitute California's coastal zone management program within the coastal zone for purposes of the [CZMA]" (Coastal Act § 30008 (Supp. 1986)). California submitted the Coastal Act, together with other state laws and programs, to the Secretary of Commerce for CZMA review. On November 7, 1977, the Secretary of Commerce approved California's coastal zone management program. 42 Fed. Reg. 60585. See *American Petroleum Institute* v. *Knecht*, 456 F. Supp. 889, 915 (C.D. Cal. 1978), aff'd, 609 F.2d 1306 (9th Cir. 1979).

2. Granite Rock is a California corporation engaged in the business of mining chemical grade white limestone. It presently holds unpatented federal mining claims under the Mining Act of 1872, 30 U.S.C. 22 *et seq.*, on federally owned lands within the Los Padres National Forest. J.S. App. A2.[3]

[3] The Mining Act states that, "[e]xcept as otherwise provided, all valuable mineral deposits in lands belonging to the United States * * * shall be free and open to exploration and purchase, and the lands in which they are found to occupation and purchase, by citizens of the United States" (30 U.S.C. 22). Persons who locate valuable mineral interests and properly stake their claims "shall have the exclusive right of possession and enjoyment of all the surface included within the lines of their locations" (30 U.S.C. 26). A mining claim is a vested possessory right comparable to an easement. *Black* v. *Elkhorn Mining Co.*, 163 U.S. 445, 450 (1896). The holder of a perfected mining claim may obtain a federal patent to the land by verifying his location of a valuable mining claim, complying with various notice and recording requirements, and paying required fees. See 30 U.S.C. 29; 43 C.F.R. Pt. 3860.

[Continued]

Granite Rock first proposed to develop its mining claims in 1980. The company submitted a five-year plan of operations to the Forest Service in accordance with federal regulations, set forth at 36 C.F.R. Pt. 228, governing mining activities on national forest lands (J.A. 25-34).[4] The Forest Service consulted with state agencies, conducted an environmental assessment, and approved a modified plan of operations in 1981 (*id.* at 35-57). Granite Rock initiated its open pit mining operations shortly thereafter. The California Coastal Commission received notice of Granite Rock's proposed plan of operations, but did not raise timely consistency objections, under Section 307(c)(3)(A) of the CZMA, to Granite Rock's proposal. Appellants' Br. 14, n.21; J.A. 17.

3. On October 17, 1983, the California Coastal Commission advised Granite Rock that the company's mining activities occur within California's coastal zone boundary

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[3] [Continued]

The federal government retains broad power over lands subject to mining claims. See *United States* v. *Locke*, No. 83-1394 (Apr. 1, 1985), slip op. 20. For example, the United States retains the right to protect the land from trespass or waste. *United States* v. *Nogueira*, 403 F.2d 816, 824 (9th Cir. 1968); *Teller* v. *United States*, 113 F. 273, 280-281 (8th Cir. 1901). The United States also retains extensive authority to regulate the activity of the mining claimant on its unpatented claims. *United States* v. *Goldfield Deep Mines Co.*, 644 F.2d 1307 (9th Cir. 1981); *United States* v. *Weiss*, 642 F.2d 296 (9th Cir. 1981). Finally, lands subject to an unpatented mining claim "remain open for public use except for the restrictions imposed where actual mining or prospecting operations are taking place." *United States* v. *Curtis-Nevada Mines, Inc.*, 611 F.2d 1277, 1285 (9th Cir. 1980) (footnote omitted).

[4] The Forest Service promulgated its mining regulations as an exercise of its general authority for management of the national forests. See Organic Administration Act of 1897, 16 U.S.C. 478, 551; see also 30 U.S.C. 612. The regulations, which are intended to "minimize adverse environmental impacts on National Forest System surface resources" (36 C.F.R. 228.1), require that holders of unpatented mining claims submit a mining plan describing the precise scope of proposed operations. 36 C.F.R. 228.4-228.5. The regulations also specify environmental quality, safety, restoration, fire prevention, access, and bonding requirements. See 36 C.F.R. 228.8-228.13. The regulations specifically require compliance with federal and state air quality, water quality, solid waste disposal, and fire prevention standards. 36 C.F.R. 228.8, 228.11.

and are therefore subject to regulation under the California Coastal Act (J.A. 22-23). It instructed Granite Rock "to apply to the Coastal Commission for a coastal development permit for any development, as defined in Section 30106 of the Coastal Act, at the site undertaken after the date of this letter" (*ibid.*).[5] Granite Rock immediately filed an action in the United States District Court for the Northern District of California requesting, inter alia, a declaration that the Coastal Commission has no authority to regulate Granite Rock's mining activities within the Los Padres National Forest (*id.* at 7-14).

The district court held that Granite Rock is subject to the Coastal Act's permitting requirements (J.S. App. A11-A32). The court first concluded that the CZMA's federal lands exclusion does not prevent Coastal Commission regulation (*id.* at A17-A23), stating that Congress "did not mean to shield from direct state regulation purely private activity such as commercial mining operations on federal land which are not subject to ultimate federal control" (*id.* at A23). The court then upheld the state permitting requirements under a general preemption analysis, reasoning that states possess concurrent authority to regulate activities on the federal lands in question (*id.* at A23-A31). The court stated that "[a]s long as the state's permit requirement does not render plaintiff's exercise of rights under the Mining Act impossible, no impermissible conflict exists" (*id.* at A28).

The court of appeals reversed (J.S. App. A1-A10). It stated that "even if we assume that the land in question falls within the coastal zone, the legislative history and certain provisions of the CZMA conclusively demonstrate that Congress intended the CZMA *not* to change the status quo with respect to the allocation of state and federal power over lands within the coastal zone" (*id.* at A6).

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[5] The Coastal Commission also instructed Granite Rock "to prepare and submit for Coastal Commission review and approval a certification of consistency" in accordance with Section 307(c)(3) of the CZMA. J.A. 22-23. The Commission has since conceded that its failure to raise timely consistency objections resulted in a waiver of its rights under the CZMA consistency provisions. Appellants' Br. 14, n.21; J.A. 17.

Applying federal preemption principles, the court concluded that "Forest Service regulations mandate that the power to prohibit the initiation or continuation of mining in national forests for failure to abide by applicable environmental requirements lies with the Forest Service" and that "an independent state permit system to enforce state environmental standards would undermine the Forest Service's own permit authority and thus is preempted" (*id.* at A9). It noted that its conclusion "is bolstered by the fact that even the Forest Service is limited in the amount of regulation it may impose as a condition of mining in national forests because of the federal policy to encourage mining on federal lands" (*ibid.*).

The California Coastal Commission appealed to this Court under 28 U.S.C. 1254(2).[6]

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[6] We suggest that this Court does not have appellate jurisdiction under 28 U.S.C. 1254(2). The court of appeals did not declare any portion of the California Coastal Act "invalid as repugnant to the Constitution, treaties or laws of the United States" (*ibid.*). Instead, "an exercise of authority under state law [was] invalidated without reference to the state statute" (*Silkwood* v. *Kerr-McGee Corp.*, 464 U.S. 238, 247 (1984)). *See Minnesota* v. *Alexander*, 430 U.S. 977 (1977) (dismissing, for want of jurisdiction, an appeal from a decision holding that Army Corps of Engineers dredging projects are exempt from state permitting authority); see also *Hancock* v. *Train*, 426 U.S. 167 (1976) (reviewing an invalidation of state permitting authority by writ of certiorari). And contrary to the Coastal Commission's contentions (Br. 3-4), an invalidation of state law was not the "necessary predicate" for the court's ruling. The California legislature apparently structured its Coastal Act to extend state jurisdiction over federal lands only to the extent that federal law would permit. See Coastal Act § 30008 ("within federal lands excluded from the coastal zone * * * the State of California shall, *consistent with applicable federal and state laws*, continue to exercise the full range of powers, rights, and privileges it now possesses or which may be granted") (emphasis added). Thus, the court of appeals' conclusion that federal law precludes state regulation does not invalidate the state statute. The Court may, of course, treat the appeal as a petition for certiorari. 28 U.S.C. 2103.

We note another potential jurisdictional defect in this case. Granite Rock's five-year plan of operations expired on February 26, 1986 (J.A. 54), and the company has not submitted a new plan for Forest Service review. Once a plan is submitted, Forest Service

INTRODUCTION AND SUMMARY OF ARGUMENT

The California Coastal Commission contends that Granite Rock Company—a quarry operator conducting mining operations on federal land pursuant to a federal mining claim and in accordance with federal regulations—is subject to the land use permitting requirements of California's coastal zone management program. We disagree. The Property Clause vests Congress with the power "to dispose of and make all needful Rules and Regulations respecting the Territory or other Property belonging to the United States" (U.S. Const. Art. IV, § 3, Cl. 2). Congress has not authorized—and, indeed, has forbidden—the California Coastal Commission's application of state coastal management requirements to federal lands. The Coastal Commission's proposed regulation is specifically prohibited by the CZMA's federal lands exclusion. It is also inconsistent with federal land use principles and the existing programs for managing mining activities on federal lands.

The CZMA directly answers the Coastal Commission's contentions. Section 304(a) of the CZMA provides that states must exclude from their coastal zone management programs "lands the use of which is by law subject solely to the discretion of * * * the Federal Government, its officers or agents". The Department of Commerce—the expert agency charged with implementation of the CZMA—has reasonably interpreted Section 304(a) to require that states exclude all lands "owned, leased, held in trust

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approval is neither automatic nor immediate; moreover, the California Coastal Commission may object, under the CZMA's consistency provisions, to the proposed plan. Hence, the past dispute in this case is arguably moot and any future dispute is arguably unripe. On the other hand, this Court could conclude that the questions presented by the parties should be resolved now because Granite Rock seeks declaratory relief, the issue may recur, and its resolution would materially aid Granite Rock in planning its future development activities. See *Pacific Gas & Electric Co.* v. *State Energy Resources Conservation and Development Comm'n*, 461 U.S. 190, 200-201 (1983). The Coastal Commission briefly discussed the mootness question (Br. 12 n.17). Should the Court desire further guidance on this question, we suggest that it order supplemental briefing by the parties and the United States.

or whose use is otherwise by law subject solely to the discretion of the Federal Government" (15 C.F.R. 923.33 (a)). Thus, California's coastal zone management program cannot be applied to federally-owned lands. Indeed, the CZMA specifically provides for state input to federal land use decisions affecting the coastal zone through the "consistency review" process (§ 307(c), 16 U.S.C. 1456 (c)). This further corroborates that the California Coastal Commission has no authority to regulate directly activities—including federally authorized mining activities—that occur on federal lands.

The CZMA's provisions reflect general principles of public land law that would preclude the Coastal Commission's proposed application of permitting requirements even in the absence of the CZMA's specific federal lands exclusion. The Property Clause gives Congress "power over the public lands 'to control their occupancy and use, to protect them from trespass and injury and to prescribe the conditions upon which others may obtain rights in them * * *.'" *Kleppe* v. *New Mexico*, 426 U.S. 529, 540 (1976) (quoting *Utah Power & Light Co.* v. *United States*, 243 U.S. 389, 405 (1917)). Congress, in turn, has given the Department of the Interior and other federal agencies broad authority to manage the federal lands. These agencies, rather than the states, are charged with primary responsibility for federal land management.

Congress has recognized the value of federal-state cooperation in managing the vast public domain. It has therefore employed a variety of mechanisms to give the states a voice in federal land use determinations. For example, the Federal Land Policy and Management Act authorizes the Secretary of the Interior to develop federal land use plans, for Bureau of Land Management lands, in coordination with state and local governments (43 U.S.C. 1712(c)(9)). The Forest and Rangeland Renewable Resources Planning Act contains similar coordination provisions (16 U.S.C. 1604(a)), and, as previously mentioned, the CZMA expressly requires consistency review. Furthermore, Congress, while encouraging private mining activities on federal lands through the Mining Act of 1872, has provided a specific mechanism for accommodating state land use interests. Section 601 of the Surface Mining Control and Reclamation Act authorizes the Secretary of the Interior to review, at the request of a Governor or an affected person, whether federal lands may be unsuitable for mining operations based on certain adverse impacts on adjoining lands (30 U.S.C. 1281).

In the present case, both Congress and the Forest Service have attempted to accommodate legitimate state interests. But the fact remains that federal law, rather than state law, ultimately governs the use of federal lands. Federal law—as expressed in the CZMA, the federal land management statutes, the Mining Act of 1872, Section 601 of the Surface Mining Control and Reclamation Act, and the Forest Service regulations—neither authorizes nor leaves room for the California Coastal Commission to apply its coastal zone management permitting requirements to mining activities occurring on national forest lands.

ARGUMENT

THE CALIFORNIA COASTAL COMMISSION CANNOT IMPOSE STATE LAND USE REQUIREMENTS UPON A QUARRY OPERATOR THAT CONDUCTS MINING OPERATIONS ON FEDERAL LAND

A. The Coastal Zone Management Act's federal lands exclusion exempts federal mining claims from regulation under state coastal management programs

The CZMA provides a direct and conclusive answer to the present case. Section 304(a) of the CZMA excludes from the state coastal zone regulation "lands the use of which is by law subject solely to the discretion of or which is held in trust by the Federal Government, its officers or agents" (16 U.S.C. 1453(1)). The Department of Commerce—the expert agency charged with implementing the CZMA—has concluded in its implementing regulations that Section 304(a) excludes federally-owned land from state regulation (15 C.F.R. 923.33(a)). There is no serious doubt that the Department's regulation is a reasonable interpretation of Section 304(a), that California has agreed to administer its state coastal management program in compliance with this regulation, and that the exclusion applies to all federally-owned lands.

The CZMA accordingly prohibits the California Coastal Commission from applying its permitting requirements to Granite Rock's mining activities within the Los Padres National Forest.

1. The Commerce Department has correctly interpreted Section 304(a) of the CZMA to exclude all federally-owned lands from state coastal management program regulation. The import of Section 304(a)'s language, while not completely free from ambiguity, is fairly discernible. It provides that, if the federal government has "sole[] * * * discretion" over the use of the lands in question, those lands are excluded from the state coastal management program. By its plain terms, it excludes lands that are subject to federal—rather than state—land use control. The exclusion must include, at a minimum, all federally-owned lands. Congress, by virtue of the Property Clause, has " 'complete power' " over their use. See, *e.g.*, *Kleppe* v. *New Mexico*, 426 U.S. 529, 540 (1976) (quoting *United States* v. *City of San Francisco*, 310 U.S. 16, 30 (1940) (footnote omitted)).[7]

The CZMA's legislative history supports that interpretation. Section 304(a)'s federal lands exclusion originated in the Senate bill's definition of the coastal zone. See S. 3507, 92d Cong., 2d Sess. § 304(a) (1972). The accompanying Senate report explained (S. Rep. 92-753, 92d Cong., 2d Sess. 9 (1972)):

> The coastal zone is meant to include the non-Federal coastal waters and the non-Federal land beneath the coastal waters, and the adjacent non-Federal shorelands including the waters therein and thereunder.

The report observed that, as a result of the bill's consistency requirements, "[a]ll federal agencies conducting or supporting activities in the coastal zone are required to administer their programs consistent with approved

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[7] "True, for many purposes a State has civil and criminal jurisdiction over lands within its limits belonging to the United States, but this jurisdiction does not extend to any matter that is not consistent with *full power* in the United States to protect its lands, *to control their* use and to proscribe in what manner others may acquire rights in them." *Utah Power & Light Co.* v. *United States*, 243 U.S. 389, 404 (1917) (emphasis added).

state management programs" (*ibid.*). It added, however, that the bill would not "extend state authority to land subject solely to the discretion of the Federal Government, *such as national parks, forests and wildlife refuges,* Indian reservations and defense establishments" (*ibid.* (emphasis added)).

The Senate's federal lands exclusion was included in the conference bill. The conference report explained (H.R. Conf. Rep. 92-1544, 92d Cong., 2d Sess. 12 (1972)):

> The Conferees also adopted the Senate language * * * which made it clear that Federal lands are not included within a state's coastal zone. As to the use of such lands which would affect a state's coastal zone, the provisions of section 307(c) [the CZMA consistency provisions] would apply.

The report added that "those lands traditionally managed by the Department of Interior or the Department of Defense, such as parks, wildlife refuges, military reservations, and other such areas covered by existing legislation, were specifically excluded from the coverage of the bill" (*id.* at 13). Furthermore, during the debate on the conference bill, Rep. Mosher, a member of the conference committee, stated that the bill "in no way affects the jurisdictional responsibilities of the Environmental Protection Agency, any other Federal agency, or the Department of the Interior in regard to the administration of Federal lands, since the conferees have specifically eliminated those land areas from the definition of coastal zone" (118 Cong. Rec. 35548 (1972)).[8]

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[8] The repeated observation by the conferees that Section 304(a) would exclude "federal lands" is significant. The term "federal lands" is generally used to describe all lands to which the United States holds title. See, *e.g.*, Alaska National Interest Lands Conservation Act, 16 U.S.C. 3102(2); Surface Mining Control and Reclamation Act, 30 U.S.C. 1291(4). See also U.S. Dep't of the Interior Bureau of Land Management, *Public Land Statistics 1985*, at 109; 1 Rocky Mountain Mineral Law Foundation, *American Law of Mining* § 3.02[1] (2d ed. 1985). Thus, the conferees presumably intended that Section 304(a) would exclude, at a minimum, *all* federally-owned lands. The Department of Commerce has concluded that Section 304(a)'s exclusion of lands "the use of which is by law subject solely to the discretion" of the federal government, encom-

Thus, the legislative history of Section 304(a) fully supports—indeed, probably compels—the Commerce Department's interpretation of the federal lands exclusion. That interpretation finds further support in an informal opinion from the Justice Department's Office of Legal Counsel (OLC), issued in 1976 (prior to the promulgation of the regulations), at the request of the General Counsel of the National Oceanic and Atmospheric Administration (NOAA) (J.A. 85-95).[9] The OLC opinion reviews the language and legislative history of Section 304 (a) in light of established principles of federal land law, concluding (J.A. 94):

> In short, the plain language of the statute appears to exclude all lands owned by the United States, since the United States has full power over the use of such lands and "sole discretion" with respect to such use. This conclusion is supported by the legislative history of the Act. Nowhere is there any suggestion that Congress intended to exclude some federal land from the Coastal Zone, and hence from State regulation, while including other such land within the Zone.

Finally, the Commerce Department's interpretation is consistent with the provision's apparent purpose—to preserve the independence of federal land use management decisions.[10] Section 304(a) protects the federal govern-

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passes lands leased to the federal government as well. See 15 C.F.R. 923.33.

[9] Congress has provided that executive agencies may request the Attorney General to render an opinion "on questions of law" arising in the administration of their departments (28 U.S.C. 512). The Attorney General has delegated authority to provide informal opinions to OLC (28 C.F.R. 0.25.). In this instance, the General Counsel of NOAA sought guidance whether the federal lands exclusion applied to all federally-owned lands or only to these lands subject to federal legislative jurisdiction pursuant to Article I, Section 8 of the Constitution. See J.A. 86.

[10] As the OLC opinion notes (J.A. 93-94), Section 304(a)'s language apparently originated in a Senate bill designed to encourage national land use planning. See S. 3354, 91st Cong., 2d Sess. § 305(b)(1)(A) (1970), *reprinted in* S. Rep. 91-1435, 91st Cong., 2d Sess. 10 (1970). Like the CZMA, that bill specified, as a requirement for federal funding, that state land use plans exclude "lands

ment's established prerogatives over federally-owned lands. See, *e.g.*, *Kleppe* v. *New Mexico*, 426 U.S. 529, 539-540 (1976). " 'A different rule,' as was said in *Camfield* v. *United States*, [167 U.S. 518, 526 (1897)], 'would place the public domain of the United States completely at the mercy of state legislation.' " *Utah Power & Light Co.* v. *United States*, 243 U.S. 389, 405 (1917). The Commerce Department's interpretation is, moreover, strongly supported by this Court's opinion in *Secretary of the Interior* v. *California*, 464 U.S. 312 (1984). The Court, in the course of describing the CZMA, gave Section 304(a) its natural reading, stating that the federal lands exclusion would "reach federal parks, military installations, Indian reservations, and other federal lands that would lie within the coastal zone but for the fact of federal ownership" (464 U.S. at 323).

In sum, the Commerce Department's interpretation of the CZMA's federal lands exclusion is consistent with the plain language of Section 304(a). To the extent that the statutory language is ambiguous, the agency's interpretation is reasonable and entitled to deference from the courts.[11]

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the use of which is by law subject solely to the discretion of or which is held in trust by the Federal Government, its officers or agents" (*ibid.*). The Senate report explained (*id.* at 38-39):

> Federal lands and Federal trust-Indian lands are excluded in order that the Federal Government's independence in the management of its lands will not be compromised. The Committee acknowledges the need for improved Federal land use policies * * * but feels that the comprehensive substantive planning responsibilities of the Federal Government with respect to Federal lands should be considered separately from the present legislation, in which the primary substantive responsibilities are vested in State agencies.

The Senate bill did not pass. Congress, however, ultimately did address federal land management through the Federal Land Policy and Management Act of 1976 (FLPMA), 43 U.S.C. 1701 *et seq.*, the National Forest Management Act of 1976, and the Forest and Rangeland Renewable Resources Planning Act of 1974, 16 U.S.C. 1600 *et seq.* See pages 21-25, *infra.*

[11] See, *e.g.*, *Japan Whaling Ass'n* v. *American Cetacean Society*, No. 85-954 (June 30, 1986), slip op. 11; *Young* v. *Community Nutrition Institute*, No. 85-664 (June 17, 1986), slip op. 5-7;

2. The district court, at the California Coastal Commission's urging, concluded that the CZMA's federal lands exclusion should not apply in this case because federal lands subject to mining claims are not "lands the use of which is by law subject solely to the discretion of * * * the Federal Government" (16 U.S.C. 1453(1)). See J.S. App. A17-A23; see also J.A. 22-23. The court of appeals did not reach that question. We note, in the event that the issue arises here, that the Coastal Commission's position is incorrect.[12]

FDIC v. *Philadelphia Gear Corp.*, No. 84-1972 (May 27, 1986), slip op. 13; *United States* v. *Riverside Bayview Homes, Inc.*, No. 84-701 (Dec. 4, 1985), slip op. 9-10; *Chemical Manufacturers Ass'n* v. *NRDC*, No. 83-1013 (Feb. 27, 1985), slip op. 9-10; *Chevron U.S.A. Inc.* v. *NRDC*, 467 U.S. 837, 843 (1984).

[12] The California Coastal Commission recently subscribed to its novel interpretation of Section 304(a) in approving the Local Coastal Program for the Big Sur Coast of Monterey County. That local coastal program states:

> As provided by the Federal Coastal Zone Management Act of 1972 (CZMA), lands subject to exclusive federal jurisdiction, such as the Naval Facility at Pt. Sur, are not subject to Coastal Commission or County jurisdiction. However, when federally owned lands are opened to non-federal development, such developments are subject to coastal permit requirements. Accordingly, the land use designations shown for federal lands are for the purpose of regulating future non-federal development, if any. Federal projects on excluded lands will be addressed by the federal consistency process as provided by the CZMA.

Big Sur Coast, Land Use Plan, Local Coastal Program, Monterey County, California 81 (approved April 10, 1986). This plan plainly departs from the Commerce Department's regulations and the Coastal Commission's prior representations that "all lands owned by the Federal government are excluded from the California coastal zone" (J.A. 106). It has not been submitted to the Department of Commerce for approval as an amendment to the California Coastal Zone Management program. See 16 U.S.C. 1455(g); 15 C.F.R. 923.80. The Coastal Commission's unilateral redefinition of the federal lands exclusion is inappropriate in light of the CZMA's requirement that state programs comply "with rules and regulations promulgated by the Secretary" (16 U.S.C. 1455(c)(1)). The CZMA cannot function effectively if the states, upon program approval, engage in creative reinterpretation of the CZMA's basic terms.

The scope of the federal lands exclusion has already been conclusively determined by the Commerce Department's unambiguous and authoritative regulatory construction, which the district court failed even to acknowledge. The Commerce Department has excluded, without qualification, all federally owned lands (15 C.F.R. 923.-33), the CZMA requires California to comply with that regulation (16 U.S.C. 1455(c)(1)), and California has previously agreed that "all lands owned by the Federal government are excluded from the California Coastal zone" (J.A. 106). California must adhere to the Commerce Department's settled interpretation of the federal lands exclusion. In all events, California's competing interpretation is inconsistent with the language, legislative history, and purpose of Section 304(a).

Congress, in the exercise of its "complete power" over federal land use (see page 11, *supra*), may open federal lands to private mining, as it did in the Mining Act of 1872. That action, prescribing an allowable land use, does not curtail the federal government's "sole[] * * * discretion" (16 U.S.C. 1453(1)) over the lands in question. The government retains sole power to dictate the land's use. See *United States* v. *Coleman*, 390 U.S. 599, 602 (1968). ("Under the mining laws Congress has made public lands available to people for the purpose of mining valuable mineral deposits and not for other purposes." (footnote omitted)). A person who acquires a mining claim receives certain rights of possession (30 U.S.C. 26), but neither he nor any other entity shares the government's discretion to prescribe how the land shall be used. The claimant is entitled to use the property only for the purposes specified by Congress, and he is divested of his rights if he fails to take necessary steps toward those ends. See 30 U.S.C. 28; 43 U.S.C. 1744(a); see generally 2 Rocky Mountain Mineral Law Foundation, *American Law of Mining* chs. 45-46 (2d ed. 1985). Thus, the plain language of Section 304(a) supports the conclusion that the federal lands exclusion remains applicable to lands subject to a mining claim.[13]

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[13] Congress has authorized a variety of other possessory interests in federal lands, including oil and gas leases issued pursuant to the

The legislative history of Section 304(a) indicates that the federal lands exclusion extends, without qualification, to *all* federally-owned lands. As the OLC opinion notes (J.A. 94), "Nowhere is there any suggestion that Congress intended to exclude some federal land from the Coastal Zone, and hence from State regulation, while including other such land within the Zone." The legislative reports contain no suggestion that the federal lands exclusion dissipates if federally-owned lands are opened to non-federal development. They focus solely on whether the acreage in question is "Federal" or "non-Federal" land. See H.R. Conf. Rep. 92-1544, *supra*, at 12; S. Rep. 92-753, *supra*, at 9. See also 118 Cong. Rec. 35548 (1972) (the bill does not affect the "administration of Federal lands"). The congressional committees are, of course, familiar with federal lands terminology. They undoubtedly understood that federally-owned lands subject to mining claims are "federal" lands. See *United States* v. *Fickett*, 205 F. 134 (9th Cir. 1913); 1 Rocky Mountain Mineral Law Foundation, *American Law of Mining* § 3.02 (2d ed. 1985).

The purposes of Section 304(a) are best served by exclusion of all federally owned lands, whether or not subject to mining claims. As previously explained (pages

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Mineral Leasing Act, 30 U.S.C. 181 *et seq.*, term permits for public recreation facilities in National Forests issued pursuant to 16 U.S.C. 497, and permanent rights of way across federal lands that are available under a variety of statutes. See, *e.g.*, *Ventura County* v. *Gulf Oil Corp.*, 601 F.2d 1080 (9th Cir. 1979), aff'd, 445 U.S. 947 (1980); *Union Oil Co.* v. *Morton*, 512 F.2d 743 (9th Cir. 1975) (oil and gas leases); *Wilson* v. *Block*, 708 F.2d 735, 756-760 (D.C. Cir. 1983) (recreation facility permit); *Wilderness Society* v. *Morton*, 479 F.2d 842, 853-854 (D.C. Cir. 1973) (pipeline right-of-way). Some of these possessory rights are property within the meaning of the Fifth Amendment. But in each case, the federal government retains title in fee to the underlying land, the right to restrict the grantee's use of the property to the limitations and purposes of the grant, and the right to manage the property for other purposes not inconsistent with the granted rights. See *United States* v. *Curtis-Nevada Mines, Inc.*, 611 F.2d 1277, 1285 (9th Cir. 1980); see also *United States* v. *Gates of the Mountains Lakeshore Homes, Inc.*, 732 F.2d 1411 (9th Cir. 1984). In each case, the government retains sole discretion over ultimate land use.

13-14, *supra*), the federal lands exclusion is intended to preserve the independence of federal land use management decisions. Federal management of public domain, multiple-use lands such as those held by the Forest Service and the Bureau of Land Management, is, in large part, a determination of where, and under what conditions, private members of the general public will be allowed to use those lands. These management decisions may result in limited property interests such as leaseholds, easements, or, as in this case, mining claims.[14] The creation of limited private rights in the use of public domain lands is a normal and expected result of federal management of those lands. If the creation of such private rights negated the CZMA's federal land exclusion and subjected the affected federal lands to state management and control, the independence of federal land management, as well as the need for any CZMA consistency review, would be effectively eliminated.[15]

Furthermore, the application of California's Coastal Act permitting requirements would, at best, simply duplicate other regulatory requirements. As the Coastal Commission repeatedly concedes (Br. 15, 38, 45), it cannot apply the Act to prohibit mining on federal lands; in-

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[14] See note 13, *supra*. The federal management action may also result in permits or licenses to use federal property that do not rise to the status of property rights but are nevertheless subject to revocation by the federal government only if certain procedural guarantees are respected. See, *e.g.*, 5 U.S.C. 558(c); *Holland Livestock Ranch* v. *United States*, 655 F.2d 1002 (9th Cir. 1981). Cf. *United States* v. *Fuller*, 409 U.S. 488 (1973). Or the result may be the creation of contractual rights to take or harvest the resources of the public domain. See 16 U.S.C. 472a (permitting the sale of "trees, portions of trees, or forest products located on National Forest System lands").

[15] Congress has expressly recognized the national interest in encouraging mining activities. See Mining and Minerals Policy Act of 1970, 30 U.S.C. 21a; see also FLPMA, 43 U.S.C. 1701(a)(12); National Materials and Minerals Policy, Research, and Development Act, 30 U.S.C. 1601 *et seq.* Federal lands must be managed in light of the competing federal policies of mineral development and environmental protection. The federal government, rather than an individual state, should strike the balance between potentially conflicting national goals.

stead, it seeks to impose its permitting requirements as "an administrative vehicle for attaching non-prohibitory environmental conditions for mining" (*id.* at 38).[16] But the federal regulatory regime already protects state coastal management and environmental interests. In our view, the CZMA's consistency requirements apply fully to the Forest Service's approval of a mine operator's plan of operations affecting a land or water use of California's coastal zone. See 15 C.F.R. 930.51. California is free to invoke this congressionally authorized mechanism to protect its legitimate interests. The imposition of a separate state regulatory regime, with its attendant expenses and delays, would likely hamper the congressional goal of encouraging mining on federal lands.

Thus, we submit that the CZMA's federal lands exclusion applies with dispositive force in this case and precludes the California Coastal Commission from applying its coastal management permit requirements to mining activities conducted on federal lands.

[16] Although the Coastal Commission disclaims any intention to prohibit mining, it presumably would refuse to issue a permit—and thereby impose a mining prohibition—if Granite Rock failed to comply with its "non-prohibitory environmental conditions." Thus, the Commission would exercise what are, in effect, prohibitory powers. See *Hancock* v. *Train*, 426 U.S. 167, 180 (1976). Notably, it is far from clear that a coastal development permit is either needed or can function effectively as an "administrative vehicle." A coastal development permit is issued "[i]n addition to * * * any other permit required by law" (Coastal Act § 30600) and is issued only if "the proposed development is in conformity with the certified local coastal program" (§ 30604(b)). Hence, a coastal development permit has the singular purpose of assuring consistency with local coastal *land-use* plans and is unmistakably a land-use permit. The California courts have repeatedly stated that a coastal development permit is a land-use permit and that judicial review of the permitting decisions is pursuant to the state law standards for review of adjudicatory land-use decisions. See, *e.g.*, *Liberty* v. *California Coastal Comm'n*, 113 Cal. App. 3d 491, 498, 170 Cal. Rptr. 247, 251 (1980) (parking regulation); *Patterson* v. *Central Coast Regional Coastal Zone Conservation Comm'n*, 58 Cal. App. 3d 833, 130 Cal. Rptr. 169 (1976) (subdivision requirements). See also *Rea Enterprises* v. *California Coastal Zone Conservation Comm'n*, 52 Cal. App. 3d 596, 617-618 n.4, 125 Cal. Rptr. 201, 215-216 n.4 (1975) (Ashby, J., dissenting) (residential construction).

B. Even in the absence of the CZMA's federal lands exclusion, the California Coastal Commission could not apply its coastal management permitting requirements to federally authorized activities conducted on federal lands

The California Coastal Commission does not address the CZMA's federal lands exclusion. Instead, it characterizes the issue here as whether ordinary federal preemption principles require displacement of state "environmental regulation" (Br. i, 18). But this is not an ordinary preemption case. And the issue is not simply whether the state may impose pollution controls. The question here is whether *federally owned land* is subject to *local land use planning* (see note 16, *supra*). The Property Clause vests Congress with the power to determine appropriate uses of federal lands. Congress, exercising this plenary power, has enacted both comprehensive federal land use regimes and specific laws governing mining that provide mechanisms for federal-state consultation and coordination. Accordingly, even if the CZMA's federal lands exclusion and consistency review provisions were ignored, federal law would preclude direct application of local land use permitting requirements.

1. Congress, through the Property Clause, "exercises the powers both of a proprietor and of a legislature over the public domain." *Kleppe* v. *New Mexico*, 426 U.S. at 540. It has "power over the public lands 'to control their occupancy and use, to protect them from trespass and injury and to prescribe the conditions upon which others may obtain rights in them * * *.'" *Ibid.* (quoting *Utah Power & Light* v. *United States*, 243 U.S. at 405). This Court has "repeatedly observed that '[t]he power over the public land thus entrusted to Congress is without limitations.'" *Kleppe*, 426 U.S. at 539 (quoting *San Francisco*, 310 U.S. at 29). The Property Clause "permit[s] 'an exercise of the complete power which Congress has over particular public property * * *.'" *Kleppe*, 426 U.S. at 540 (quoting *San Francisco*, 310 U.S. at 30).

The federal government's legislative and proprietary power over federal lands necessarily limits the states' authority to regulate those lands.[17] This Court has not given precise definition to the preemptive qualities of the Property Clause. However, it is clear that federal lands are not "subject to the jurisdiction, powers and laws of the State in the same way and to the same extent as are similar lands of others." *Utah Power & Light Co.*, 243 U.S. at 404. State law "does not extend to any matter that is not consistent with full power in the United States to protect its lands, to control their use, and to prescribe in what manner others may acquire rights in them" (*ibid.*).[18]

It is not necessary in this case to determine whether the Property Clause, of its own force, precludes application of state land use regimes to federal lands. The Clause, "in broad terms, gives Congress the power to determine what are 'needful' rules 'respecting' the public lands." *Kleppe*, 426 U.S. at 539. Congress, in response, has enacted federal land management statutes (in addition to specific mining laws) that specify the state role

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[17] See, *e.g.*, *Hancock* v. *Train*, 426 U.S. 167, 179 (1976) ("where 'Congress does not affirmatively declare its instrumentalities or property subject to regulation,' 'the federal function must be left free' ") (quoting *Mayo* v. *United States*, 319 U.S. 441, 447, 448 (1943) (footnote omitted)).

[18] The Property Clause plainly forbids the states from authorizing the use of unoccupied federal lands. "[T]he settled course of legislation, congressional and state, and repeated decisions of this court have gone upon the theory that the power of Congress is exclusive and that only through its exercise in some form can rights in lands belonging to the United States be acquired." *Utah Power & Light Co.*, 243 U.S. at 404. The degree to which the Property Clause correspondingly limits the states' power to restrict the use of federal lands, however, has never been definitively settled. This Court suggested in *Omaechevarria* v. *Idaho*, 246 U.S. 343 (1918), that states may have power to restrict incidentally private uses of federal land where Congress has not spoken and the purpose of the regulation is otherwise within the legitimate powers of the state. It upheld an Idaho statute that prohibited grazing sheep on public lands that had been used for grazing cattle, emphasizing that the federal government had not actively managed the land, that the statute did not attempt to grant a right to use the lands, and that the state provision was "enacted primarily to prevent breaches of the peace." *Id.* at 352.

in the federal land use planning process. See Federal Land Policy and Management Act of 1976 (FLPMA), 43 U.S.C. 1701 *et seq.*; National Forest Management Act of 1976 (NFMA) and Forest and Rangeland Renewable Resources Planning Act of 1974 (FRRRPA), 16 U.S.C. 1600 *et seq.* These statutes, like the CZMA (see pages 11-18, *supra*), demonstrate that the federal government, rather than the states, controls land use decision-making over the public domain.

The FLPMA establishes a federal land use management program for "public lands" (43 U.S.C. 1702(e)) within the jurisdiction of the Department of the Interior's Bureau of Land Management (BLM). Section 202(a) of the FLPMA authorizes the Secretary of the Interior to "develop, maintain, and, when appropriate, revise land use plans which provide by tracts or areas for the use of the public lands" (43 U.S.C. 1712(a)). It specifically directs the Secretary, in developing these plans, to coordinate federal planning and management activities with the programs of state and local government, to keep apprised of state and local plans and to provide meaningful involvement for state and local officials (43 U.S.C. 1712(c)(9)). Section 202 further provides (*ibid.*):

> Land use plans of the Secretary under this section shall be consistent with State and local plans to the maximum extent he finds consistent with Federal law and the purposes of this Act.

Thus, the FLPMA specifically defines the state's role in the authorized federal land use planning process. The federal government retains ultimate control over federal land, but the policies of local land use plans will be reflected in federal plans to the extent that it is consistent with federal objectives to do so.[19]

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[19] The legislative history of Section 202 demonstrates that Congress intended to *preserve* exclusive federal control over federal land use decisions. The Conference Report states (H.R. Rep. 94-1724, 94th Cong., 2d Sess. 58 (1976)):

> The conferees adopted a consolidation of the Senate and House provisions for coordination of BLM land use planning with Federal, State, local governments, and Indian tribes, with revisions making clear that the ultimate decision as to deter-

The National Forest System is subject to a similar federal land management scheme. At the time of the FLPMA's enactment, Congress, through the FRRRPA, had already established a comprehensive land use planning regime for these lands.[20] Congress therefore concluded that it was unnecessary to extend the FLPMA's land use planning provisions to National Forest System lands. See 122 Cong. Rec. 23448-23450 (1976). Congress, instead, supplemented and revised the FRRRPA through the NFMA.

The NFMA/FRRRPA regime, like the FLPMA scheme, provides a well-defined role for the states in federal land

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> mining the extent of feasible consistency between BLM plans and such other plans rests with the Secretary of the Interior. This affirmed the need to maintain the integrity of governing Federal laws and Congressional policies.

See also H.R. Rep. 94-1163, 94th Cong., 2d Sess. 5, 7 (1976); S. Rep. 94-583, 94th Cong., 1st Sess. 45 (1975). FLPMA, by contrast, does require that federal land use plans *comply* with state "pollution control laws" (43 U.S.C. 1712(c)(8)). And FLPMA provides that federally granted rights-of-way shall "require *compliance* with State standards for public health and safety, environmental protection, and siting, construction, operation, and maintenance of or for rights-of-way for similar purposes if those standards are more stringent than applicable Federal standards" (43 U.S.C. 1765(a) (emphasis added)). Thus, when Congress wished to subject federal lands to state law, it made that intention manifest. Likewise the Department of Agriculture and the Department of the Interior both expressed their understanding that Section 202's coordination provisions were intended to provide coordination between federal land management plans on federal lands and state land management programs on *non-federal* lands. See S. Rep. 94-583, *supra*, at 100, 103. Finally, we note that Section 204 of FLPMA gives the Secretary of the Interior specific authority to withdraw lands from location under the mining laws. 43 U.S.C. 1714.

[20] See 16 U.S.C. 1604. Indeed, it provided a model for FLPMA's land use planning provisions. See H.R. Rep. 94-1163, *supra*, at 5. The FRRRPA, in turn, grew out of previous statutes providing for federal management of national forest lands. See, *e.g.*, Multiple-Use Sustained-Yield Act of 1960, 16 U.S.C. 528 *et seq.* See also S. Rep. 93-686, 93d Cong., 2d Sess. 2-3 (1974). As the Department of Agriculture explained, "Land use and resource planning are, of course, integral to the management of the National Forest System and have long been a routine component of National Forest System administration" (*id.* at 27).

use planning. Section 6(a) directs the Secretary of Agriculture to "develop, maintain, and, as appropriate, revise land and resource management plans for units of the National Forest System, coordinated with the land and resource management planning processes of State and local governments and other Federal agencies" (16 U.S.C. 1604(a)). Section 7 instructs the Secretary to share the information that he develops with the states so that they may "plan[] for the protection, use, and management of renewable resources on non-Federal land" (16 U.S.C. 1605). Thus, Congress again designed a comprehensive federal land use program that provides for federal-state cooperation. It again recognized the states' right to plan the use of non-Federal lands, but limited the states to an advisory role in federal land management decisions.[21]

Congress, through the FLPMA and the NFMA/FRRRPA regimes, and the federal land management agencies, through congressionally authorized regulations,[22] ver-

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[21] The legislative history, repeatedly emphasizing the Forest Service's responsibility for comprehensive land management planning, fully supports this interpretation. See, *e.g.*, H.R. Rep. 94-1735, 94th Cong., 2d Sess. 19 (1976) (NFMA); H.R. Rep. 94-1478, 94th Cong., 2d Sess., Pt. 1, at 10 (1976) (NFMA); S. Rep. 94-893, 94th Cong., 2d Sess. 34-35 (1976) (NFMA); H.R. Rep. 93-1163, *supra*, at 2-3 (FRRRPA); S. Rep. 93-686, *supra*, at 5 (FRRRPA). Although the legislative history acknowledges the states' responsibility for land use planning on non-federal lands (*id.* at 13), it nowhere suggests that states would have land use planning authority over federal lands.

[22] Both the FLPMA and the NFMA vest substantial discretion in Executive Branch agencies to develop and refine federal land use policy. These agencies have given further clarification to the role of state law in federal land management programs. See 43 C.F.R. Pt. 1600 (BLM); 36 C.F.R. Pt. 219 (Forest Service). The land use planning process specifically considers whether particular lands are suitable for mining activities. See 43 C.F.R. 1610.7-1; 36 C.F.R. 219.22. The BLM and the Forest Service have also promulgated regulations governing specific operations—such as private mining—on federal lands. See, *e.g.*, 43 C.F.R. Pt. 3809 (BLM regulations governing surface management of mining activities on public lands); 36 C.F.R. Part 228 (Forest Service regulations governing national forest lands). These regulations, responsive to the congressional goal of federal-state cooperation, permit joint administration and enforcement of environmental requirements (see, *e.g.*,

ify what is implicit in the Property Clause—federal land management can justly be characterized as a field "in which the 'federal interest is so dominant that the federal system will be assumed to preclude enforcement of state laws on the same subject.'" *Hillsborough County* v. *Automated Medical Labs., Inc.*, No. 83-1925 (June 3, 1985), slip op. 5 (quoting *Rice* v. *Santa Fe Elevator Corp.*, 331 U.S. 218, 230 (1947)). The use of federal lands is "'intimately blended and intertwined with responsibilities of the national government'" (*Hillsborough County*, slip op. 11 (quoting *Hines* v. *Davidowitz*, 312 U.S. 52, 66 (1941)). The states' role is correspondingly limited. See *Utah Power & Light Co.*, 243 U.S. at 404-405.[23] The presence or absence of express congressional authorization of direct state land use control takes on special significance in this context. State land use requirements have no application to federal lands "save as they may have been adopted or made applicable by Congress" (*id.* at 405).

2. The Coastal Commission urges that the Mining Act of 1872 authorizes application of its land use permitting requirements. We disagree. The Act, designed to encourage mineral development,[24] is based on a fundamental premise that "[e]xcept as otherwise provided, all valuable mineral deposits in lands belonging to the United States * * * shall be free and open to exploration and purchase

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43 C.F.R. 3809.3-1(c)) and frequently require that mining activities be conducted in compliance with state environmental standards (see, *e.g.*, 36 C.F.R. 228.8). They nevertheless preserve *federal control* over land use decisions on federal lands, "[c]oordinat[ing], *to the greatest extent possible*, with appropriate State agencies," mechanisms to protect affected lands (43 C.F.R. 3809.0-2(c) (emphasis added)).

[23] As Governor Babbitt has stated, "Federal lands in the West are generally not subject to any form of state management or administration. State planning and zoning laws stop dead at the federal fence." Babbitt, *Federalism and the Environment: An Intergovernmental Perspective of the Sagebrush Rebellion*, 12 Envtl. Law 847, 853 (1982).

[24] See *Creede & Cripple Creek Mining & Milling Co.* v. *Uinta Tunnel Mining and Transportation Co.*, 196 U.S. 337, 351 (1905); *Steel* v. *Smelting Co.*, 106 U.S. 447, 449-450 (1882). See also 30 U.S.C. 21a; 43 U.S.C. 1701(a)(12).

* * *" (30 U.S.C. 22). The Act adopts state law in three basic areas. First, Section 26 provides that state law, to the extent that it is consistent with federal law, governs a miners' "possessory title" (30 U.S.C. 26). Second, Section 51 provides that state law shall govern acquisition of water (30 U.S.C. 51). And third, Section 43 states that "[a]s a condition of sale, [state law] may provide rules for working mines, involving easements, drainage, and other necessary means to their complete development, and those conditions shall be fully expressed in the patent" (30 U.S.C. 43). Plainly, Sections 26 and 51 do not implicate land use concerns.[25] We therefore turn our attention to Section 43.

Section 43 permits the states, in the absence of federal legislation, to impose necessary easements and other interests for the development of patented working mines in the district. See, *e.g.*, *Amador Queen Mining Co.* v. *Dewitt*, 73 Cal. 482 (1887). The western states generally implemented this legislation by "prescribing methods of obtaining easements and rights of way for mining purposes and providing for condemnation proceedings * * *." 1 C. Lindley, *Mines* § 252 (3d ed. 1914). See, *e.g.*, *Baillie* v. *Larson*, 138 F. 177 (D. Ida. 1905). Notably, Section 43 applies only to patented lands that have been severed from the public domain; thus, it does not expressly address the states' power to prescribe rules while the lands remain in federal ownership. But even if Section 43 permits

[25] Section 26 authorizes the states to prescribe various rules concerning the posting, content and recording of the location of mining claims, and the means of giving notice or recording of annual assessment work, as conditions for maintaining the individual miner's possessory title. See 1 C. Lindley, *Mines* § 250 (3d ed. 1914). This Court has found such supplemental state legislation valid and enforceable. *Butte City Water Co.* v. *Baker*, 196 U.S. 119, 125-126 (1905). Indeed, as this Court recognized in *United States* v. *Locke*, No. 83-1394 (Apr. 1, 1985), federal law contained no recording requirements for mining claims prior to 1976; the recording systems were solely creatures of state law. Granite Rock has apparently complied with all state recording requirements. Likewise, it is undisputed that Section 51 requires Granite Rock to acquire water rights in accordance with state law. See *Andrus* v. *Charlestone Stone Products Co.*, 436 U.S. 604 (1978); see also 16 U.S.C. 481.

state regulation of mining *claims*, it has no application in this case.

The historical evidence indicates that Section 43 serves the limited purpose of permitting the state to burden one miner's operations for the purpose of allowing a neighboring miner fully to develop his mine. Typically, when one miner located a valuable lode discovery, other miners would soon locate adjacent claims. See, *e.g.*, *Calhoun Gold Mining Co.* v. *Ajax Gold Mining Co.*, 182 U.S. 499, 502 (1901). Section 43 was apparently designed to permit state designation of easements regulating access to claims, transportation of ore, and adits for drainage, allowing each miner a full opportunity to develop his mine (see 182 U.S. at 509). Viewed in this light, Section 43 plainly does not authorize the Coastal Commission's proposed general land use regulation. Section 43 permits the states to regulate the competing interests of miners in the development of their respective mines; it does not authorize the states to conduct wholesale regulation of mining on federal lands as part of a regional or local land use management scheme.[26] Absent a clearer statement of congressional intent or an historical record of interpretation supporting general state land use power over mining claims, Section 43 cannot be read as a congressional adoption or incorporation of such authority.[27]

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[26] The "hydraulic mining" cases cited by the Coastal Commission (Br. 23-24) do not support a different result. In those cases, the United States, private plaintiffs, and California sought to enjoin particularly destructive mining practices that resulted in pollution and obstruction of navigable waters. See *United States* v. *North Bloomfield Gravel Mining Co.*, 53 F. 625 (N.D. Cal. 1892); *Woodruff* v. *North Bloomfield Gravel Mining Co.*, 45 F. 129 (N.D. Cal. 1891); *Woodruff* v. *North Bloomfield Gravel Mining Co.*, 18 F. 753 (D. Cal. 1884); *People* v. *Gold Run Ditch & Mining Co.*, 66 Cal. 138 (1884). Those cases indicate that miners are subject to nuisance actions, at least to restrain deposit of debris (or pollutants) into a state's waters. But they do not support the application of local land use regulations to mining activities on federal lands. Indeed, hydraulic mining was ultimately subjected to *federal* regulation under the Caminetti Act, 33 U.S.C. 661 *et seq.* See *North Bloomfield Gravel Mining Co.* v. *United States*, 88 F. 664 (9th Cir. 1898).

[27] Accordingly, both federal and state courts have held that local governments cannot apply land use requirements to federal mineral

In short, the Mining Act of 1872 does not address conflicts between mining activities on federal lands and state land use planning. However, recent mining legislation does deal directly with this issue. Section 601 of the Surface Mining Control and Reclamation Act authorizes the Secretary of the Interior to review whether an area "may be unsuitable for mining operations" because of "an adverse impact on lands used primarily for residential or related purposes" (30 U.S.C. 1281(a) and (b)). The Governor of a state or "[a]ny person having an interest which is or may be adversely affected" may initiate the review process (30 U.S.C. 1281(c)). If the Secretary determines that the benefits resulting from a designation outweigh the benefits of mineral development, he may either withdraw the area from mineral entry or limit

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development activities. See, *e.g.*, *Ventura County* v. *Gulf Oil Corp.*, 601 F.2d 1080 (9th Cir. 1979), aff'd, 445 U.S. 947 (1980) (prohibiting application of a county's open space use permit requirements to oil and gas drilling on national forest lands); *Elliott* v. *Oregon International Mining Co.*, 654 P.2d 663 (Or. 1982) (prohibiting enforcement of county surface mining ordinances to reserved federal mineral interests); *Brubaker* v. *Board of County Commissioners*, 652 P.2d 1050, 1056 (Colo. 1982) (prohibiting denial of a special use permit for mining activities that were alleged to be "inconsistent with the long-range plan of the county and with existing surrounding uses"). The Coastal Commission contends (Br. 29-30) that state land use regulation is permissible provided that the state does not prohibit mining activities, noting that several state courts have allowed local regulation of mining claims on federal lands. But permitting requirements are inherently prohibitory—failure to comply with specific requirements will result in denial of the permit. See *Hancock*, 426 U.S. at 180. We submit that the proper distinction turns on the substance rather than the effect of state regulation. A state cannot determine the appropriate use of federal lands; however, it may impose certain valid, neutrally prescribed pollution control standards to mining activities. See, *e.g.*, 36 C.F.R. 228.8. Indeed, the cases permitting local regulation of mining of federal lands have typically involved pollution control regulations rather than land use requirements. See *State ex rel. Cox* v. *Hibbard*, 570 P.2d 1190 (Or. 1977) (dredge and fill permit); *State ex rel. Andrus* v. *Click*, 554 P.2d 969 (Idaho 1976) (dredge permit). See also *Mt. Emmons Mining Co.* v. *Town of Crested Butte*, 690 P.2d 231 (Colo. 1984).

mining operations (30 U.S.C. 1281(f)). Valid existing rights, however, are not to be affected (30 U.S.C. 1281(d)).

Thus, Congress has recognized that there may be conflicts between mineral development on federal lands and other activities on non-federal lands. Congress, in turn, has provided a federal solution. The creation of a federal process for resolving the conflict demonstrates that federal law, rather than state law, controls land use decisions affecting mining on federal lands. Furthermore, it demonstrates once again that Congress is sensitive to state interests in the use and management of the public domain.

3. A consistent theme runs throughout the law governing management of federal lands: the federal government has sole authority to determine the appropriate use of the public domain. Congress has provided that federal land managers shall consult and coordinate activities with the states. But the federal government ultimately controls federal land use decisions. There is simply no place for application of the Coastal Commission's land use planning requirements to activities occurring on federal property.

The Coastal Commission will be afforded substantial participation in any approval of a future plan of operations for Granite Rock's mining activities on Pico Blanco. The Forest Service has already agreed to prepare an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act, 42 U.S.C. 4321 *et seq.*, prior to approving any new plan of operations that Granite Rock might submit. The Forest Service, in accordance with Council on Environmental Quality regulations that implement NEPA (40 C.F.R. 1503.1(a)(2)), will solicit comments from affected state agencies in the course of preparing such a statement. Additionally, the Forest Service's approval of a plan of operations is subject to the consistency requirements of Section 307 (c)(3)(A) of the CZMA to the extent that the plan affects a land or water use in the coastal zone. The State of California and the Coastal Commission thus have ample opportunity both to obtain information about, and to control, the environmental consequences of Granite Rock's mining activities.[28]

In sum, Congress has ensured that state land use interests and concerns receive careful attention within the federal land management framework. But it has also retained the federal government's ultimate control over the use of the public domain. The California Coastal Commission has no authority to apply state land use permitting requirements to Granite Rock's mining activities occurring on federal lands.

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[28] The Coastal Commission concedes (Br. 38) that its coastal development permitting process cannot be applied to Granite Rock's activities in the manner in which the permit requirement is normally applied—to determine whether the proposed use of land is compatible with the coastal program. See, *e.g.*, *Bel Mar Estates* v. *California Coastal Comm'n*, 115 Cal. App. 3d 936, 171 Cal. Rptr. 773 (1981) (real estate development). It wishes to use the coastal development permit as an "administrative vehicle" (Br. 38) for imposing environmental (as opposed to land use) regulations. That permit would be both different in substance from the "coastal development permit" described in the Coastal Act and duplicative of the requirements of other authorities under state and federal law. See note 16, *supra*.

A party subject to the state coastal zone requirements must obtain a coastal development permit "[i]n addition to obtaining any other permit required by law * * *." Coastal Act § 30600(a) (1977). The County Air Pollution Control District can require a permit for, inter alia, operating equipment resulting in air emissions (Cal. Health & Safety Code §§ 40100, 42300 (West 1979)). The California Regional Water Quality Control Board may specify "discharge requirements" for addition of pollutants into surface waters, which are deemed equivalent to a permit under California law (Cal. Water Code §§ 13200, 13203, 13263(f), 13374 (West 1971 & Supp. 1986)). California law also requires registration prior to hauling hazardous waste (Cal. Health & Safety Code § 25163(a) (West 1977)). Finally, pursuant to the terms of a Memorandum of Understanding with the Forest Service, California may apply the reclamation features of its Surface Mining and Reclamation Act of 1975, Cal. Pub. Res. Code § 2710 *et seq.* (West 1984) to noncoal mining such as Granite Rock's limestone quarry. Thus, California law provides ample authority to issue appropriate permits.

CONCLUSION

The judgment of the court of appeals should be affirmed.[29]

Respectfully submitted.

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AUGUST 1986

[29] See also note 6, *supra*.

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INTERNAL
MINERAL REPORT

MINERAL EXAMINATION OF THE ORO GRANDE PLACER MINING CLAIM KLAMATH NATIONAL FOREST

Portions of Sections 13 and 14, T.37N., R.10W., MDM.

By

LESTER LUBETKIN
Certified Mineral Examiner #5
North Zone, MAM

November 30, 1990

INTRODUCTION

This internal report is to document the findings of a mineral examination of the Oro Grande placer mining claim (PMC). The examination was conducted because a Plan of Operations was submitted for this claim, which is located within the Trinity Alps Wilderness. This report was prepared to describe and summarize the findings of the mineral examination of the Oro Grande PMC up to this date, and is not to be used for other purposes.

In order to conduct a mining operation in a designated wilderness, the presence of a valid existing right at the present and as of the date of wilderness designation must be confirmed. Forest Service policy and direction regarding mining activities on unpatented mining claims in Congressionally designated wilderness are provided in Forest Service Manual 2816.11. As mentioned, the Oro Grande PMC is located within the Trinity Alps Wilderness. This wilderness was designated by Act of Congress on September 28, 1984, and withdrawn from mineral entry as of that date, subject to valid existing rights.

I conducted a preliminary field visit to the Oro Grande PMC on September 20, 1989. I was accompanied by Ken McMaster during this site visit. Mr. McMaster is the claimant's representative and operator on the claim. I met with the claimant, Ms. Marion Fawl, on September 21, 1989, to discuss the purpose of the mineral examination and the mineral examination procedures. At that time I also requested detailed information to verify that a discovery exists on the claim, and that a discovery existed as of the date of withdrawal.

The field examination of the Oro Grande placer claim occured on June 26-28, 1990. I was accompanied and assisted during the examination by:

Sample OG-3 was collected on June 28, 1990, from a site located in the western portion of the claim, within Channel Unit I (see Map 4). The sample area nearly spanned the river in this low gradient reach (Drawing 3), at the same location as the operator's sample site 2. The sample was collected by dredging for a total of two hours. The sample included roughly crescentic-shaped area of about 12 by 23 feet, with gravels ranging from 0.6 to 2 feet deep. The total volume of material dredged was approximately 10 cubic yards.

The deposit at this site was loose sandy gravel overlying outwash material, similar to that at sample sites OG-1 and OG-2. The outwash deposit was locally less compact than at the other sample sites, possibly due to more silt and less clay than at the other locations. The distinctive color, and occurrence of angular metavolcanic rocks and deeply weathered granitic rocks were similar to exposures in the other sample sites.

Photos 13 and 14 show the sample site before and after dredging. The sample represents the entire thickness of the alluvial gravel within the river channel in this area, along with what gold is recoverable from the upper surface of the underlying outwash deposit. 12,684.8 milligrams of gold were recovered from this sample, yielding a gross recovery of $81.57 per hour of dredging for a 5-inch dredge (Table 3).

The sampling results from samples OG-1, OG-2 and OG-3 indicate that the gross recovery from suction dredge mining the loose alluvial gravels ranges from $32.73 to $81.57 per hour of dredging for a 5-inch dredge. The average gross recovery from mining all of the available river gravels within the limits of the claim is $55.50 per hour of operation (Table 3). Table 4 shows that the gross recovery per hour of dredging from samples OG-2 and OG-3 are reasonably close to the gross recovery per hour of dredging determined from the operator's samples at sample sites 3 and 2, respectively. The average gross recovery per hour from samples OG-1, OG-2 and OG-3 is also reasonably consistent with the average gross recovery determined from the operator's samples at sites 1 through 6. The average gross recovery estimated from the production information provided by Ken McMaster is less than the average recovery from samples OG-1, OG-2 and OG-3, and less than the average recovery from McMaster's samples from sites 1 through 6 (Table 1).

MINING METHOD AND ECONOMIC EVALUATION

The only reasonable mining method available for working the alluvial gravels within the active river channel in the Oro Grande PMC would be the use of a small suction dredge, with an intake no larger than 6 inches. This is the mining method being employed by the operators, where a 5-inch suction dredge was being operated. This mining method appears to be economically viable, based on the sampling results, information provided by McMaster, and an economic analysis. Table 5 shows the calculations and assumptions used in estimating the mining costs for a suction dredging operation, using a 5-inch dredge, with one person mining full time. Operating costs are estimated to be $20.66 per hour, based on a reasonable wage rate of $12.00 per hour. Capital costs are estimated to be $7,000 including the move-in costs for equipment and supplies. The mine life is estimated to be 3 years to mine the 2,416 cubic yards of minable gravels in this deposit, at a production rate of 12 cubic yards per day and an operating season of 70 days per year. As seen in Table 3, Environmental Assessment

Proposed Plan of Operation
for
Oro Grande Mining Claim
by
Ken and Debbie McMaster

USDA Forest Service
Klamath National Forest
Salmon River Ranger District
Siskiyou County, California

Purpose and Need for Action

Ken and Debbie McMaster submitted a proposed plan of operation for the Oro Grande mining claim to the Salmon River Ranger District which was received June 6, 1991. The plan states that they want to mine gold from gravels in the South Fork of the Salmon River with a motorized suction dredge during the normal dredging season. The normal operating season runs from the last Saturday before Memorial day to September 15. During the operating period, they plan to occupy and use a cabin, workshop, and outhouse that are located on the mining claim. During the remainder of the year, they plan on using the main cabin and workshop for storing mining equipment and supplies.

The claim is located on the South Fork of the Salmon River in the SW 1/4 of Section 13 and the SE 1/4 of Section 14, T.37 N., R.10 W., MDM. It is approximately 1 1/2 miles west of Mountain Meadows Ranch. The Oro Grande mining claim is on public land which is part of the National Forest System and within the Trinity Alps Wilderness.

The oldest record of location for the mining claim was filed in 1934. The Oro Grande mining claim was relocated in 1953 and since then, has had annual proof of labor affidavits filed with Siskiyou County as required. The location and proofs of labor have been documented with the Bureau of Land Management. As required, there was a mineral examination of the claim in 1990 which determined that the claim has a valid discovery.

This Environmental Assessment will review the need for the disturbance to the surface resource caused by the continued occupancy and use of structures on the Oro Grande unpatented mining claim.

Issues revealed by scoping which are addressed by this document are the following:

1. the authorization to occupy and use existing permanent structures during the active period of a part time mining operation.

2. the authorization to use existing permanent structures throughout the year for storage of mining equipment and supplies for a part time mining operation.

3. the authorization to use existing permanent structures for occupancy and/or storage for a part time mining operation that is within a one hour walk of a road.

4. the preservation of structures that may be the last examples of a unique construction method.

5. the occupancy and/or use of structures retained for their historical features.

6. meeting sanitation requirments of Siskiyou County.

Issues which were considered and removed from this analysis:

Authorization to use motorized equipment to mine within a wilderness.

Policy found in the Forest Service Manual 2323.72 directs that the Forest Service will ensure that mineral development operations will be conducted in accordance with valid existing rights for locatable minerals while preserving the wilderness resource to the extent possible. The Wilderness Act of 1964 authorized essential mechanized equipment for mining within wilderness areas. Mr. McMaster has used a motorized suction dredge on the claim since 1979. This use predates the inclusion of the area into a wilderness. The use of the motorized suction dredge is an economical and effective method for the extraction of mineral values from underwater gravels for the small operation miner. Non-motorized alternatives would require the stream to be dewatered by running the water through some form of flume system. The stream gravels would then be processed through a sluice box to recover the mineral values. This would be a return to more primitive methods found in early day mining activities. This would also be much more destructive to the stream environment than the suction dredging. Motorized suction dredging is a more reasonable method to recover mineral values from the under water gravels than to use more primitive mining methods. There is a short term disturbance to the peace and solitude caused by the dredge engine. However, this is offset by the lack of major disturbance and long lasting impact to the riparian environment.

Affected Environment

The claim is about 1 1/2 miles west of Mountain Meadow Ranch, which is on the Big Flat Road from Coffee Creek. Access to the claim is by foot trail along the South Fork of the Salmon River. It takes about one hour to walk from the trailhead to the claim. On that area of the South Fork, there has been periodic mining for the last 140 years. Gold was first discovered in the Salmon River in the 1850's. During the late 1800's, the trail system along the South Fork was a major access into the Salmon River mines. The present mining claim was first located by Roy Latta and others in 1934. It was relocated in 1950 and renamed the Oro Grande by Roy Latta. It was again relocated by Roy and Dorothy Latta on June 23, 1953. Since that time it has had the proof of labor affadavits filed with the Siskiyou County as required, and proper documentation has been filed with the Bureau of Land Management which follows requirements of Section 314.(a)(1) and (2) of the Federal Land Management Policy act of 1976. The Oro Grande claim is now owned by Marion Fawl who is the daughter of Roy and Dorothy Latta and is the aunt of Ken McMaster. The

BLM Form 3060-1
(July 1984)

BLM Case No.
CACA 30673

UNITED STATES
DEPARTMENT OF AGRICULTURE
FOREST SERVICE
KLAMATH NATIONAL FOREST

MINERAL REPORT

VALIDITY AND MINERAL CHARACTER DETERMINATION
FOR MINERAL PATENT OF THE
ORO GRANDE PLACER MINING CLAIM (CAMC 29103)

LANDS INVOLVED:
Siskiyou County, California
T. 37 N., R. 10 W. (cancelled 6/6/1996), Mount Diablo Meridian
Sections 13 and 14; MS 6982
(Approximately 20 acres (8.1 ha))

Prepared by:

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Date

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Date

Management Acknowledgement:

Margaret J. Boland
Forest Supervisor
Klamath NF

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Date

EXHIBIT 15
PAGE 5 OF 6

ECONOMIC EVALUATION

Mining Scenario

I believe that the only viable method for mining the auriferous gravel in the active channel of the South Fork Salmon River is by suction dredging. The claimants may have prospected and explored adjacent bench gravel deposits but their primary activity of recent years has been in the active stream channel. Bench gravel/terrace deposits noted during the exam are quite large and would easily exceed yardages found in the active channel. Mining of this material would be considered if mining of the active stream gravel did not support a discovery at the critical dates.

Claimant Ken McMaster utilizes the same basic suction dredge methods as most other dredgers do. I find no reason to significantly modify his methods as described in the mining methods section of this report for the purpose of this evaluation except that I will add a low cost "Blue Bowl" for recovery of very fine gold that may be lost in the spoils from the claimant's spiral concentrator. This eliminates the need to pack out concentrates or to recover gold through on site mercury amalgamation.

Through information provided in the patent application and through personal discussions with claimants Ken McMaster and Steven Fawl, I learned that Ken McMaster is the primary operator of dredges on the claim. He almost always has a helper assisting him by tending the dredge to clear jams, move spoils, reposition the dredge, and keep the sluice free of rocks that hang up in the sluice. This assistant also helps with moving boulders in the river and as a "runner" for equipment and supplies. In my opinion and from my observations, most full-time dredging operations are at least two-person operations. The evidence suggests that a full-time dredging operation on the Oro Grande PMC has been and would continue to be a two-person operation. I consider the Oro Grande operation to consist of one experienced dredge operator and one helper rather than two experienced dredge operators because Ken McMaster does all of the nozzle operation himself.

It is not uncommon for an operator to develop several holes during the course of a single season depending on the recovery at a particular site. This could be a factor in estimating how much production time occurs during a 40-hour work week if it takes a long time to develop a hole down to bedrock. Based on my observations during sampling for this evaluation, I found that the false bedrock can be reached in less than 15 minutes of dredging. For this reason I feel confident to assume that all dredge operation time can be considered production time. Under this scenario, I have found through my own experience, through observations of this and other operators, and through discussions with these and other dredge operators, that over a typical work week an efficient two-person crew would conduct an average of at least 15 hours per week (3 hours per day) of non-production work. This non-production work includes time to transport supplies to the dredge site, moving equipment from site to site, site preparation including moving boulders, clearing rock plugs, sluice clean-up, processing concentrates, and repairs and maintenance. For an 8 hour work day, this leaves a maximum average of 5 hours per day for

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