Chapter 4
RESPONSES TO DSEIR COMMENTS

Master Responses are provided in this chapter to address CEQA topics. As previously described, the Department received a large number of letters and emails during the public comment period on the DSEIR related to the environmental analysis, as well as extensive oral comments provided at the six public hearings conducted during the comment period. Many of these comments addressed identical or similar topics. To streamline the response process, the Department created a set of Master Responses that addresses those issues receiving the most comment. These Master Responses consider the body of comments received on each topic and address the topic as comprehensively as possible, such that the responses speak to the various substantive issues raised in individual comments. A set of appendices to this FSEIR provides a cross-reference between the comment letters and individuals speaking at public meetings with the various Master Responses. Specifically, **Appendix J** addresses the unique comment letters, **Appendix K** addresses the individuals speaking at the public meetings, and **Appendix L** addresses the form letters and variants.

In addition to the Master Responses, the Department prepared specific responses to individual comments received for comments related to water quality and cultural resources. Also included in this chapter are Department responses to peer reviews overseen by and conducted on behalf of the State Water Resources Control Board (SWRCB).

4.1 Master Responses to Comments on the DSEIR

The Department prepared 47 Master Responses (MRs) that cover a variety of topics, including both general and resource-specific issues. "MR-GEN" preceding a sequential number (-1, -2, and so forth) designates a Master Response related to a general issue. "MR-" preceding an abbreviation for a specific resource plus a sequential number designates a Master Response related to that resource (MR-BIO-1).

Master Responses to General Topics

MR-GEN-1: CEQA and APA Requirements Related to Comment Response

Several comments did not raise specific questions or information regarding the adequacy of the environmental analysis provided in the DSEIR or any other significant environmental point. Where a comment does not specify additional information needed or particular insufficiencies in the DSEIR, or otherwise address a significant environmental point related to the Proposed Program, the comment is noted, but no substantive response is required under CEQA.

Under Government Code Section 11346.9 of the Administrative Procedure Act (APA), every agency proposing to adopt regulations, such as the proposed Suction Dredge Permit

Program (Program or Proposed Program), must prepare a "final statement of reasons" that includes:

> A summary of each objection or recommendation made regarding the specific adoption, amendment, or repeal proposed, together with an explanation of how the proposed action has been changed to accommodate each objection or recommendation, or the reasons for making no change. This requirement applies only to objections or recommendations specifically directed at the agency's proposed action or to the procedures followed by the agency in proposing or adopting the action. The agency may aggregate and summarize repetitive or irrelevant comments as a group, and may respond to repetitive comments or summarily dismiss irrelevant comments as a group. For the purposes of this paragraph, a comment is "irrelevant" if it is not specifically directed at the agency's proposed action or to the procedures followed by the agency in proposing or adopting the action.
>
> (Gov. Code, § 11346.9, subd. (c).)

While CEQA does not require a lead agency to respond to comments that do not raise questions or information regarding the adequacy of the DSEIR or any other significant environmental point, the Department has determined to satisfy the aforementioned requirement of the APA by including responses to comments regarding the proposed regulations in this FSEIR, so that the interested public and agencies will have the convenience of a single document that addresses all substantive comments received on the DSEIR and proposed regulations. Responses to comment on the proposed regulations are provided in Chapter 3 of this FSEIR, and this chapter provides responses to comments on the CEQA analysis. This chapter contains Master Responses, as well as responses to individual comments regarding water quality (including peer reviews overseen by and conducted on behalf of SWRCB) and cultural resources. Tables that align the appropriate Master Response to the each individual comment letter or individual commenting at the public meetings are available in **Appendices J, K, and L**.

MR-GEN-2: Comments in Support or Opposition to Suction Dredging

The Department received many letters and comments that expressed support for, or opposition to, suction dredging and/or the regulation amendments as proposed by the Department. The Department appreciates this input. The Department circulated the DSEIR and provided notice of the proposed regulations to solicit public comments regarding the sufficiency of the related environmental analysis and the extent to which the proposed regulations comport with controlling provisions of the Fish and Game Code. The public comment process is not intended to be a "vote counting" exercise, however, and comments expressing a policy preference are noted and will be considered by the Department as it contemplates final action. As to those policy comments, no further specific response is warranted under CEQA or the APA (see MR-GEN-1). That said, many letters expressing policy preferences also included specific information regarding the environmental analysis or the proposed regulations, and this information is considered and addressed in the responses to comments, with corresponding changes being made to the FSEIR, where and as appropriate under controlling law.

MR-GEN-3: Comments Regarding CEQA Terminology

Some comments objected to the use of certain terminology in the DSEIR, such as "potentially" significant in describing some environmental impacts, or that some impacts "may" be significant. Some comments from the mining community objected because they perceived the impacts' characterization as too conservative, imputing harm to the environment where they believe none exists, while others in the environmental community objected to the language as insufficiently direct, qualifying the significance of the impact in a way that somehow lessens its importance or potential for harm to the environment. The Department's exercise of discretion in the use of such terminology, however, is entirely consistent with CEQA and the State CEQA Guidelines.

That the Department is using professionally accepted CEQA terminology in this environmental analysis is helpful to understand. In general, CEQA directs agencies in the EIR context to disclose and analyze potentially significant environmental effects that may occur as a result of a proposed project. Informed by that analysis and other factors, public agencies must then determine whether those effects are ultimately less than significant under CEQA. This approach and the related terminology are entirely consistent with CEQA. Likewise, and more importantly from a substantive standpoint, the Department's CEQA analysis is supported by and based on technical, scientific, and other information relevant to an assessment of the environmental effects of suction dredging in California.

The State CEQA Guidelines define "significant effect on the environment" as a "substantial, or *potentially* substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance." (CEQA Guidelines, § 15382 (italics added).) The determination of the significance, or potential significance, of an impact must be based on substantial evidence. "Substantial evidence" is defined in State CEQA Guidelines Section 15384 as follows:

> (a) "Substantial evidence" as used in these guidelines means enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached. Whether a fair argument can be made that the project may have a significant effect on the environment is to be determined by examining the whole record before the lead agency. Argument, speculation, unsubstantiated opinion or narrative, evidence which is clearly erroneous or inaccurate, or evidence of social or economic impacts which do not contribute to or are not caused by physical impacts on the environment does not constitute substantial evidence.

Substantial evidence shall include facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts. The DSEIR provides a comprehensive evaluation of the project's environmental impacts in compliance with CEQA and the State CEQA Guidelines, and in accordance with professionally accepted methodology for the evaluation of environmental resources. The DSEIR and this FSEIR present substantial evidence to support the conclusions drawn within these documents regarding the significance of the project's environmental effects. When comments disagree about environmental conclusions, the EIR need only summarize the main points of disagreement and explain the lead agency's

reasons for accepting one set of judgments instead of another. Section 15151 of the State CEQA Guidelines states that "Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts." (See also *Greenbaum v. City of Los Angeles* (1984) 153 Cal.App.3d 391, 413; and *Browning-Ferris Industries v. City Council* (1986) 181 Cal.App.3d 852, 862–863.) The lead agencies will ultimately determine which conclusion is appropriate, based on the substantial evidence presented in the EIR and other documents in the whole of the record.

The comment letters and responses to them present summaries of the areas of disagreement. In some cases, there is no substantial evidence offered by comments to support that a different conclusion should be drawn. As such, no further response to disagreements presented in the comment letters is necessary. If evidence is provided by the comment to support the disagreement with the DSEIR's conclusion, the evidence is summarized and considered in making the EIR's conclusion. The Department will review and consider all the substantial evidence in the whole of the record in making its decision about the project and its environmental effects.

MR-GEN-4: The Role of Primary Research in the CEQA Process

The Department received multiple comments that critiqued the environmental review effort conducted by the Department because no on-the-ground studies using suction dredges were completed to support the impact analysis in the DSEIR. The original work plan for the Department's environmental review effort did include observation of suction dredging in the field. However, this was precluded by an injunction issued by the Alameda County Superior Court on July 9, 2009, as well as a statutory moratorium on suction dredging established by Senate Bill (SB) 670 on August 6, 2009. While the First Appellate District recently lifted the injunction, the statutory moratorium remains in effect. (See Fish and G. Code, 5653.1: *Hillman et al. v. Cal. Dept. of Fish and Game* (December 28, 2011, A126402) [nonpub. opn.], 2011 Cal.App. Unpub. Lexis 9897.)

That said, some comments noted that observations and/or studies could have been conducted outside of California, in a location(s) where suction dredging is currently allowed, as in a neighboring state. The Department determined that conducting studies in other states was not feasible or appropriate considering both the cost and the additional time that such studies would require. Comments also suggested that the Department could obtain an exemption from SB 670 and the Court injunction during its pendency to perform suction dredging-related studies. This option was not pursued by the Department for similar reasons.

Certain comment letters also expressed criticism that some of the scientific literature used as the basis for the SEIR's conclusions is not relevant because it relates to suction dredging in other states, or focused on different, but analogous, types of activities (e.g., other forms of stream disturbance). The Department uses its professional judgment to ensure that such information, where it was used, was adequate to assist in characterizing the potential impacts from suction dredging.

Finally, it is important to consider the requirements of CEQA with respect to primary data collection. "CEQA does not require a lead agency to conduct every test or perform all

research, study, and experimentation recommended or demanded by comments." (CEQA Guidelines, § 15204.) Rather, CEQA requires lead agencies to use the best information readily available. To this end, the Department conducted an extensive literature review of published information regarding suction dredging (Appendix D of the DSEIR), and considered all information submitted during the scoping and public review period for the DSEIR. The water quality analysis in the DSEIR also made extensive use of a study conducted by the U.S. Geological Survey (USGS) on suction dredging. This approach, in the Department's opinion, provided sufficient, detailed information to ensure meaningful analysis and disclosure of the significant environmental effects associated with the Proposed Program.

MR-GEN-5: Baseline Conditions Used for the CEQA Analysis

Some comments asserted that the Department's use of a baseline environmental setting in which suction dredge mining does not presently occur is artificial and illegal under CEQA, in light of the lengthy history of suction dredge mining in the state. As explained in the DSEIR, the use of vacuum or suction dredge equipment for instream mining is currently and has been prohibited by statute in California since August 2009. (Fish & G. Code, § 5653.1, added by Stats. 2009, ch. 62, § 1 (SB 670 (Wiggins).) As signed into law by Governor Schwarzenegger and effective August 6, 2009, SB 670 established a moratorium on instream suction dredge mining in California, even with a permit previously issued by the Department. SB 670 also prohibited the Department from issuing any new permits under the previous regulations. The interim moratorium was in place prior to the Department's issuance of the Notice of Preparation (NOP) for the DSEIR on October 26, 2009. Assembly Bill (AB) 120, approved by Governor Jerry Brown on July 26, 2011, will be in effect by its own terms in the Fish and Game Code until June 30, 2016. (See Stats. 2011, ch. 133, § 6, p. 9, amending Fish & G. Code, § 5653.1.) Under AB 120, it is possible that the existing moratorium could end before June 30, 2016. That can occur under controlling statute only if the Department certifies five conditions to the Secretary of State. (Fish & G. Code, § 5653.1, subd. (b).) Of note, at least one of those conditions is beyond the legal authority of the Department. (*Id.*, subd. (b)(5).) Until recently, separate from the statutory moratorium, the Department was also subject to a separate court order prohibiting the issuance of any new suction dredge permits. The First Appellate District recently reversed that order, setting aside a related preliminary injunction in effect since July 9, 2009. Referring to AB 120 and SB 670, the court remarked, because "recently enacted legislation prohibits suction dredge mining in the near term and at least until environmental review is completed and new regulations are in place [citing Fish & Game Code Section 5653.1], there is no longer a threat of immediate irreparable harm justifying provisional relief in the form of a preliminary injunction." Regardless of the injunction, of course, suction dredge mining in California is currently prohibited by statute until June 30, 2016. (Fish & G. Code, 5653.1, subd. (b).)

Under CEQA, the environmental setting or "baseline" is normally the existing physical conditions in and around the vicinity of the proposed project, as those conditions exist at the time the NOP is published. (CEQA Guidelines, § 15125.) For the Proposed Program, the Department determined that a conservative approach to identifying the environmental baseline, namely, a "no dredging" baseline, was appropriate. As described above, the enactment of SB 670 in August 2009 established an immediate, statewide moratorium on instream suction dredge mining, all more than 2 months before the Department issued the

NOP for the SEIR. The moratorium has been in place since that time, it currently persists, and it will likely continue to persist absent further legislative or judicial action through June 30, 2016. (Fish & G. Code, 5653.1, subd. (b).)

Against this backdrop, the Department determined in its lead agency discretion under CEQA that the appropriate environmental baseline for the SEIR is one that reflects the actual existing condition here in California. For purposes of CEQA and the Department's current environmental review effort, the analysis set forth in the DSEIR is tied to an environmental baseline that assumes no suction dredging in California, because that was (and remains) the state of the regulatory and physical environment at the time the NOP was published and throughout this time the SEIR is being prepared and evaluated by the Department. By providing a "fresh look" at the impacts of suction dredge mining on the environment generally, the Department's approach minimizes the risk of understating the effects of suction dredge mining on the environment. To use the alternative baseline urged by some comments in the mining community in which suction dredge mining is assumed to be presently occurring would not reflect real-world conditions, and thus would potentially mislead both the interested public and the Department. The Department's position on this issue is further supported by a recent appellate decision disapproving an agency's decision to use a future baseline against which to measure project impacts. (*Sunnyvale West Neighborhood Assn. v. City of Sunnyvale City Council* (2010) 190 Cal.App.4th 1351.) Therefore, the Department is confident that its baseline approach is both legally and factually conservative, and appropriate given the related discretion afforded to lead agencies under State CEQA Guidelines, Section 15125.

MR-GEN-6: Scope of the Department's Regulatory Authority

Various comments raised a number of issues related to the nature and extent of the Department's regulatory authority governing suction dredge mining. At one end of the stakeholder spectrum, the Department received comments from the mining community questioning whether the Department has authority to regulate suction dredging where federal mining interests are involved, including suction dredging on federal land in California. At the other end of the stakeholder spectrum, the Department received comments from tribal and environmental interests concerned about the significant unavoidable environmental effects that could occur as a result of suction dredge mining under the proposed regulations, and the limit of the Department's regulatory authority to reduce those impacts to less than significant under CEQA. Both categories of comments concern the Department's regulatory authority related to suction dredge mining. This Master Response addresses both categories, turning first to comments from the mining community (i.e., that the Department is over-regulating), and then to comments from various tribal and environmental interests (i.e., that the Department is under-regulating).

The Department's Legal Authority to Regulate Suction Dredge Mining throughout California

The Department received several comments from the mining community questioning the Department's legal authority to regulate suction dredge mining where federal mining interests are involved, particularly on federal land in California. In general, these comments contend that the Department's legal authority governing suction dredge mining under the

Fish and Game Code is preempted by federal law and that the Department's enforcement of the proposed regulations will constitute a taking of private property without just compensation. In short, the Department received several comments contending the Department and the State of California generally have no legal authority to regulate suction dredging when federal mining interests are implicated.

As many comments recognize, Fish and Game Code Section 5653 et seq. provides the Department with specific statutory authority to regulate suction dredging throughout California. Section 5653, subdivision (a), provides, in pertinent part, that the "use of any vacuum or suction dredge equipment by any person *in any river, stream, or lake of this state* is prohibited, except as authorized under a permit issued to that person" by the Department. (Italics added.) The statewide scope of the Department's authority is underscored again in the same subdivision: "Before any person uses any vacuum or suction dredge equipment *in any river, stream, or lake of this state*, that person shall submit an application for a permit for a vacuum or suction dredge to the department, specifying the type and size of equipment to be used and other information as the department may require." (Fish & G. Code, § 5653, subd. (a) (italics added); see also *id.*, § 83 (for purposes of the Fish and Game Code, "'State' means the State of California").) Indeed, if any person suction dredges in California without or in violation of a permit issued by the Department, "that person is guilty of a misdemeanor." (*Id.*, § 5653, subd. (b).) That the Fish and Game Code grants the Department legal authority to regulate suction dredge mining throughout California is beyond question. So, too, is the Department's statewide mandate to protect fish and wildlife resources.

The Department exists by statute, charged by the same authority through its Director to administer and enforce the Fish and Game Code and any related regulations. (See generally *Id.*, §§ 700, 702.) Specifically, the Department is the state's designated trustee agency for fish and wildlife, and the Department is responsible in that capacity to conserve, protect, and manage those resources throughout California. (*Id.*, §§ 711.7, subd. (a), 1802.). CEQA also codifies the Department's trustee agency status for fish and wildlife throughout California. (Pub. Resources Code, § 21070; CEQA Guidelines, § 15386, subd. (a).)[1] The same is true of case law, including cases acknowledging that, for purposes of California's fish and wildlife resources, the Department effectuates the Public Trust Doctrine through the Fish and Game Code on a statewide basis. (See *Environmental Protection Information Center v. California Dept. of Forestry and Fire Protection* (2008) 44 Cal.4th 459, 515 ("*EPIC*"); *Center for Biological Diversity, Inc. v. FPL Group, Inc.* (2008) 166 Cal.App.4th 1349, 1363–1364 ("*FPL*").) The Department's trustee mandate underscores in this respect that, to the extent the Department is charged by statute to ensure that suction dredge mining will not be deleterious to fish, that legal authority is statewide.[2] (Fish & G. Code, § 5653, subd. (b).)

Most of the related comments from the mining community acknowledge and do not dispute that the Department has explicit authority under the Fish and Game Code to regulate suction dredging statewide. The mining community asserts instead that the Department's

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

[2] Separate from the Department's specific permitting authority, suction dredging is currently prohibited by statute throughout California. (Fish & G. Code, § 5653.1, added by Stats. 2009, ch. 62, § 1, p. 2, and amended by Stats. 2011, ch. 133, § 6, p. 9.)

authority under state law is pre-empted by federal law, invoking various constitutional principles to support that contention. A number of comments making these arguments are or have taken a similar tack in related litigation against the Department and the State of California, and some of that litigation is still pending.[3] As described above, however, the statewide scope of the Department's regulatory authority is beyond dispute. So is the Department's obligation to administer and enforce state law.

Article III, Section 3.5, of the California Constitution provides that an administrative agency such as the Department has no power to:

(a) declare a statute unenforceable, or refuse to enforce a statute, on the basis of it being unconstitutional unless an appellate court has made a determination that such statute is unconstitutional;

(b) declare a statute unconstitutional; [or]

(c) declare a statute unenforceable, or to refuse to enforce a statute on the basis that federal law or federal regulations prohibit the enforcement of such statute unless an appellate court has made a determination that the enforcement of such statute is prohibited by federal law or federal regulations.

These provisions of the California Constitution control in the present case. The Department cannot declare, find unenforceable, or otherwise refuse to enforce the relevant provisions of the Fish and Game Code for the reasons alleged by the mining community. The Department is obligated in fact and law to administer and enforce the Fish and Game Code throughout California, and the Department will continue to effectuate its statutory authority consistent with that legal mandate. Of note, the U.S. Supreme Court has already upheld the authority of the State of California to apply and enforce state environmental law where federal mining interests are involved, including on federal land. (*California Coastal Comm'n v. Granite Rock Co.* (1987) 480 U.S. 572; see also *Tahoe-Sierra Preservation Council, Inc. v. Tahoe Regional Planning Agency* (2002) 535 U.S. 302 (32-month building moratorium pending completion of a comprehensive land use plan does not constitute an uncompensated taking of private property).)

The Department's Legal Authority to Promulgate Regulations Governing Suction Dredge Mining and the Related Obligation Under CEQA to Avoid or Substantially Lessen Significant Environmental Effects

As noted above, the Department received a number of comments expressing concern that the DSEIR identified various significant and unavoidable impacts associated with the proposed regulations. A number of comments stated that CEQA requires the Department to

[3] *Kimble et al. v. Schwarzenegger et al.*, Super. Ct. San Bernardino County, 2010, No. CIVDS1012922, filed September 15, 2010; *Hillman et al. v. Cal. Dept. of Fish and Game* (December 28, 2011, A126402) [nonpub. opn.], 2011 Cal.App. Unpub. Lexis 9897; see also *Reynolds v. State of California et al.,* E.D. Cal., No. 2:11-CV-01381-MCE-CMK, filed June 7, 2011, dismissed September 26, 2011; and *Public Lands for the People et al. v. State of California et al.*, E.D. Cal., No. 2:09-CV-02566-MCE-EFB, filed September 14, 2009, judgment entered March 16, 2010, 9th Cir. No. 10-158-52, appeal dismissed July 15, 2010.

avoid or substantially lessen any such impacts to below a level of significance. Other comments recognized correctly that CEQA actually directs the Department to avoid or substantially lessen project-related significant effects to the extent feasible consistent with the Department's legal authority independent of CEQA. Going further, various comments contend that the Department's status as a trustee agency and the Public Trust Doctrine generally provide the Department with the legal authority to condition the issuance of suction dredge permits by requiring individual miners to engage in particular practices to ensure that no significant effects on the environment occur.

To begin, CEQA does not require lead agencies to avoid or substantially lessen all significant effects to a less-than-significant level. Instead, CEQA requires lead agencies to mitigate a proposed project's significant effects to the extent feasible. (Pub. Resources Code, §§ 21002, 21002.1, subd. (b); CEQA Guidelines, §§ 15002, subd. (a)(3), 15021, subd. (a).) This legal obligation has been described by the California Supreme Court as CEQA's "substantive mandate." As the Supreme Court emphasized almost 15 years ago, "[u]nder CEQA, a public agency must . . . consider measures that might mitigate a project's adverse environmental impact, and adopt them if feasible." (*Mountain Lion Foundation v. Fish & Game Comm.* (1997) 16 Cal.4th 105, 123, citing Pub. Resources Code, §§ 21002, 21081; see also *Sierra Club v. State Board of Forestry* (1994) 7 Cal.4th 1215, 1233 ("CEQA compels government first to identify the environmental effects of projects, and then to mitigate those adverse effects through the imposition of feasible mitigation measures or through the selection of feasible alternatives.").) Importantly, where related mitigation measures or alternatives are infeasible, or the lead agency lacks the legal authority to impose or otherwise condition its approval of a project on such measures or alternatives, the agency may still approve the project despite the significant environmental effects. (Pub. Resources Code, § 210801, subd. (a)(2)–(3); CEQA Guidelines, §§ 15091, subd. (a)(2)–(3), 15093.)

In terms of the substantive mandate, CEQA itself does not provide public agencies such as the Department with independent legal authority to address significant effects. According to Public Resources Code, Section 21004:

> In mitigating or avoiding a significant effect of a project on the environment, a public agency may exercise only those express or implied powers provided by law other than this division. However, a public agency may use discretionary powers provided by such other law for the purpose of mitigating or avoiding a significant effect on the environment subject to the express or implied constraints or limitations that may be provided by law. The State CEQA Guidelines further explain: "CEQA does not grant an agency new powers independent of the powers granted to the agency by other laws." (CEQA Guidelines, § 15040, subd. (b).) The principle that CEQA itself does not provide agencies with independent legal authority to avoid or substantially lessen significant effects is underscored indirectly by the legislative direction emphasizing that CEQA shall not be interpreted to impose substantive and procedural obligations beyond those explicitly stated. (Pub. Resources Code, § 21083.1).) CEQA is explicit: it does not provide the Department with legal authority to require individual suction dredgers to avoid or substantially lessen significant environmental impacts

> that occur as a result of suction dredging. That authority must be provided by other law.

Of note, some of the related comments received by the Department may reflect more familiarity with environmental review efforts of local land-use agencies. Indeed, most CEQA review in California occurs at the local level. Local agencies, particularly those with plenary land-use jurisdiction, exercise broad police power-based regulatory authority to act in furtherance of the general health, safety, and welfare of the public. (Cal. Const., art. XI, § 7; *DeVita v. County of Napa* (1995) 9 Cal.4th 763, 782.) In general, that authority is so broad that it sometimes fuels the misperception that CEQA itself confers substantive legal authority on public agencies to address significant environmental effects. This is not the case, however. That authority must exist separately from CEQA.

For the Department, its legal authority for purposes of CEQA's substantive mandate is grounded in the Fish and Game Code. (See generally Fish & G. Code, §§ 700, 702.) As noted earlier, the Department regulates suction dredge mining through explicit statutory authority provided by Fish and Game Code Section 5653 et seq. Section 5653.9 directs the Department, in particular, to promulgate regulations to administer the Proposed Program consistent with the requirement that the Department may only authorize suction dredging under the Fish and Game Code when it will not be deleterious to fish. (See *Id.*, § 5653, subd. (b).) Controlling statute also provides that the Department, pursuant to the adopted regulations, "shall designate waters or areas wherein vacuum or suction dredges may be used pursuant to a permit, waters or areas closed to those dredges, the maximum size of those dredges that may be used, and the time of year when those dredges may be used." (*Ibid.*)

In short, the Department's specific legal authority recognized by CEQA as necessary in the present case is provided by Fish and Game Code Section 5653 et seq. (Pub. Resources Code, § 21004; CEQA Guidelines, § 15040.) Consistent with these provisions, the Department is required to administer the Proposed Program through regulations promulgated as required by Section 5653.9, the permissible scope and content of those regulations is dictated by Section 5653, and the Department's related substantive charge is cast in terms of and limited to ensuring that suction dredging is not deleterious to fish. Despite comments to the contrary, Fish and Game Code Section 5653 et seq. does not provide the legal authority necessary for the Department to address the significant and unavoidable environmental effects unrelated to fish (as defined in Fish & G. Code, § 45) that were identified in the DSEIR.

Various comments go further, contending other applicable law gives the Department the authority to avoid or substantially lessen all of the significant and unavoidable impacts associated with suction dredging. Each of these comments is rooted in the Department's statutory charge as a trustee agency and the Public Trust Doctrine. Looking forward, the Department also expects some comments will argue that AB 120 provides the Department with the independent legal authority recognized by CEQA as necessary in the present case (Pub. Resources Code, § 21004; CEQA Guidelines, § 15040; see also Fish & G. Code, § 5653.1, as amended by Stats. 2011, ch. 133, § 6, p. 9, effective July 26, 2011.).

The Department's status as California's trustee agency for fish and wildlife is beyond question. The first of two relevant sections in the Fish and Game Code indicates that California's "fish and wildlife resources are held in trust for the people of the state by and through [the Department]." (Fish & G. Code, § 711.7, subd. (a).) The second relevant section provides that the Department has "jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species." (*Id.*, § 1802.) CEQA also casts the Department's trustee status in jurisdictional terms. (Pub. Resources Code, § 21070 (the Department is a "trustee agency" with "jurisdiction by law over natural resources . . . held in trust for the people of the State of California"); see also CEQA Guidelines, § 15386, subd. (a).)

The two relevant sections in the Fish and Game Code cast the Department's trustee status in broad jurisdictional, but nonspecific terms. Section 1802, for example, following the language quoted above, speaks only in terms of the Department with its "biological expertise" reviewing environmental documents and consulting with lead and responsible agencies during required CEQA review. Another section in the same Fish and Game Code article and chapter also indicates that various, related policies and objectives as expressed do not "provide any power to regulate natural resources or commercial or other activities connected therewith, except as specifically provided by the Legislature." (Fish & G. Code, § 1801, subd. (h).)

Taken together, Sections 1802 and 711.7 provide the Department with trustee jurisdiction over fish and wildlife in California. Yet, neither section provides explicit, substantive authority governing the nature and scope of the Department's trustee jurisdiction. That authority appears to come, instead, from the specific substantive provisions in the Fish and Game Code. (See, e.g., *Id.*, § 5653 et seq.) It is not clear, as a result (in fact, it appears unlikely), that Sections 1802 and 711.7, alone or in combination, provide the Department with the independent legal authority recognized as necessary in the present case by Public Resources Code Section 21004.

The Department recognizes that Public Resources Code Section 21004 also speaks in terms of implied legal authority. In the present case, because the Fish and Game Code casts the Department's trustee status in broad jurisdictional, but nonspecific terms, some comments appear to contend that the Department's trustee mandate provides substantive legal authority by implication. It is more likely, as noted above however, that the legal authority available to the Department to effectuate its trustee mandate derives from other substantive provisions of the Fish and Game Code. Regardless, to the extent the Department's broadly cast trustee mandate provides the Department with implied substantive legal authority, that authority is certainly limited to fish and wildlife. That authority would not and does not extend to the significant and unavoidable water quality, cultural resource, and noise impacts identified in the DSEIR, particularly to the extent those impacts stand alone, distinct at a certain point from impacts on the trust resources that the Department is actually charged by law to protect. As to the significant and unavoidable impacts on biological resources identified in the DSEIR, again, the Department is skeptical its trustee status alone provides the substantive legal authority by implication that Public Resources Code Section 21004 underscores is necessary.

The Department anticipates that some commenters may assert that the Department has a broader obligation to think creatively about funding and program options to target reduction or avoidance of impacts falling outside the Department's jurisdiction by analogizing the Department's legal position to those relied on by the Board of Trustees for the California State University system in *City of Marina v. Board of Trustees of California State University* (2006) 39 Cal.4th 341. The University's EIR failed to discuss possible feasible modifications to the project at issue in the case or other on-campus acts that could reduce or eliminate the need for the University's need for "fair share" funding of off-site mitigation costs. The Department believes the holdings of these cases are inapplicable to the Proposed Program and DSEIR because the DSEIR and these responses to comments adequately explain just how exhaustively the Department has considered whether and how it has the legal and technical capacity to attempt to mitigate the extra-jurisdictional impacts, such as those on cultural resources and noise. Unlike the University in the *City of Marina* and *City of San Diego* cases, the Department has fully explored all of its feasible options for mitigating these impacts through changes to the Program, including mitigation measures and alternatives, but it has concluded, based on substantial evidence, that no such feasible options exist to reduce these impacts to a less-than-significant level or to avoid them entirely.

As explained above, for example, the Department considered whether it could obtain additional funding for some types of mitigation, but concluded it is constrained by Fish and Game Code Section 711, subdivision (a)(1), which limits the Department's funding for nongame programs (the category into which the suction dredging program falls) to certain sources: (i) the General Fund, which is subject to the appropriative discretion of the Legislature; (ii) nongame user fees, which are prescribed for use according to statute; and (iii) sources other than the Fish and Game Preservation Fund, which are fees available by statute only for specific uses and which do not include the Proposed Program. Consistent with the directive under AB 120 and its authority as an executive branch agency, the Department will continue to pursue other funding options through legislative appropriation channels; however, there is no assurance that any additional legislative appropriations would be approved. Therefore, the Department cannot rely on the hope of any such future funding to further mitigate beyond the feasible limits identified in this EIR.

Moving on, a number of comments contend the Public Trust Doctrine provides the Department with the independent legal authority recognized as necessary by Public Resources Code Section 21004. In considering these comments, the Department is guided by the California Supreme Court's seminal decision in *National Audubon Society v. Superior Court et al.* (1983) 33 Cal.3rd 419 ("*National Audubon*") and other related case law. (See, e.g., *EPIC*, *supra*, 44 Cal.4th 459; *FPL*, *supra*, 166 Cal.App.4th 1349.)

Rooted historically in California as a shield to protect tidelands, the California Supreme Court described the Public Trust Doctrine almost 30 years ago as "more than an affirmation of state power to use public property for public purposes. It is an affirmation of the duty of the state to protect the people's common heritage of streams, lakes, marshlands and tidelands, surrendering that right of protection only in rare cases when the abandonment of that right is consistent with the purposes of the trust." (*National Audubon*, *supra*, 44 Cal.4th at p. 441.) Tasked with reconciling the Public Trust Doctrine and California's appropriative water rights system, the court remarked, "we believe that before state courts and agencies

approve water diversions they should consider the effect of such diversions upon interests protected by the public trust, and attempt, so far as feasible, to avoid or minimize any harm to those interests." (*Id.*, at p. 426.) According to the court, "[t]he public trust doctrine serves the function in that integrated system of preserving the continuing sovereign power of the state to protect public trust uses, a power which precludes anyone from acquiring a vested right to harm the public trust, and imposes a continuing duty on the state to take such uses into account in allocating water resources." (*Id.*, at p. 452.)

The Public Trust Doctrine clearly applies to fish and wildlife resources. (*FPL*, *supra*, 166 Cal.App.4th at pp. 1359–1364.) With respect to those resources, the California Supreme Court considered in *EPIC* whether an incidental take permit (ITP) issued by the Department under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.) "constituted abandonment of … DFG's public trust obligation to protect the natural resources of the state[.]" (*EPIC*, *supra*, 44 Cal.4th at p. 515.) According to the Supreme Court:

> "As the Court of Appeal recognized, there are two distinct public trust doctrines invoked by EPIC. First is the common law doctrine, which involves the government's 'affirmative duty to take the public trust into account in the planning and allocation of water resources....' [Citation omitted.] The second is a public trust duty derived from statute, specifically Fish and Game Code section 711.7, pertaining to fish and wildlife: 'The fish and wildlife resources are held in trust for the people of the state by and through the department.' (*Id.,* subd. (a).) There is doubtless an overlap between the two public trust doctrines—the protection of water resources is intertwined with the protection of wildlife. [Citation omitted.]"
>
> (*Ibid.*, citing *National Audubon*, *supra*, 33 Cal.3th at pp. 446–447; Fish & G. Code, § 711.7, subd. (a).)

The Supreme Court continued, "[n]onetheless, the duty of government agencies to protect wildlife is primarily statutory." (*EPIC*, *supra*, 44 Cal.4th at p. 515.) The court then quoted policy in Fish and Game Code Section 1801, including subdivision (h), and stated, "[g]enerally speaking, therefore, we will look to the statutes protecting wildlife to determine if the Department or another government agency has breached its duties in this regard." (*Ibid.*)[4]

The Supreme Court turned, in this respect, to controlling statute to assess the plaintiffs' claim that the Department violated the Public Trust Doctrine. Noting its earlier conclusion that the Department had, in fact, gone further in granting the CESA ITP than authorized by statute, the court found the violation was "not of some general public trust duty, but of a specific statutory obligation." (*Ibid.*) Finding no support in the record for plaintiffs' second related claim, the court concluded that the Department had not violated a "common law public trust duty." (*Id.* at p. 516.)

[4] As noted earlier, Fish and Game Code Section 1801, subdivision (h), provides that the "policy of the state to encourage the preservation, conservation, and maintenance of wildlife resources under the jurisdiction and influence of the state" is not intended to provide "any power to regulate natural resources or commercial or other activities connected therewith, except as specifically provided by the Legislature."

The First Appellate District took a similar tack in *FPL*. Holding that members of the public may enforce the public trust against responsible public agencies, the Court of Appeal indicated that the Public Trust Doctrine "places on the state the responsibility to enforce the trust." (*FPL*, *supra*, 166 Cal.App.4th at p. 1368.) Making that point following a discussion of the Department's trustee jurisdiction under Fish and Game Code Section 1802, however, the court acknowledged the case before it provided no reason to "address the [public trust] responsibilities that sundry agencies bear in this regard, [and] whether such obligations be imposed by statute or by common law." (*Id.* at p. 1369.) The court instead remarked that it mattered "not whether the obligations imposed by the public trust are considered to be derived from the common law or from statutory law, or from both. Either way, public agencies must consider the protection and preservation of wildlife although, as the Supreme Court indicates, the contours of that obligation are, '[g]enerally speaking' … defined by statute." (*Id.* at p. 1364.)

The Supreme Court's decisions in *National Audubon* and *EPIC*, and the Court of Appeal's decision *FPL* provide important guidance in the present case. Most important for purposes of the Public Trust Doctrine generally, is that the Department's related substantive obligations are rooted in and governed by the Fish and Game Code. Furthermore, to the extent the Department has a related common law obligation separate from the Fish and Game Code, or simply as a result of its trustee mandate, that common law obligation requires the Department to consider the effect of its actions on trust resources and attempt, so far as feasible, to avoid or minimize any harm to those interests.

The Department finds no legal support against this backdrop for the argument that the Public Trust Doctrine provides the Department with stand-alone, substantive legal authority in the present case. As a state agency that exists entirely by statute, the Department's substantive obligations and related legal authority begins and ends with the Fish and Game Code. Separate from that authority, even if the common law Public Trust Doctrine applies to the Department, any related obligations are limited to considering the effects of its actions on trust resources and, consistent with the legal authority recognized as necessary by Public Resources Code Section 21004, to address those effects to the extent feasible. The Department disagrees, as a result, that the Public Trust Doctrine provides the Department with the substantive legal authority necessary to require individual suction dredgers to avoid or substantially lessen the water quality, cultural resource, and noise impacts identified in the DSEIR as significant and unavoidable. Those effects are beyond the substantive reach of the Department under the Fish and Game Code.

Finally, as noted above, the Department expects some comments will argue that recent amendments to Fish and Game Code Section 5653.1 provide the Department with the legal authority to fully mitigate all the significant and unavoidable effects identified in the DSEIR. AB 120, enacted as an urgency measure on July 26, 2011, modified existing law establishing a statewide moratorium on suction dredging while the Department completes the current environmental review and rulemaking effort. (See generally Fish & G. Code, § 5653.1, added by Stats. 2009, ch. 62, § 1, p. 2, and amended by Stats. 2011, ch. 133, § 6, p. 9.) Under former Section 5653.1, the interim moratorium was set to expire upon the Department's certification to the Secretary of State that it had certified this SEIR, adopted updated regulations, and those regulations had taken effect. (Fish & G. Code, 5653.1, subd. (b)(1)-(3).) As amended, the interim moratorium established by Section 5653.1 will expire by its

own terms on June 30, 2016. (*Id.*, subd. (b).) The moratorium could also end earlier, however, if the Department certifies the three conditions highlighted above, along with two other conditions added by AB 120. The two conditions added by AB 120 involve the certification by Department that the updated regulations "fully mitigate all identified significant environmental impacts" and that a "fee structure is in place that will fully cover all costs" for the Department to administer the Proposed Program. (*Id.*, subd. (b)(4)-(5).)

The *full mitigation* certification contemplated by Section 5653.1 does not provide the Department with the substantive legal authority necessary to address significant environmental effects beyond the reach of the Department's existing jurisdiction. The condition is one of five that, if all are certified by the Department in combination, could shorten the length of the existing moratorium. Nothing in AB 120, or Section 5653.1, as amended, provides the Department with any new or different regulatory authority with respect to suction dredging generally. AB 120, in this respect, does not provide the Department with substantive legal authority to address the significant and unavoidable impacts identified in the DSEIR that fall outside of the Department's existing jurisdiction.

MR-GEN-7: Definition and Determination of Deleterious

A number of comments expressed concern regarding the Department's determination that suction dredging under the proposed regulations will not be deleterious to fish. A number of comments contend the benchmark used by the Department in making its determination is not consistent with related legislative history or the published California trial court decision in *People v. Guntert* (1981) 126 Cal.App.3d Supp. 1 ("*Guntert*"). Finally, various comments contend the Department should consider any adverse effect caused by suction dredging on any individual fish to be deleterious for purposes of the Fish and Game Code.

The Fish and Game Code provides, "If the Department determines, pursuant to the regulations adopted pursuant to Section 5653.9, that the [suction dredge] operation will not be deleterious to fish, it shall issue a permit to the applicant." (Fish & G. Code, § 5653, subd. (b).) The term "deleterious" is not defined in the Fish and Game Code, despite appearing in seven different sections of the code. (See *Id.*, §§ 1505, 5650, subd. (a)(6), 5653, subd. (b), 5948, 6100, 6303, 12016.) In each of the seven sections, the term is used in a different way, in a different context, suggesting the Legislature intended the term "deleterious" to be construed and applied based on the specific context at issue. In the present case, that context is suction dredging.

The Department's determination that suction dredging consistent with the proposed regulations will not be deleterious to fish is consistent with law and supported by substantial evidence. The determination is the result of a comprehensive technical analysis of the best available science and other relevant information, vetted through a lengthy and extensive public review. The Department's determination is also based on a specific finding that related impacts on fish as broadly defined by the Fish and Game Code will not manifest at the community or population level, or persist for longer than one reproductive or migration cycle. Indeed, the proposed regulations meet the objective of safeguarding against such effects through a variety of mechanisms, including species- and waterbody-specific closures and seasonal restrictions, restrictions and limitations on the use of specific vacuum or suction dredge equipment, and annual limits on the number of permits issued by

the Department. This approach and the benchmark ultimately employed by the Department to inform its determination are consistent with related legislative history, the Department's stated mission and overall charge as California's trustee agency for fish and wildlife, the Department's substantive regulatory authority governing suction dredge mining, and common sense.

Even so, a number of comments contend the Department's deleterious effects determination is inconsistent with controlling law, particularly the published trial court decision in *Guntert*. The Department does not agree. In *Guntert*, the Appellate Department of Placer County Superior Court reviewed a decision by the Foresthill Justice Court involving an alleged criminal violation of what is now Fish and Game Code Section 5650, subdivision (a)(6).[5] Central to the action was a stipulation between the parties defining the word "deleterious" for purposes of a jury instruction governing whether the defendant "did permit to pass into and deposit in the American River a substance and material deleterious to fish and plant life." (*Guntert*, *supra*, 126 Cal.App.3rd Supp. at pp. 6–7.) According to the stipulated instruction:

> "The word 'deleterious' as used in the statute means more than merely harmful in a negligible or transitory way; it is something noxious or pernicious, that will kill, destroy or cause severe injury to fish, birds or plants. A substance or material is not deleterious if it is not destructive of the life of fish, birds or plants to such a degree that the fish, birds or plants can no longer continue to inhabit the stream in their previous numbers and location."
>
> *(Ibid.)*

Describing the jury instruction as rooted in a New York case from 1884 and "nearly unintelligible," the Superior Court observed the instruction appeared to "require that a substance cause a permanent annihilation or displacement of fish or wildlife before the substance may be considered deleterious." (*Id.* at p. 7.) The court then stated:

> [T]he stipulated instruction could be interpreted so as to permit someone to dump sulfuric acid into a stream, to annihilate the fish population in the immediate vicinity of the dump, and to escape criminal responsibility by showing that the fish population subsequently recovered. We hardly think that the Legislature intended to sanction that possibility when it enacted Fish and Game Code Section 5650.
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> (*Id.* at p. 8.)

Turning to the evidentiary issue in the criminal case before it, the Superior Court commented: "Because the parties stipulated at the outset of trial to defendant's erroneous instruction, and because the instruction served to frame the issues, the trial proceeded much like a pool game on an uneven table." (*Ibid.*) According to the Superior Court, the

[5] Fish and Game Code Section 5650, subdivision (a)(6), makes it "unlawful to deposit in, permit to pass into, or place where it can pass into the waters of this state … [a]ny substance or material deleterious to fish, plant life, mammals, or bird life."

defendant had one defense during trial and, by improperly ordering the jury to disregard related testimony from the defendant's principal expert, the trial court "took that defense in its entirety from the jury." (*Id.* at p. 10.) Finding the error prejudicial, the Superior Court remanded the action for further proceedings in the Justice Court. (*Ibid.*)

In considering a proper jury instruction on remand, the Superior Court emphasized its obligation to "give effect to statutes," and to interpret statutory language guided by context and common sense usage. (*Id.* at p. 8.) The obvious purpose of Section 5650, the court noted, "is to protect the marine habitat of the waters of California. In this regard," the court continued:

> [W]e recognize that a little of a good thing, such as sand, will have no effect on marine life when it is deposited in a river but that too much of a good thing, such as sand, can produce very potent effects indeed on the marine habitat. Synthesizing Webster[6] with the purpose of the statute, and keeping in mind that nobody wants to see boys prosecuted for skipping rocks on pools of the American River, we conclude that for purposes of [what is now Fish and Game Code Section 5650, subdivision (a)(6)] a substance or material is deleterious if, because of its nature or quantity, it has a harmful effect on fish, plant life or bird life when it is deposited in the waters of the State of California.
>
> *(Ibid.)*

The Department disagrees against this backdrop that its deleterious effect determination is inconsistent with *Guntert*. As an initial legal matter, *Guntert* is instructive, but not controlling. *Guntert* addresses an evidentiary issue in a criminal prosecution under what is now Fish and Game Code Section 5650, subdivision (a)(6). The court's comments on remand regarding an appropriate jury instruction are also tied specifically to the same section and subdivision. The Department, in contrast, is currently engaged in quasi-legislative rulemaking governing suction dredging under Fish and Game Code Section 5653, an entirely different section. In the present context, the Department is considering and has determined after careful review that suction dredging under the proposed regulations—as an *activity*—will not be deleterious to fish. *Guntert*, again, addresses when a *substance or material* is deleterious to fish, plant, or bird life for purposes of criminal prosecution under a different section of the Fish and Game Code. *Guntert* is instructive, in this respect, but not controlling.

Legal context aside, some of the criticism leveled against the Department is rooted in the stipulated instruction set aside by the Superior Court in *Guntert*. As noted above, the court rejected the agreed on instruction concerned it would permit someone to "annihilate" a population of fish and then "escape criminal responsibility by showing that the fish population subsequently recovered." (*Id.* at p. 8.) In so doing, the court recognized correctly that a material or substance may still be deleterious to fish, plant, or bird life far short of permanent annihilation or displacement of a given population. The Department agrees. Just

[6] The Superior Court noted, "Webster defines 'deleterious' as, 'having an often obscure or unexpected harmful effect.'" (*Guntert*, *supra*, 126 Cal.App.3rd Supp. at p. 8.)

because a fish population recovers does not mean the underlying causative agent is not deleterious. The Department's deleterious effects determination in this application, does not suffer the same shortcoming that marked the initial jury instruction in *Guntert*.

The benchmark for the Department's determination is not permanent annihilation or displacement. Nor is it based on a conclusion that affected populations of fish will ultimately recover at some unspecified time in the future. The Department's determination rests instead on careful analysis and a substantive conclusion that suction dredging under the proposed regulations will not be deleterious to fish as broadly defined in the Fish and Game Code.[7] The Department's determination is based specifically on a finding that related impacts on fish will not manifest at the community or population level, or persist for longer than one reproductive or migration cycle. In so doing, the Department believes, and substantial evidence supports its determination that, effects on fish as a result of suction dredging under the proposed regulations will not *annihilate* or *displace* any community or population of fish, and any other effects will persist, if at all, for no longer than one reproductive or migration cycle. In contrast, the stipulated instruction set aside in *Guntert* was based fundamentally on the notion that material is not deleterious unless impacts result to such a degree that fish no longer inhabit a particular watercourse in their previous numbers and location. The Department makes no similar error here.

The Department's deleterious effects determination is also consistent with the court's direction on remand in *Guntert*. The Superior Court, after rejecting the stipulated instruction, looked forward underscoring its obligation to interpret statutory language guided by context and common sense usage. Turning to the specific statutory language at issue, informed by various practical considerations, the court concluded, "a substance or material is deleterious if, because of its nature or quantity, it has a harmful effect on fish, plant life or bird life when it is deposited in the waters of the State of California." (*Id.* at p. 8.) At the same time, the court also highlighted an ordinary dictionary, noting the word *deleterious* was defined as an "often obscure or unexpected harmful effect." (*Ibid.*)

Some comments cast the court's finding on remand to stand for the proposition that "deleterious" means "harmful" as a matter of law. In other words, suction dredging is deleterious to fish for purposes of the Fish and Game Code if any related harmful effect to any individual fish would result. The Department disagrees. First, as highlighted in the preceding paragraph, the *Guntert* court itself cast its conclusion in terms of obscure and unexpected harmful effects, and not just harmful effects. Likewise, the court cast its conclusion against the backdrop of broader concerns, speaking in terms of fish, plant, and bird life generally; impacts on fish populations specifically; and the Legislature's focus on habitat protection generally. Importantly, the court also cast its conclusion acknowledging the practical complexities inherent in any deleterious determination, admonishing that boys should not be prosecuted for skipping rocks. Viewing *Guntert* in context, the Department does not agree the case equates deleterious under the Fish and Game Code with any harmful effect, particularly on an individualized basis. The Department's deleterious effects determination does not run afoul of the court's direction on remand for the same reason.

[7] Section 45 of the Fish and Game Code defines "fish" to mean "wild fish, mollusks, crustaceans, invertebrates, or amphibians, including any part, spawn, or ova thereof."

The view in the present context that any harm caused by any suction dredging operation to any individual fish is deleterious under the Fish and Game Code cannot be reconciled with the Department's broader mandate. The Department's long-stated mission is to manage California's diverse fish, wildlife, and plant resources, and the habitats on which they depend, for their ecological values and their use and enjoyment by the public. To that same end, the Fish and Game Code casts the Department's jurisdiction broadly in terms of managing biologically sustainable populations of fish and wildlife. (Fish & G. Code, § 1802.) Codified state policy, in turn, underscores the importance of maintaining viable populations of species not only for their intrinsic value, but also for their use and enjoyment, including hunting and fishing. (See generally *Id.*, § 1801.) Indeed, with respect to these activities, state policy highlights the importance of regulation to maintain viable wildlife resources, public safety, and quality outdoor experience. (*Id.*, subd. (e).) Similarly, codified policy makes clear that one objective of the California's broader wildlife conservation effort is the overall economic well-being of the citizens of the state. (*Id.*, subds. (f), (g).)

The Department is sympathetic to the goal of protecting every individual fish. However, that goal is neither mandated nor reasonable in this case. Suction dredging, under the proposed regulations, may harm an individual fish or a small number of individual fish on a temporary, localized basis. Yet, the proposed regulations will also ensure that authorized suction dredging will not result in impacts on fish that manifest at the community or population level, or persist for longer than one reproductive or migration cycle. In this sense, any impacts on fish that do occur with suction dredging authorized under the proposed regulations will be less than significant and not deleterious. This approach is consistent with California's codified policy to conserve wildlife at a population level. It also serves an important equitable interest. It would be unfair if individualized harm to fish is the benchmark for suction dredging compared with other recreational groups, such as fishermen, that also take fish on an individualized basis. That result would not be consistent with the wildlife policy of the State of California.

The Department's approach to deleterious effects, and its related determination generally, are also supported by legislative history. A related word of caution, however, is also important. Legislative history is instructive only if it sheds light on the "collegial view of the legislature as a whole" at the time the legislation at issue is adopted. (*Kaufman & Broad Communities v. Performance Plastering Inc*. (2005) 133 Cal.App.4th 26, 30 ("*Kaufman*").) The opinion of a single legislator or bill proponent may be interesting, but individual opinion does not establish the intended scope of the legislation unless that opinion is representative of the view of the Legislature as a whole. For suction dredging, the relevant legislative history begins in 1961, when California enacted its first statute (AB 1459) specifically regulating suction dredging. A review of that and other subsequent legislative history does not establish a unified understanding regarding what criteria the Department should use to evaluate whether suction dredging is deleterious to fish**.** The legislative history does reveal, however, a consistent understanding of the "intent" of the legislation ultimately enacted, suggesting that intent is representative of the Legislature's view as a whole.

In short, legislative history in the present case demonstrates an overall intent to prevent disruption to key salmon and trout-spawning habitat from suction dredge activities. (See, e.g., Analysis of SB 1459, Legislative Analyst (June 9, 1961) (noting that suction dredging "has led to some problems with respect to disturbing spawning areas"); State of California

Interdepartmental Communication to the Honorable Edmund G. Brown, Governor, from the Director, Department of Fish and Game (June 28, 1961) (recommending approval of the bill and noting that it is "very much concerned over the possible effects this [suction dredge] equipment may have on spawning areas as well as aquatic life"); Bill Memorandum from Alexander Pope, Legislative Secretary to Governor Brown (July 14, 1961) (noting that "damage to spawning areas [from suction dredging] is particularly feared"); Letter from Stanley Arnold to Honorable Edmund G. Brown, Governor of California (June 16, 1961) (noting "the [suction dredge] equipment will definitely disturb and remove both salmon and trout eggs which are laid in the gravel bottoms of streams.").)

The Legislature, in this respect, appears principally and consistently focused in the legislative history on protecting specific fish species from suction dredging during particularly vulnerable times of those species' spawning life cycle. (See Letter from Stanley Arnold to Honorable Edmund G. Brown, Governor of California (June 16, 1961) (noting that suction dredging could adversely affect fish and aquatic life unless "activities are limited to less sensitive areas or are pursued during times of the year when damage would be minimal.").)

The Department's proposed regulations are structured to the same effect. That is, the Department's Proposed Program is designed to prevent suction dredging from affecting fish populations and communities with persistent, harmful disruption of reproductive and migration cycles. Stated another way, the Department's Proposed Program is designed to ensure that suction dredging is limited or banned in waterways when necessary to protect fish species' critical life stages. This approach, again, is consistent with relevant legislative history.

In sum, comments criticizing the Department's deleterious effects determination reflect differing viewpoints about when and under what circumstances suction dredging is or should be considered deleterious under Fish and Game Code Section 5653, subdivision (b). Those differing viewpoints, in fact, play an important role in informing these ongoing administrative proceedings, just as they have and will likely continue to do so in the legislative arena and the courts. In the interim, however, the Department is charged by existing law to administer a suction dredge permitting program under the Fish and Game Code, and that charge vests the Department with quasi-legislative authority and the related obligation to ensure through regulation that authorized suction dredging will not be deleterious to fish. Under that authority, the decision as to when and under what circumstances suction dredging will not be deleterious to fish ultimately rests with the Department.

MR-GEN-8: Need for Permit-by-Permit CEQA Review and Individualized Deleterious Effect Determinations under the Fish and Game Code

The Department received a number of comments contending the Department should conduct CEQA review on an individualized basis for every permit issued under the proposed regulations. According to some comments, permit-by-permit CEQA review is necessary because the issuance of suction dredge permits is discretionary for purposes of CEQA and not ministerial. Other comments question whether the environmental review

effort currently underway is sufficient for the Department to issue individual permits under the proposed regulations.

The Department received similar comments regarding the deleterious effect determination that the Department is required to make under Fish and Game Code Section 5653. In general, these comments contend that the Department must make an operation-specific deleterious effect determination for every permit. According to some of the comments, the Department is precluded from issuing any individual permit unless it determines that the specific operation will not be deleterious to fish. These comments, as well as those related to CEQA, are both addressed below.

Permit-By-Permit CEQA Review

Fish and Game Code Section 5653 et seq. sets forth the requirements for the Department's Proposed Program. To begin, subdivision (a) prohibits the use of any vacuum or suction dredge equipment in any river, stream, or lake in California, except as authorized under a permit issued by the Department in compliance with regulations adopted pursuant to Section 5653.9. Section 5653.9, for its part, requires the Department to adopt regulations to implement Section 5653, and to promulgate those regulations in compliance with CEQA and the APA. The scope and subject of the regulations to be adopted by the Department is described in Section 5653, subdivision (b). According to that subdivision, the regulations adopted by the Department shall designate (1) waters or areas where vacuum or suction dredges may be used pursuant to a permit, (2) waters or areas closed to those dredges, (3) the maximum size of dredge that may be used, and (4) the time of year when dredges may be used. In so doing, the required regulations prescribe the time, place, and manner where vacuum and suction dredge equipment may be used in California under the Fish and Game Code Section 5653. The regulations also serve to ensure that authorized suction dredging will not be deleterious to fish. (Fish & G. Code, § 5653, subd. (b).)

Section 5653 also addresses the issuance of individual permits. Subdivision (b) provides, in pertinent part, "If the department determines, pursuant to the regulations adopted pursuant to Section 5653.9, that the operation will not be deleterious to fish, *it shall issue* a permit to the applicant." (Italics added.) Subdivision (c) speaks in similar terms: "The department shall issue a permit upon the payment" of the permit fee required by statute. In short, once the required regulations are adopted, the Department is directed by statute in mandatory terms to issue permits upon payment of the required permitting fee. (See also *Id.*, § 5653, subd. (a) (application requirements).)

Reading together the relevant portions of the Fish and Game Code, the Department is charged with administering the Proposed Program, including the issuance of individual permits, through regulations promulgated in compliance with CEQA and the APA. Under Section 5653, subdivision (a), permits may only be issued in compliance with the adopted regulations. Under subdivision (b), the adopted regulations govern the time, place, and manner when suction dredging is permitted in California under the Fish and Game Code. Under subdivisions (b) and (c), the issuance of permits is mandatory, but all such permits and any related suction-dredging activities are subject to and must comply with restrictions set forth in the adopted regulations. To that end, once the Department adopts the required

regulations informed by concurrent CEQA review, issuing individual permits is mandatory upon payment of the required fee.

Comments in favor of permit-by-permit CEQA review rely on an apparent conflict in the Fish and Game Code. On one hand, it is clear by statute that the "issuance of permits" is a discretionary project for purposes of CEQA. (See *Id.*, § 5653.1, subd. (a).) Indeed, as noted above, the Department is obligated by the Fish and Game Code to promulgate regulations governing the time, place, and manner of authorized suction dredging, and to adopt those regulations in conjunction with required environmental review under CEQA. (*Id.*, §§ 5653, 5653.9.) However, once the regulations are adopted, the issuance of individual permits is mandatory and seemingly ministerial. (*Id.*, § 5653, subds. (b), (c).)

The Department has given considerable thought to this apparent contradiction and the related claim that separate CEQA review is required for every individual permit. The Department recognizes, for example, that a proposed project with both discretionary and ministerial aspects must be treated as discretionary for purposes of CEQA. (CEQA Guidelines, § 15268, subd. (d).) At the same time, well-established principles of statutory construction require the Department to interpret the Fish and Game Code in a way that gives effect to controlling statutory language. (*Lambert Steel Co. v. Heller Financial, Inc.* (1993) 16 Cal.App.4th 1034, 1040 ("Significance should be given to every word, and construction making some words surplusage is to be avoided.").) The same is true of the Department's obligation to harmonize the controlling provisions in the Fish and Game Code with CEQA, giving effect to both. (*Ibid.* ("In addition, the various parts of a statutory enactment must be harmonized by considering the particular section in the context of the statutory framework as a whole."); see also *Isobe v. Unemployment Ins. Appeals Bd.* (1974) 12 Cal.3d 584, 590–591 ("A statute should be construed so as to harmonize, if possible, with other laws relating to the same subject.").) In so doing, the Department agrees the issuance of suction dredge permits consistent with and subject to the adopted regulations is discretionary for purposes of CEQA. The issuance of individual permits, however, is also a fundamental part of the *whole of the action* proposed by the Department and analyzed during the environmental review conducted concurrently with the related rulemaking required by Fish and Game Code Section 5653.9. Against this backdrop, including the mandatory obligation to issue permits, the Department believes the subsequent issuance of an individual permit is not a distinct, discretionary action requiring individualized CEQA review.

The Department's determination is consistent with the Fish and Game Code. Added in 2009, Section 5653.1, subdivision (a), provides:

> The issuance of permits to operate vacuum or suction dredging equipment is a project pursuant to [CEQA]…and permits may only be issued, and vacuum or suction dredge mining may only occur as authorized by any existing permit, if the department has caused to be prepared, and certified the completion of, an environmental impact report for the project pursuant to the court order and consent judgment entered in the case of the Karuk Tribe of California et al. v. California Department of Fish and Game, et al., Alameda County Superior Court Case No. RG 05211597 [*Karuk*].

Notice, for example, that the quoted subdivision casts the *issuance of individual permits* as the *project* specifically for purposes of the CEQA effort currently underway. Notice also, for purposes of CEQA, that the subdivision casts the issuance of permits as contingent only on certification of this SEIR. With the statutory mandate directing the Department to issue permits, if the Legislature had intended the Department to conduct individualized CEQA review for every permit, it would have said so. (*Williams v. County of San Joaquin* (1990) 225 Cal.App.3d 1326, 1332–1333 ("it is a well-accepted principle of statutory interpretation that when 'a statute, with reference to one subject contains a given provision, the omission of such provision from a similar statute concerning a related subject . . . is significant to show that a different intention existed.'").) The same is true in the broader context of Section 5653.1. Enacted in 2009 as an urgency measure, Section 5653.1 established an immediate statewide moratorium on instream suction dredge mining. (See Stats. 2009, ch. 62 (SB 670), § 1, p. 2, adding former Fish & G. Code, § 5653.1.)[8] As originally enacted, the moratorium would have ended by its own terms when the Department completed the environmental review effort currently underway, along with related rulemaking. Again, if the Legislature intended for the Department to conduct additional environmental review for individual permits before suction dredging could resume, presumably it would have said so.

That the issuance of individual permits is part of the whole of action subsumed by the current environmental review effort is also consistent with the order and consent judgment issued in the *Karuk* litigation. In *Karuk*, the court found new information that the Department's "pattern and practice of issuing suction dredge mining permits under the current regulations could result in environmental effects different or more severe than the environmental impact considered in the 1994 EIR on the Coho salmon, and/or other fish listed as endangered or threatened after the completion of the 1994 EIR."[9] (*Karuk Tribe of California et al. v. California Department of Fish and Game*, Super. Ct. Alameda County, 2005, No. RG05211597, Order and Consent Judgment, December 20, 2006.) To that same end, the parties stipulated and the court issued the order and consent judgment, and directed the Department to conduct updated environmental review of the Proposed Program and, if necessary, to adopt updated regulations. In issuing the order and judgment, the court invoked Public Resources Code Section 21166, the provision in CEQA governing agency obligations to conduct unexpected subsequent or supplemental environmental review. Inherent in the reference to Section 21166 is the acknowledgment that the issuance of permits under the adopted regulations is discretionary for purposes of CEQA. (CEQA Guidelines, §15126, subd. (c) (the obligation to conduct subsequent or supplemental review only arises in the context of proposed discretionary action).) Also inherent in the order and consent judgment is the recognition that the issuance of individual permits under the adopted regulations is the *project* for purposes of the CEQA review ordered by the court. Nothing in the order and consent judgment suggests the parties or the court envisioned the Department's completing the required review only to conduct additional CEQA review on an individualized basis, permit by permit. Any such vision, of course, cannot be reconciled with the broader statutory context described earlier.

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[8] California amended Fish and Game Code section 5653.1, effective July 26, 2011. (Stats. 2011, ch. 133, § 6, p. 9.)

[9] The Department promulgated the existing regulations governing suction dredge mining in 1994 after preparing and certifying a related EIR (SCH No. 93102046). The existing regulations are found in the California Code of Regulations, Title 14, commencing with Section 228.

In short, the Department disagrees that individualized CEQA review is required on a permit-by-permit basis. That view cannot be reconciled with the controlling provisions of the Fish and Game Code. Indeed, the statutory language directing the Department in mandatory terms to issue individual permits may well render such action ministerial for purposes of CEQA. That view as well, however, is also difficult to reconcile with Section 5653.1, subdivision (a) ("issuance of permits" is discretionary for purposes of CEQA). The Department, in this respect, can only reconcile this apparent contradiction with the conclusion that the exercise of discretion tied to issuance of individual permits is part and parcel of the project at issue for purposes of the CEQA review the Department is required to conduct in promulgating the required regulations. Under this approach, instead of additional review being triggered by the issuance of an individual permit, the need for subsequent or supplemental environmental review for the permitting program as a whole is driven by Public Resources Code Section 21166. This view not only harmonizes the controlling provisions of the Fish and Game Code and CEQA, giving effect to both. It is also consistent with the order and consent judgment in the *Karuk* action, which specifically ordered the Department to conduct updated environmental review of the Proposed Program under Section 21166.

Other practical considerations also bear emphasis. The Department is well aware, more than any other state agency, of the ongoing controversy associated with suction dredging. The Department has been in the middle of the conflict for a number of years and expects to remain so for some time to come, as various stakeholders with disparate interests continue to focus on the issue. Mindful of the related complexities and likely litigation, the Department believes its determination regarding permit-by-permit CEQA review is also rooted in common sense. As noted above, the issuance of individual permits, by statute, is an inherent part of the *project* at issue for purposes of the CEQA review effort currently underway. Under well-established CEQA principles, subsequent, supplemental, or additional environmental review generally is the exception to the norm. (*Laurel Heights Improvement Assn. v. Regents of the University of California* (1993) 6 Cal.4th 1112, 1130.) Yet, at the same time, additional permit-specific review may be appropriate in limited circumstances, an issue the Department's proposed regulations embrace head on. As emphasized already, the Department's proposed regulations include detailed time, place, and manner restrictions for suction dredging on a waterbody-specific basis throughout California. Submit an application, pay the required fee, suction dredge consistent with the regulations, and nothing more is generally required under the "standard" provisions in the regulations. Propose to deviate, however, and only within certain prescribed parameters, and other requirements apply. First among them, importantly, is the obligation to submit a notification to the Department pursuant to Fish and Game Code Section 1600 et seq. The Department may determine in response to the notice that a Lake and Streambed Alteration Agreement (LSAA) is required, an agreement that can only be executed by the Department following required compliance with CEQA. In other words, if any permittee proposes to deviate from the standard provisions in the regulations governing suction dredging generally, the Department will conduct operation-specific CEQA review where, in response to the required notification, an LSAA is necessary to protect fish and wildlife resources.

Where an LSAA is necessary, the Department currently envisions that tiered, project-specific environmental review will occur. (See generally Pub. Resources Code, §§ 21093, 21094; CEQA Guidelines, § 15152.) In so doing, the Department will prepare an initial study

or other analysis and determine whether a project-specific negative declaration, mitigated negative declaration, or EIR is required. Second-tier, project-specific environmental documents will also be subjected to required public review prior to any final action. Importantly, the cost incurred by the Department to conduct project-specific environmental review for the related LSAA will be borne by the permit applicant, along with the related LSAA permitting fee. (See generally Pub. Resources Code, § 21089, subd. (a); Cal. Code Regs., tit. 14, § 699.5.)

In sum, the Department acknowledges the issuance of suction dredge permits is discretionary for purposes of CEQA. As for related environmental review, the issuance of individual permits is the *project* and a fundamental part of the *whole of the action* for the CEQA review and rulemaking effort currently underway. Against this backdrop, coupled with the Department's mandatory obligation to issue permits once the required regulations are adopted, the argument that individualized permit-by-permit CEQA review is required cannot be reconciled with controlling statute and legislative intent. That is not to say, however, that the Department's Proposed Program or certain individual permits are immune from additional environmental review. As to the Program as a whole, just as the court acknowledged in the *Karuk* litigation, the need for subsequent or supplemental review of the permitting program as a whole is governed under existing law by Public Resources Code Section 21166. Likewise, for suction dredging operations subject to the LSAA notification requirements, no such agreements can or will be executed by the Department without appropriate project-specific CEQA review. In the Department's opinion, this approach is the only common sense way to reconcile the legal principles that the issuance of permits generally is discretionary, but once the required regulations are adopted, the issuance of individual permits consistent with and subject to the regulations is mandatory.

Permit-By-Permit Deleterious Effect Determinations

The Department also received a number of comments contending the Department must make permit-specific deleterious effect determinations under the Fish and Game Code. According to some comments, individual permits cannot be issued without a determination by the Department that the specific operation proposed by a permit applicant will not be deleterious to fish. In other words, various comments argue the Fish and Game Code requires the Department to make a deleterious effect determination on an individual basis every time a permit is issued.

Comments making these arguments are focused on Section 5653, subdivisions (a) and (b). Read together, according to the comments, these subdivisions stand for the proposition that suction dredging is prohibited unless the Department makes a permit-specific determination that the specific operation will not be deleterious to fish. This argument, however, focuses on limited language without broader context, ignoring particularly the purpose and scope of the regulations the Department is required to adopt under Fish and Game Code Section 5653.9.

Section 5653.9 provides, in pertinent part, that the Department "shall adopt regulations to carry out" Section 5653. As to the latter section, subdivision (a) does, indeed, prohibit the use of any vacuum or suction dredge equipment in California. The explicit exception to the

broad prohibition, however, is through a permit issued by the Department "in compliance with the regulations adopted pursuant to Section 5653.9." As to the substance of the regulations, Section 5653, subdivision (b), directs the Department to adopt specific time, place, and manner restrictions when vacuum and suction dredge equipment "may be used." The same subdivision also defines by law when such equipment may be used (i.e., when it "will not be deleterious to fish"). In so doing, the only discretion left to the Department by statute is to determine and promulgate regulations identifying the time, place, and manner restrictions required to ensure that authorized suction dredging will not be deleterious to fish. Indeed, as noted above, once the Department adopts the regulations, the Fish and Game Code directs the Department in mandatory terms to issue permits simply upon payment of the permitting fee required by statute. (Fish & G. Code, § 5653, subd. (c).) Promulgating the regulations required by statute is, in law and practice, the Department's determination as to when suction dredging "by any person in any river, stream, or lake of this state" will not be deleterious to fish. Arguments in support of permit-by-permit deleterious effect determinations cannot be reconciled with controlling statute.

In making their argument, as noted above, comments focus on Section 5653, subdivisions (a) and (b). The crux of their argument, according to comments, is the following sentence in subdivision (b): "If the department determines, pursuant to the regulations adopted pursuant to Section 5653.9, that *the operation will not be deleterious* to fish, it shall issue a permit to the applicant." (Italics added.) The highlighted language, according to the comments, requires the Department to make an operation-specific determination. That language, however, cannot be read in isolation. Indeed, the same sentence speaks of the determination *pursuant to the regulations*. The comments overlook this point of law and, even more importantly, the broader scope and context of the Department's statutory charge to promulgate regulations defining when authorized suction dredging will not be deleterious to fish. In other words, to focus on a single portion of a single sentence in Section 5653, subdivision (b), is to miss the point that the determination as to when suction dredging "by any person in any river, stream, or lake of this state" will not be deleterious to fish is made in the context of the Department promulgating the regulations required by Section 5653.9.

In sum, the Department disagrees with comments that deleterious effect determinations are required by the Fish and Game Code on a permit-by-permit basis. That determination is made, and it is part and parcel of the Department's statutory charge to promulgate regulations defining the circumstances when authorized suction dredging will not be deleterious to fish. The argument that operation-specific determinations are required in addition to or outside the context of the required regulations cannot be reconciled with the controlling provisions of the Fish and Game Code.

MR-GEN-9: Enforcement Capabilities

Some comments expressed concern regarding the Department's enforcement capabilities. The Department received a number of comment letters questioning whether the Department has sufficient personnel, including law enforcement, to monitor individual suction dredge operations, and to enforce and prosecute individuals and permitees conducting operations in violation of the proposed regulations and other applicable law. According to the comments, because the Department allegedly lacks sufficient personnel to

monitor and enforce the proposed regulations and other applicable law, the Department cannot conclude, as CEQA contemplates, that the regulations would be fully enforceable and related impacts would be less than significant.

The Department currently employs 392 fish and game wardens. The Department wardens have full peace officer authority, and their jurisdiction extends anywhere in the state. (Pen. Code, § 830.2, subd. (e); Fish & G. Code, § 856.) The primary duty of Department wardens is to detect and investigate violations of the Fish and Game Code and its implementing regulations. Once an investigation is complete, the warden either issues a citation directly to the offender or files a formal complaint with the local District Attorney's Office (or the Attorney General's Office) recommending that criminal or civil charges be filed. It is up to the District Attorney (or in some cases the Attorney General's Office) to prosecute an enforcement action. (See, e.g., Gov. Code, § 26500.)

The Department acknowledges the need for more fish and game wardens. The Department has advocated expansion of its warden force to more effectively detect and deter violations of the Fish and Game Code and its implementing regulations. Poaching violations, which include exceeding limits on the number, size, and species of fish or game that may be taken at different times and locations, are of such a nature that they are often undetected. Similarly, efforts to combat violations related to lucrative black markets in wildlife products would be enhanced with an expanded warden force. However, these violations are fundamentally different, and much harder to detect, than illegal suction dredging. Suction dredge operations are relatively stationary, they are conducted for extended periods of time, and, as a water-dependent activity, they can only be conducted within limited areas. This provides greater opportunity for detection of violations by the Department's warden force.

But wardens are not alone in detecting illegal dredging operations. Wardens work closely with both enforcement officers and non-enforcement staff from other federal, state, and local agencies, including officers from agencies focused on resource management, such as the U.S. Forest Service (USFS), Bureau of Land Management, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, and the California Department of Parks and Recreation. Wardens also investigate information provided by members of the general public and interested nongovernmental organizations.

Tips from members of the public and other agency personnel are strongly encouraged by the Department, and the Department has a robust program to facilitate public input. The Department established the Californians Turn In Poachers and Polluters Program (Cal-Tip) in 1981 to give members of the public an opportunity to assist in protecting the state's fish and wildlife resources. To implement the Cal-Tip program, the Department maintains a toll-free telephone number that operates 24 hours per day, 7 days a week. Calls are answered by law enforcement agency employees, and information is quickly disseminated to local wardens. Callers can remain anonymous if they wish. With existing staff levels, the Department responds to thousands of these tips every year.

Both before and after the moratorium went into effect, Department wardens have conducted patrols to monitor and detect suction dredging activity. Since the statutory moratorium went into effect in August of 2009, the Department has received more than 120

tips involving suction dredging, and has investigated or contacted suspected suction dredge miners on more than 225 occasions. Wardens have responded to every single report of possible suction dredging activity, and have found that most of the people contacted were aware of the moratorium, were not in violation of any law, and were cooperative with law enforcement. These contacts resulted in 17 citations, 17 warnings, and several successful prosecutions by local District Attorneys. The Department expects these high response and compliance rates to remain unchanged in the future. Whether existing staffing at the Department is sufficient to effectively enforce a program where 4,000 annual permits are issued depends on enforcement objectives in terms of the frequency of enforcement inspections desired and how detailed those inspections need to be. Based on previous experience, the Department believes that the inspection procedures, including the frequency of inspections, will be sufficient to assure that suction dredge mining under the proposed regulations will not be deleterious to fish.

While some of the comments suggest there will be high rates of noncompliance by members of the suction dredging community, CEQA does not require the Department to presume that there will be high rates of noncompliance or that suction dredge operators have a special propensity to violate the law. Indeed, as described above, prior Department contacts with the mining community indicate the vast majority of miners operate consistent with applicable laws.

The Department acknowledges there would be benefits to increased funding for Department law enforcement, including funds to increase the overall number of Department wardens in California. While these increases would likely enable the Department to investigate more violations of the Fish and Game Code that are difficult to detect, such as poaching and commercialization of wildlife, the Department disagrees that it is or will be unable to enforce the existing or proposed suction dredge regulations without additional resources. There is no support for suggestions that current staff levels make the proposed regulations unenforceable. The Department has demonstrated its ability to fully investigate and enforce law governing suction dredging, including alleged violations reported in recent years. There is no evidence that the Department's existing and foreseeable enforcement capacity renders the proposed regulations unenforceable or that, for purposes of CEQA, related impacts subject to the Department's regulatory authority under the Fish and Game Code will not be less than significant.

MR-GEN-10: Comments Discussing Alternatives to the Proposed Regulations

The Department received a number of comments addressing alternatives to the proposed regulations; some related to the alternatives considered in the DSEIR and others that are not. In addition, some comments discussed alternatives, highlighting related issues, but in many instances without an explicit acknowledgement that the comment was specifically related to alternatives.

Comments regarding alternatives implicate several general themes. First, many comments simply express a policy preference for a particular alternative, arguing the Department should adopt the alternative, as opposed to the Proposed Program. Second, various comments inquired about the environmentally superior alternative identified in the DSEIR, asking why the alternative was not identified as the Proposed Program and arguing that it

should be ultimately adopted by the Department. Third, the Department received a number of comments urging the Department to consider, if not adopt, various other alternatives not previously considered in the DSEIR. Each of these issues is addressed below.

CEQA's Requirements for an Adequate Alternatives Analysis

Some commenters criticized the Department's selection of the alternatives selected for analysis in the DSEIR. As required by State CEQA Guidelines Section 15126.6, however, the DSEIR considers a reasonable range of potentially feasible alternatives. That section provides that:

> [a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives.
>
> (CEQA Guidelines, § 15126.6, subd. (a).)

An EIR's alternative analysis need not be driven by any one particular impact or project objective, as some of the commenters appear to suggest. (See *Sierra Club. v. City of Orange* (2008) 163 Cal.App.4th 523, 545-547 [rejecting argument that EIR's alternatives analysis was insufficient because each alternative had environmentally disadvantageous aspects].) "CEQA establishes no categorical legal imperative as to the scope of alternatives to be analyzed in an EIR. Each case must be evaluated on its own facts, which in turn must be reviewed in light of the statutory purpose." (*Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 566.) For many projects, including this one, there may be "literally thousands of 'reasonable alternatives' to the proposed project" along a continuum of possible plans or versions of a proposed project or program. (*Village Laguna of Laguna Beach v. Board of Supervisors* (1982) 134 Cal.App.3d 1022, 1028–1029.) "Thus, as both the California and federal courts have recognized, '[t]he statutory requirement for consideration of alternatives must be judged against a rule of reason.'" (*Ibid.*)

CEQA requires lead agencies in the context of an EIR to describe a reasonable range of alternatives to the proposed project that could feasibly attain most of the basic project objectives and would avoid or substantially lessen any of the significant environmental impacts of the proposed project. Additionally, a No Project Alternative must be analyzed. Under CEQA, alternatives considered in an EIR need not be analyzed at the same level of detail as the proposed project.

Factors Guiding the Department's Selection of Potentially Feasible Alternatives for Analysis in DSEIR

The rationale for selecting the alternatives discussed in the DSEIR can be found in Chapter 6, "Alternatives." That discussion provides the reasoning that informed the Department's decision to select four alternatives for analysis in the DSEIR, including the required "no project" alternative. The Department believes that both the range of the alternatives selected for analysis and the alternatives themselves are "reasonable" in light of the basic project objectives and the facts and circumstances affecting the project, including its statewide setting, the limits of the Department's jurisdiction, availability of technical data, and economic and technological feasibility. No changes to the DSEIR's alternatives analysis are necessary.

To meet the CEQA requirements relative to alternatives, the Department considered four alternatives to the Proposed Program, including a "no program" alternative. With the exception of the No Program Alternative, all of the alternatives considered in the DSEIR focus on reducing one or more of the significant impacts of the Proposed Program. Because of the nature of the Department's authority under Fish and Game Code Section 5653 (see MR-GEN-7, above), the regulations are focused on avoiding "deleterious effects to fish." In addition, as described in the Initial Statement of Reasons, while some of the alternatives would further reduce adverse effects on fish, the Department has concluded that suction dredging conducted in accordance with the proposed regulations would not be deleterious to fish.

All of the significant and unavoidable impacts of the Proposed Program as identified in the DSEIR involve environmental resource issues that fall outside of the Department's regulatory authority under the Fish and Game Code. The Department did not analyze alternatives aimed at reducing or avoiding these extra-jurisdictional impacts because they are not even potentially feasible under the limits of the Department's regulatory authority. As noted above, CEQA requires that an agency consider "potentially feasible" alternatives, and not projects or programs that are clearly infeasible on their face. Keeping in mind the informational purpose of CEQA, an analysis of alternatives that are merely hypothetical owing to the constraints on the Department's jurisdiction ultimately would not be useful or helpful to the Department's decision makers or the public, because the Department lacks the legal authority to choose or implement programs that would require agency activity or enforcement outside the limits of its statutory jurisdiction.

The Proposed Program was selected for full analysis in the DSEIR because it could feasibly attain most of the basic project objectives and avoid significant environmental impacts related to the topics over which the Department has authority (i.e., those with a nexus to the concept of "deleterious to fish"). As described above, while the alternatives considered in the DSEIR would reduce adverse effects on fish to some greater extent than the Proposed Project, and thus meet the requirements of CEQA set forth in Guidelines Section 15126.6, none of the alternatives, including the Environmentally Superior Alternative, are needed to avoid deleterious effects on fish, since the Proposed Program would already accomplish this. Accordingly, the Department chose to analyze the Proposed Program as the project, as opposed to the Environmentally Superior Alternative identified in the DSEIR.

Other Alternatives Suggested by Comments

Various comments suggested a suite of alternatives beyond the DSEIR to the Department's general approach to the proposed regulations or to specific aspects of the proposed regulations. Examples of alternatives beyond those considered in the DSEIR, related to the Department's overall approach to the proposed regulations, include the following:

- conducting county-by-county, drainage-by drainage, or reach-by-reach evaluations to develop appropriate suction dredging requirements and approvals (for a discussion of this topic, please see below MR-GEN-16 and Chapter 3, *Section 228.5(a): Suction Dredge Use Classifications*);
- allowing additional permits to be issued under the Streambed Alteration Program, once the permit limit has been reached (for a further discussion of this topic, please see Chapter 3, "Section 228(g): Permit Cap");
- issuing permits for individual suction dredges, rather than to individuals;
- restricting the number of dredges per claim rather than the number of permits;
- making changes in the definition of a dredge (e.g.,, a request that a "dry land dredge" be exempt from these regulations);
- using a permit process more similar to that conducted for Timber Harvest Plans; and
- developing regulations governing site-specific investigations to allow dredging in closed areas. [10]

Examples of more specific alternatives suggested for particular aspects of the proposed regulations include the following:

- making changes to, or eliminating, certain use classifications that identify the seasons when suction dredging would be allowed (for a discussion of how the use classes were developed, see the response in Chapter 3, "Section 228.5(a): Suction Dredge Use Classifications");
- applying different restrictions for various species, such as a seasonal elevational restriction to protect passerines (for a discussion of impacts on passerines, see MR-BIO-12):
- closing areas to suction dredging that are already designated as closed pursuant to other regulatory authorities, or based on other protective types of designations (National Parks, Wild and Scenic Rivers, etc.) (for a discussion of

[10] The Department has no legal authority to promulgate regulations authorizing suction dredging in waters otherwise closed to the activity under the Fish and Game Code. That point is underscored in a January 6, 2000, informal opinion issued to the Department by the California Department of Justice, Office of the Attorney General. That informal opinion was adopted, in turn, by the Sacramento County Superior Court with a related judgment entered to the same effect in 2007. (See *Eason v. Department of Fish and Game et al.*, Super. Ct. Sacramento County, 2006, No. 06CS00768, judgment entered October 24, 2007.) The Superior Court judgment, itself predicated on the January 2000 opinion from the Office of the Attorney General, resulted in the deletion of former California Code of Regulations, Title 14, Section 228, subdivision (b)(1), as approved by the Office of Administrative Law on April 7, 2008 (OAL File No. 2008-0222-02 NR).

this topic, see the response in Chapter 3, "Section 228(m): Compliance with Other Laws");

- applying a "resting period" for streams;
- requiring a smaller nozzle size on smaller streams;
- requiring placement of absorbent pads under suction dredge motors to reduce the potential for petroleum spills/leaks;
- requiring use of mufflers;
- establishing noise standards in locations where no guidelines exist;
- soliciting suggestions regarding the appropriate forms of identification in obtaining a permit (for a discussion of this topic, see Chapter 3, "Section 228(c)(1): Identification Requirements for a Suction Dredge Permit");
- requiring GPS tracking units on dredges to help compliance/enforcement efforts; and
- providing education to dredgers about proper disposal of hazardous materials, ways to improve stream habitat through dredging, and other relevant topics.

Responses are provided to specific suggestions or critiques of alternatives made in individual comments on the DSEIR. Generally, however, the Department notes in this Master Response that it considered many of these alternatives and their related versions during development of the proposed regulations and identification of the reasonable range of alternatives carried forward by the Department for further consideration in the DSEIR. Furthermore, Chapter 3 provides some of the reasons why the proposed regulations were or were not changed based on public comment, including the types of suggestions summarized in this Master Response. Some of these alternatives or their related versions were patently infeasible and were not considered for further analysis for that reason. Others may have been potentially feasible but were rejected for policy or technical reasons.

Importantly, even with its best effort, it was not possible for the Department to consider every conceivable alternative in its CEQA analysis for the Proposed Program or to describe in the DSEIR, beyond what is legally required, why every alternative approach not carried forward was considered but rejected. That said, the reasons the Department rejected various alternatives or project design components for detailed review in the DSEIR are most often related to economic or technical feasibility, enforceability, and/or the nature and extent of the Department's regulatory authority pursuant to Fish and Game Code Section 5653 et seq. and the Fish and Game Code generally. For instance, faced with a permitting fee structure prescribed by statute, along with a related prohibition on the use of funds from other sources, the Department determined it was infeasible to perform detailed stream-by-stream evaluations throughout California. (See, e.g., Fish & G. Code, §§ 711, subd. (a)(1), 5653, subd. (c).) As another example, absent a related deleterious effect to fish, the Department has no authority under the Fish and Game Code in the context of Sections 5653 and 5653.9 to establish a noise standard in the controlling suction dredge regulations.

Comments expressing a preference for or arguing in favor of a particular alternative, as opposed to the Proposed Program, are an important part of the administrative record for

the Department's decision of whether to approve the Proposed Program or to choose one of the alternatives. These comments have been considered by Department staff and consultants and will be further considered by the Department's decision makers and will inform the Department's final exercise of discretion.

In conclusion, the Department believes that the alternatives evaluated in the SEIR represent a reasonable range of alternatives for the purposes of, and in compliance with, CEQA.

MR-GEN-11: Comments Asserting that Suction Dredging Has Beneficial Effects, or No Adverse Effect, on the Environment

The Department received numerous comments contending suction dredging is beneficial to the environment, or at least does not cause any adverse environmental effects. Specific comments in this regard include, but are not limited to, the following observations:

- Dredgers are known to collect and dispose of trash found in the streamside area.
- Suction dredges collect and remove mercury (Hg) and other potentially hazardous materials (e.g., lead) from the stream bed.
- Fish have been observed to feed on benthic invertebrates displaced by dredges from the stream bottom and discharged out of the back of the dredge.
- Dredges can loosen embedded gravels, improving spawning habitat.
- Dredge holes create cold-water refugia for aquatic species.

The Department agrees that, in some instances, suction dredging may have a beneficial impact on the environment or not cause any significant impact at all. The Initial Study prepared for the SEIR (Appendix B of the DSEIR) identifies a number of resource categories the Department expects to be unaffected by suction dredging. For other resource categories, only less-than-significant impacts are expected. Consistent with CEQA, where no impact or only less-than-significant impacts are expected as an initial matter, no additional substantive analysis is provided in the SEIR. (Pub. Resources Code, § 21100, subd. (c); CEQA Guidelines, § 15128.) Resource categories where no impact or only less-than-significant impacts are expected include impacts on agricultural resources; conflicts with local policies or ordinances protecting biological resources; interference with emergency response plans; depletion of groundwater supplies; inundation by seiche, tsunami, or mudflow; effects related to land use; generation of excess groundborne vibration; permanent increases in ambient noise levels; effects on population growth; increased demand for schools; wastewater treatment; solid waste disposal; and several others. Further details on these topics and the Department's related rationale can be found in the Initial Study (SEIR Appendix B).

For resources categories where the Department identified potentially significant impacts, the related impacts analysis in the DSEIR is grounded in the best available science, including the Department's literature review and Scoping Report. (See generally DSEIR, Appendices C and D.) Casual observations or undocumented assertions, while noted where appropriate, were not used as the basis for making conclusions in lieu of, or in the absence of, published scientific literature. That said, the Department made an effort to discuss as many of the

beneficial effects of suction dredging as possible in the SEIR, including several of the issues contained in the bulleted list above. There were instances where these effects did not justify an overall finding of "beneficial" or "no impact" for a particular impact, given the overall nature of the impact. For instance, Impact BIO-FISH-8 discusses the possibility that suction dredging could create pools that would offer thermal refugia, but ultimately concludes that the impact of creation and alteration of such pools would not be a beneficial impact as a whole (in this case, the conclusion was that the impact would be less than significant).

In addition, please see the following Master Responses, which directly address several of the specific issues raised in public comment:

- MR-GEO-1: Winter Storm Events Move Vastly More Material than Suction Dredges, and the Geomorphic Effects of Suction Dredging Are Erased Every Winter.
- MR-WQ-1: Suction Dredgers Remove More Mercury than They Discharge.
- MR-WQ-6: Natural Watershed Mercury Loading Is Much Greater than Dredging-Related Loading, and Mercury, even below the Armored Streambed, Is Available to Winter Storms.
- MR-WQ-9: Selenium Mitigates Mercury Toxicity; thus, Mercury Poses No Human Health or Aquatic Risk.
- MR-WQ-10: According to Humphreys (2005), Suction Dredges Remove 98% of the Mercury They Dredge.
- MR-WQ-12: The DSEIR Did Not Address the Fleck 3-Inch Dredge Test, which Showed Minimal Impacts of Suction Dredging on Mercury.
- MR-WQ-14: The DSEIR States that Turbidity and TSS Return to Background Levels within a Short Distance of the Dredge; thus Mercury Cannot Be Transported Long Distances, neither as Liquid nor Attached to Particles.
- MR-WQ-15: Mercury Is Floured Prior to Dredging, and There Is No Proof that Dredges Are Responsible for Flouring Mercury.
- MR-WQ-16: Suction Dredgers Remove Lead (Shot/BBs, Sinkers, etc.) from Waterways, which Is a Positive Impact.
- MR-WQ-17: Levels of Methylmercury Are Low in Streams in which Suction Dredging Occurs, and the Literature Supports that Suction Dredging Does Not Increase Levels of Methylmercury in and around the Dredge Site. Furthermore, Oxygenation Occurring during Dredging Should Make Methylation Less Likely.
- MR-BIO-1: Suction Dredging Does Not Harm or Kill Fish; Fish Are Not Frightened by Dredging and Often Congregate around Dredges.
- MR-BIO-2: Suction Dredging Improves Spawning Conditions for Fish by Loosening Stream Substrate and Providing Clean Gravel.
- MR-BIO-3: Suction Dredging Is Beneficial to Fish because It Feeds Fish and Creates Holes in which Fish Can Rest or Hold.

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

information. In so doing, the Department proceeded in the manner required by law, and its determinations are supported by substantial evidence.

Further discussion regarding the basis for the conclusion of each significant and unavoidable impact is presented as follows:

- **Water Quality:** See the Master Responses related to water quality.
- **Biological Resources:** As discussed above and in Impact BIO-WILD-2, the Department considers the potential disturbance by suction dredgers of special-status passerines associated with riparian habitat to be significant under the Proposed Program because while the likelihood of disturbance is considered relatively low, several of these species are sufficiently rare that even a small disturbance would be substantial considering the restricted population and/or range of the species. See MR-GEN-6 for a discussion of the Department's regulatory authority in the present context and the availability of related feasible mitigation.
- **Cultural Resources:** See MR-CUL-1.
- **Noise:** The DSEIR found that suction dredges had the potential to generate noise levels in excess of local noise standards, which would be a significant impact based on the identified threshold of significance. The DSEIR also acknowledges this would not always be the case, depending on the particular suction dredging equipment being used, the local noise standard in question, and the ambient noise environment. Still, in assessing the significance of the impact under the Proposed Program overall, especially given the Department's limited regulatory authority relative to noise impacts specifically, the Department determined that noise-related impacts overall were significant and unavoidable.

  Some related comments questioned the Department's use of relatively "old" noise data on suction dredges. The noise data used for the DSEIR is from 1971. Modern engines may emit less noise. However, it cannot be assumed that all dredgers are using modern equipment. Moreover, no updated noise data was or has been submitted or otherwise brought to the attention of the Department to date, and the Department has found no more recent data. Even so, it remains likely in the Department's opinion that even "modern" engines used by suction dredgers under the Proposed Program will exceed some noise standards in some situations. All things considered, the data used by the Department in its analysis and the related significance determination is appropriately conservative.

  Finally, some comments criticized the Department for not considering other noise sources, including other mechanized equipment (e.g., all-terrain vehicles (ATVs), motor boats). It is true mechanized equipment used in connection with other activities could also exceed applicable noise standards. For purposes of CEQA, however, the question in the present context is whether suction dredging under the Proposed Program would result in significant noise impacts. The SEIR acknowledges other, unrelated sources of noise, but the Department in its lead

agency discretion did not use those sources as a comparative benchmark to make its project-specific significance determinations.

Note that as described in Section 3.2 of this FSEIR, having reviewed all the public comments and other information received to date, the Department believes at this point that several revisions to the Proposed Program are potentially feasible and that those revisions will further lessen the significant and unavoidable impacts identified in the DSEIR. For a further discussion of this topic, please see Section 3.2.

MR-GEN-13: Comments Regarding Socioeconomic Implications of the Proposed Regulations and/or the Existing Moratorium on Suction Dredging

The Department received many comments indicating that suction dredging is an important source of personal income and revenue to local communities. Some comments also contend that suction dredgers make and have made substantial capital investments in land, mining claims, equipment, etc., and that the potential for these investments to provide a return would be eliminated or restricted as a result of the Proposed Program. Drawing a comparison to suction dredging as authorized prior to the existing moratorium, other comments suggested that reinstating suction dredging would result in an overall reduction in economic activity owing to long-term resource degradation, reductions in various forms of recreational activity, and other potential issues.

Of note, social and economic effects are not environmental impacts for purposes of CEQA. For a related discussion, please see State CEQA Guidelines Section 15131. Likewise, the Department has found no evidence to date, and no evidence was presented to the Department during public review of the DSEIR, indicating that socioeconomic impacts that may occur as a result of the Proposed Program have potential specifically to cause a physical impact on the environment.

That said, as part of SEIR preparation, the Department conducted a survey to evaluate personal income and expenditures associated with suction dredging generally and the Proposed Program. The Department also prepared a related socioeconomic report to inform required analysis under the APA. The results of the survey and the socioeconomic report are included the DSEIR as Appendices F and H. The survey results and the report informed development of the Proposed Program, and generally speaking the Department expects suction dredging as proposed will have a positive economic impact relative to the existing condition (i.e., no suction dredging). As to the economic impact of the Proposed Program relative to suction dredging under the 1994 regulations, the Department determined that an analysis along those lines would require a substantially more detailed, comprehensive study than is currently required in the present context by existing law. The Department also believes that a comparison of the socioeconomic differences between suction dredging under the 1994 regulations versus the Proposed Program would be difficult to quantify, premised by necessity on a number of speculative assumptions, and not particularly informative in the present context as a result.

MR-GEN-14: Comments Stating that Suction Dredging Is Necessary to, or Interferes with, an Individual's or Society's Quality of Life

Comments received by the Department on this subject reflect two general viewpoints. The first viewpoint is that suction dredging contributes to the dredgers' quality of life, as well as that of society as a whole. Many suction dredgers described experiences of "self renewal" or other positive benefits when conducting the activity. Some expressed a desire for suction dredging to be available as an activity in which future generations could participate. On the other end of the spectrum, the Department received comments characterizing suction dredging as interfering with individual use and enjoyment of riverine areas, and that a ban or restriction on the activity is important to preserve the self-renewing aspects of these riverine areas for current and future generations.

The Department appreciates these comments and acknowledges that suction dredging is an important activity to many individuals for a variety of reasons, and that for other individuals, there are important reasons to oppose authorized dredging. Comments along these lines express, in essence, a policy preference tied to suction dredging generally. That said, those policy preferences are important and play an important role in Department efforts to implement its stated mission. The comments also fall outside of the Department's legal obligations under CEQA, the APA, and the Fish and Game Code, particularly with respect to the Department's substantive legal authority under existing law (see MR-GEN-1 and MR-GEN-6). These comments, however, inform and will be considered by the Department as it considers final action in the present case.

MR-GEN-15: Comments Regarding the Relative Impacts of Other Activities besides Suction Dredging

The Department received a number of comments asserting that a variety of other activities besides suction dredging have greater potential for adverse environmental impacts, particularly impacts on aquatic habitats and species. Specific examples provided in the comments included water diversions and fishing, among others. The comments suggest these other activities should be the focus of this SEIR, and/or that suction dredgers are being unfairly targeted by the Department.

The Department agrees a variety of stressors exist on California's rivers, streams, and lakes. The Department, however, as discussed in the DSEIR and elsewhere in other responses to comments, is subject to a court order in the present case, issued with the consent of various tribal and mining interests involved in the underlying litigation. That order and consent judgment directs the Department to conduct updated environmental review and related rulemaking, specifically focused on suction dredging under the Fish and Game Code. The Department is bound, in this respect, by both court order and existing law to focus in the present context on suction dredging and its related impacts, as opposed to the environmental impacts that may result from other activities highlighted by the various comments addressed in this response. Against this backdrop, the Department rejects the notion that the comparative impacts of various other activities should dictate conclusions as to whether suction dredging under the Proposed Program will result in significant impacts for purposes of CEQA or the Fish and Game Code. The Department's assessment of the potentially significant environmental impacts associated the Proposed Program must stand

on its own, based on an evaluation, as CEQA requires, of related changes to the existing physical conditions on the ground (i.e., in the context of no suction dredging). Other activities or factors that may have the same or similar impacts do provide context, an important component of the analysis required by CEQA, but those activities and their comparative impacts do not provide the sole basis for the Department's significance determinations in the SEIR. Again, those determinations are based, as CEQA requires, on an analysis of the changes expected to the environmental baseline as a result of the Proposed Program, gauged against the backdrop of identified thresholds of significance. Also of important note is the requirement under CEQA that an EIR contain a discussion of project-related cumulative impacts. (See generally CEQA Guidelines, § 15130.) A cumulative impact refers to the combined effect of "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." (*Id.*, § 15355). According to state law, cumulative impacts reflect "the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time." (*Id.*, § 15355, subd. (b).) Under CEQA, an EIR must discuss the cumulative impacts of a project when the project's incremental contribution to the combined effect is "cumulatively considerable." (*Id.*, § 15130, subd. (a).) However, an EIR need not discuss impacts that do not result, in part, from the proposed project. (*Id.*, subd. (a)(1).)

Consistent with these requirements, Chapter 5 of the DSEIR contains the Department's cumulative impact analysis for the Proposed Program. That discussion describes other past, present, and probable future projects, including commercial, recreational, and tribal fishing practices; various forms of recreational activity; dams; water diversions; mining; timber harvest; urbanization; and others. In this respect, the Department's cumulative impacts analysis considers the impacts as appropriate under CEQA from most, if not all, of the activities highlighted by the comments addressed in this response. As such, the SEIR does consider the impacts of other activities besides suction dredging.

MR-GEN-16: Comments Regarding the Scale of Analysis in the SEIR (Site-Specific versus Statewide)

Some comments assert that the analysis in the DSEIR is insufficiently specific and detailed regarding the proposed regulations' impacts on all streams and rivers in which suction dredge mining could occur under the Proposed Program.

The extent to which some of the SEIR's analysis is somewhat general in nature is a reflection of the fact that the Proposed Program is statewide in scope. That said, CEQA requires the SEIR to provide a sufficient degree of analysis to allow decision makers to make intelligent judgments. (CEQA Guidelines, § 15151.) "[T]he adequacy of an EIR is determined in terms of what is reasonably feasible, in light of factors such as the magnitude of the project at issue, the severity of its likely environmental impacts, and the geographic scope of the project." (*Id.*, § 15204, subd. (a).) "[T]he degree of specificity required in an EIR will correspond to the degree of specificity involved in the underlying activity which is described in an EIR." (*Id.*, § 15146; see also *Rio Vista Farm Bureau Center v. County of Solano* (1992) 5 Cal.App.4th 351, 376.) Likewise, to the extent some comments received by the Department suggest that

further data be gathered, it is not "mandatory for an agency to conduct every test and perform all research, study and experimentation recommended to it to determine true and full environmental impact, before it can approve a proposed project." (*Society for California Archaeology v. County of Butte* (1977) 65 Cal.App.3d 832, 838; see also CEQA Guidelines, § 15204, subd. (a).) The Department need only, and believes it has more than met its obligation to, provide sufficient detail in the SEIR to facilitate meaningful analysis and public disclosure of the potentially significant environmental impacts that may result with the Proposed Program.

Furthermore the SEIR addresses and the Department considered related impacts from both a statewide and regional aspect. The number of suction dredge permits issued by the Department on an annual basis under the Proposed Program is limited to 4,000, which in turn limits potential impacts. Dredging as proposed is also limited to the hours from sunrise to sunset, which further helps to limit the potential for related impacts. In addition, the SEIR and Department analyzed the results from the Suction Dredger Survey (SEIR Appendix F) and determined based on past activities where authorized suction dredging is likely to occur. The Department considered this information in developing both the county- and stream-specific proposed regulations.

The Department believes the SEIR provides an adequate level of detail and specificity regarding the potential impacts that may result from implementation of the Proposed Program, in light of the statewide nature of the program, the impossibility of forecasting exactly which portions of which streams and rivers will be mined by any particular number of miners in any given year, and other uncertainties that render it infeasible to provide more specific detail in the present context.

Master Responses to Resource-Specific Topics

Geomorphology

MR-GEO-1: Winter Storm Events Move Vastly More Material than Suction Dredges, and the Geomorphic Effects of Suction Dredging Are Erased Every Winter.

Numerous comments made the point that winter storms move vastly more material than suction dredges. The Department does not disagree with this comment, but notes that the seasonality and ways in which the material would be moved would be different. Rather than basing conclusions on a comparison of volume of material, the SEIR's analysis focused on how suction dredging could affect geomorphic processes in ways that would not have occurred otherwise, and their related indirect effects on habitat, water quality, and other resources. Specific to geomorphology, the SEIR considered the potential for suction dredging to result in dredge potholes, tailings piles, and other suspension/depositional features; destabilization of stream banks, channel bed forms, such as riffles and bars, and the overall channel profile; and alteration or destabilization of lake beds or shorelines. As a significance criterion, the SEIR concluded that impacts would be significant if they persisted following a bankfull or dominant discharge event in a river (with an expected frequency of 1.5–2.5 years following the suction dredging activities), and for more than 1 year in a lake or reservoir. In this way, the SEIR focused on impacts that would persist despite winter storm events. The DSEIR concluded that dredging conducted in compliance with the

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

in fish are still regularly above thresholds relevant to human health in many California water bodies affected by suction dredging. Many factors influence mercury levels in water bodies and fish across the U.S. If median or maximum body burdens for specific fish species in California were lower or higher than the levels for all or other states, this would not be considered evidence that suction dredging is or is not contributing to the levels that are measured in California, since multiple site-specific factors contribute to body burdens.

MR-WQ-3: Impacts of Suction Dredging on Turbidity/TSS Are Far Below that Described in the SEIR.

The Department acknowledges that rainfall- and runoff-related sediment input from within the watershed are major sources of turbidity/total suspended solids (TSS) loading. Moreover, the Department acknowledges that suction dredging operations do not add sediment material to a stream. However, it is the responsibility of the SEIR to analyze the potential dredging-related disturbance and resuspension of sediments that have been previously deposited as a result of natural runoff and its associated effects on turbidity/TSS, relative to the baseline conditions. Because dredging activity primarily occurs during the dry season, with lower streamflow conditions, dredging-related disturbances contribute to instream turbidity/TSS levels that are independent of the winter rainfall/runoff period. As noted in the DSEIR (Impact WQ-3), the analysis considers the reasonable range of turbidity/TSS levels in the discharge that might occur under the Proposed Program. Available literature indicates that dredging can cause elevated turbidity/TSS levels in the dredging plume, depending on the amount of fines in the sediment, and also can result in elevated turbidity/TSS levels compared with background conditions. The elevated levels are anticipated to be localized and limited to a relatively small area, generally no greater than about 160 meters downstream of a dredging site. However, there is potential for dredging-related sediment discharges to cause water quality degradation and exceed basin plan water-quality objectives.

While the magnitude of turbidity/TSS levels in the discharge under the Program would depend on many factors, the assessment presented in Impact WQ-3 concludes that dredging would not directly result in elevated turbidity/TSS levels sufficient to cause adverse effects on fish. However, while the direct effects of dredging on turbidity/TSS levels would be limited, the additional dredging-related turbidity/TSS discharges could contribute to existing loading in Clean Water Act (CWA) Section 303(d)-listed water bodies that have limited capacity to assimilate any additional loading. Therefore, these discharges were determined to have potential to contribute considerably to a cumulative impact.

MR-WQ-4: Existing Mercury Contamination Should Be Baseline for Impact Assessment.

Existing mercury contamination was used as the baseline for the assessment. Comparisons of amounts of mercury discharged by suction dredging and transported downstream were compared with natural watershed loadings. The potential for impacts was assessed relative to existing contamination of fish, which are generally already above criteria in many affected water bodies and, therefore, any further increase in body burdens would be expected to create increased risk to consumers.

MR-WQ-5: Pit #1 and Pit #2 Are Not Adequately Representative of Statewide Conditions for Purposes of Impact Assessment.

The justification for use of Pit #1 and Pit #2:BC as average and worst-case sediments for the statewide assessment is discussed in "Geographic Assessment" on pages 4.2-22 to 4.2-23, and "Geographic Translation" on pages 4.2-51 to 4.2-52, of the DSEIR. Limited data exist on conditions statewide. Pit #2:BC can reasonably be expected to be a worst case, based on factors identified in the DSEIR, including the pit's proximity to an area of extensive hydraulic mining and it containing among the highest levels measured in California sediment. Pit #1 can reasonably be expected to represent a typical, lower level case, as it contains sediments similar to those found in rivers on the Central Valley floor, where sediments from uncontaminated areas have diluted sediments from contaminated areas. Suction dredgers would be more likely to target Pit #2:BC because of the higher probability of finding gold in this location. In fact, it was selected by an experienced suction dredger as a location likely to contain gold, and thus can be expected to represent similar locations in watersheds contaminated with mercury from historical gold mining. Based on these factors, sediment mercury concentrations at many or most sites where suction dredging may occur are expected to range between these two cases. It is acknowledged in the assessment that more extensive data at different sites throughout historic gold-mining areas would allow for a more detailed assessment of statewide conditions; nevertheless, potential for impacts on beneficial uses was demonstrated for the South Fork of the Yuba River. While these data do not necessarily represent statewide conditions, the South Fork of the Yuba River has characteristics similar to many locations in the Sierra Nevada and foothills, owing to similar geology, climate, and historic gold-mining activities. Therefore, it is reasonable to anticipate that impacts demonstrated for the South Fork of the Yuba River would be found elsewhere in the state.

MR-WQ-6: Natural Watershed Mercury Loading Is Much Greater than Dredging-Related Loading, and Mercury, even below the Armored Streambed, Is Available to Winter Storms.

It is acknowledged that, at most sites, storm-related mercury mass loading is likely greater than dredging-related mass loading. However, the assessment determined that the quantity and concentration of dredging-related mercury discharges would be sufficient to cause adverse effects on beneficial uses. Furthermore, dredging-related activity results in mercury discharge during warm, low-flow summer months, a time period when mercury disturbance and transport from runoff would likely be minimal as a result of typically low streamflow rates. Although the implications of this are unclear, potential for mercury methylation is greater at higher temperatures, and thus it is expected that in some environments, methylmercury production would increase as a result.

The best available information suggests that armoring can provide some protection from winter runoff-related mobilization (see the DSEIR, page 4.2-36). Elemental mercury is dense enough to seep or sink below the part of the streambed available to winter storm mobilization. Therefore, it is not necessary for the armored streambed to be mobile for mercury to be found at depth. High-gradient and mobile streams still contain elemental mercury, as evinced by mercury deposits remaining more than 100 years following the end of the hydraulic mining era.

MR-WQ-7: Some Comments Are Based on the Assumption that All Mercury Is Limited to Elemental Mercury, when In Fact Much of the DSEIR Assessment Focuses on Particle-Bound Mercury.

Mercury can be present in several different forms in sediment available to suction dredge discharge. The assessment considered elemental mercury, mercury-gold amalgam, dissolved mercury, and mercury(II) bound to particles (e.g., sediment). Elemental mercury, mercury-gold amalgam, and mercury(II) bound to particles behave very differently from one another. The elemental form is a dense liquid that can occur as droplets; mercury-gold amalgam is a dense solid that is often "wet" with elemental mercury; and mercury(II) bound to particles is a charged ion whose transport will be dominated by transport of the particle to which it is attached. Mercury(II) bound to particles cannot be observed by the naked eye, and is expected to be measurable in most all sediments encountered by suction dredgers. In some areas, liquid elemental mercury may not be evident, while in other areas it will dominate sediment mercury measurements (e.g., in the location described in Humphreys 2005).

MR-WQ-8: Turbidity/TSS Could Have Local Effects, Especially in Water Bodies Impaired by Sediment.

While localized conditions of elevated turbidity/TSS could occur from dredging in accordance with the proposed regulations, levels would not be anticipated to rise to a level that would cause substantial adverse effects, including nuisance, to beneficial uses. Turbidity/TSS are regulated by numerical and narrative basin plan water-quality objectives designed to protect sensitive beneficial uses. The Central Valley Basin Plan (CV Basin Plan) objectives for turbidity, in particular, provide for consideration of an appropriate averaging time in assessing compliance of a discharge with the turbidity objective. Thus, the CV Basin Plan objective acknowledges that elevated turbidity/TSS levels may occur in a short zone downstream of a discharge while still remaining protective of beneficial uses. Based on the best available information regarding the characteristics of dredging activity anticipated under the Program (e.g., intensity, frequency, duration) and stream conditions where dredging activity primarily occurs (e.g., location, available dilution), it is considered unlikely that dredging-related turbidity/TSS discharges would result in elevated levels in the receiving water that would lead to substantial adverse effects on beneficial uses. That said, the effects of dredging-related turbidity/TSS disturbance on existing CWA Section 303(d)-listed water bodies, which are already impaired by turbidity/TSS conditions or excessive sedimentation, were found to be a considerable contribution to a cumulative impact.

MR-WQ-9: Selenium Mitigates Mercury Toxicity; thus, Mercury Poses No Human Health or Aquatic Risk.

The Department acknowledges that some existing literature raises an issue of whether effects of methylmercury might be partially or fully mitigated when the molar ratio of selenium to mercury (Se:Hg) in food sources exceeds 1:1. However, epidemiological evidence in humans for selenium's protective ability is lacking. Indeed, in some of the case studies used in the derivation of the criteria, selenium was shown not to have provided a

protective effect. An example from the U.S. Environmental Protection Agency (USEPA) criteria documents highlights this uncertainty:

> The authors conclude that prenatal exposure to methylmercury from contaminated seafood was associated with an increased risk of neurodevelopmental deficit. No evidence for a protective or beneficial effect with respect to neurological optimality score (the number of main items rated optimal out of 60) was observed for essential fatty acids or selenium…Based on [neurological optimality score], a tenfold increase in cord-blood mercury was associated with the equivalent of a 3-week reduction in gestational age. Adjustments for total PCBs [Polychlorinated Biphenyls] and fatty acid concentrations had no effect on results, and selenium was not an effect modifier. (USEPA 2001, pg. 3-9, 4-19)

It is unclear how experimental evidence in vitro or in animal studies for selenium's protective effect translates into low-dose, chronic risk assessment for human health. At this time, federally adopted criteria that were derived based on epidemiological studies which did not incorporate selenium's protective effect (based on incomplete or contradictory evidence) are believed to be the best available information regarding effects thresholds. USEPA adoption of the fish-tissue mercury criterion for human health consumption did not recognize, in its calculation, selenium's asserted ability to mitigate effects, and it did not provide a mechanism to incorporate the possibility of a mitigating effect.

Moreover, there is not substantial evidence to suggest that Se:Hg ratios in California are uniformly greater than 1:1 in areas potentially affected by suction dredging. In Peterson et al. 2009, none of the fish sampled came from regions in the Sierra Nevada in which suction dredging is commonly practiced, though some of the fish were sampled from the Klamath-Trinity region.

In the water quality assessment in the DSEIR, evaluation of potential impacts were primarily based on risks associated with consuming fish in excess of federally adopted fish-tissue criteria. These criteria are based on substantial epidemiological evidence of primarily neurological effects in humans associated with mercury exposure through consumption of fish.

MR-WQ-10: According to Humphreys (2005), Suction Dredges Remove 98% of Mercury They Dredge.

Humphreys (2005) reported that "the dredge removed about 98 percent of the mercury from the test sample based on concentration." However, only sediment mercury concentrations were quantified. Loss or capture of mercury on a total mass basis was not quantified. Mercury concentration in the lost sediment fractions were 2% of the parent sample, but this does not mean that the dredge removed 98% of the mercury in the parent sample. The statement in Humphreys (2005), "a typical suction dredge set up to recover gold recovered about 98 percent of the mercury in the high-mercury test sediment sample" is not technically accurate, since it implies that 98% of the mass of mercury was recovered, and it cannot be evaluated without a complete mass balance on mercury, which would require a mass balance of sediment captured and lost. Furthermore, the site in the study

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.

MR-WQ-12: The DSEIR Did Not Address the Fleck 3-Inch Dredge Test, which Showed Minimal Impacts of Suction Dredging on Mercury.

The portion of the Fleck study (Fleck et al. 2011) presenting results on the preliminary 3-inch dredge tests was preceded by the statement: "It is important to note that the results presented here do not represent a full-scale dredge operation nor can the results be scaled-up quantitatively. The results of the test should be evaluated as valuable information regarding the proof of concept rather than a quantitative evaluation of the effects of suction dredging on water and sediment in the South Yuba River." Even given this, the experiments showed that particle-bound mercury concentrations were elevated downstream of the dredge, and correlated with TSS concentrations. Particle-bound methylmercury concentrations were not elevated. Methylmercury concentrations are expected to be low in areas where suction dredges typically operate. The assessment assumes mobilization of particle-bound mercury, which can be transported to downstream sites and deposited in environments where methylmercury MeHg formation potential is greater.

MR-WQ-13: The Closed-Circuit Suction Dredge Prototype Employed in the USGS Study Is Not Standard Equipment, and Conclusions Drawn from that Experiment Are Not Representative of Actual Suction Dredging Conditions.

The closed-circuit tank experiment was proposed by Dave McCracken, an experienced suction dredge miner, as a possible approach to capture particle-bound mercury. Data produced from the test indicated that a small tank would not be effective at capturing particle-bound mercury and elegantly demonstrated Stokes Law (clay-sized particles stay suspended in a water column for days). However, because it was nonstandard equipment, results of the closed-circuit dredge test were not used as part of the water quality assessment and thus did not factor into the results of the assessment.

MR-WQ-14: The DSEIR States that Turbidity and TSS Return to Background Levels within a Short Distance of the Dredge; thus, Mercury Cannot Be Transported Long Distances, neither As Liquid nor Attached to Particles.

Two mechanisms are responsible for turbidity and TSS returning to background levels within short distances: dispersion and settling. Dispersion results in particles originating at a single point (i.e., the end of the sluice box) and spreading out across the stream and also parallel to the direction of flow in the stream. Dispersion does not reduce the mass of particles being transported, but does reduce their concentration (as measured by TSS) and their effect on turbidity (i.e., light-scattering). In the DSEIR, particles > 63 micrometers (μm) are assumed to settle within the stream environment; therefore, transport calculations are based only on the ≤ 63 μm fraction. While this fraction contains a high concentration of mercury, it makes up a relatively small amount of the mass of sediment moved by the dredge. Hence, although TSS and turbidity measurements return to background, mercury attached to ≤ 63 μm particles is assumed to be transported downstream, as described in the DSEIR.

MR-WQ-15: Mercury Is Floured prior to Dredging, and There Is No Proof that Dredges Are Responsible for Flouring Mercury.

As stated in the DSEIR, flouring refers to the breaking up of larger mercury droplets into several smaller droplets. The DSEIR states that it is not clear from Humphreys (2005) whether mercury was floured prior to dredging; nonetheless, floured mercury was observed in the suction dredge discharge, and thus could potentially have impacts on water quality downstream. It is not expected that elemental mercury would behave the same way during sieving as it would in the form of droplets submerged in water. Therefore, although most of mercury found in the source sediment in the Humphreys study passed a 30-size mesh during sieving, it is unclear whether this means that the diameter of most mercury droplets submerged in the water was less than the gaps in a size 30 mesh and thus was floured prior to dredging. Although potential effects of floured mercury were included in the overall assessment, because of uncertainties regarding fate and transport, floured elemental mercury was not a major consideration in arriving at the significance conclusion.

MR-WQ-16: Suction Dredgers Remove Lead (Shot/BBs, Sinkers, etc.) from Waterways, which Is a Positive Impact.

Comments on this subject point out that suction dredge operators typically remove a large quantity of debris, such as lead/iron fragments (e.g., fishing weights, shotgun pellets) and trash from streams, and provide a cleaner stream environment when they leave compared with the conditions that existed when they arrived to begin dredging operations. The potential discharge of such contaminants as characterized in these comments is primarily encompassed in the assessment for Impact WQ-1, which addresses the potential water-quality effects of dredging encampments and site development. The potential effects of contaminant discharges from these related activities to water quality were appropriately assessed relative to existing conditions in the stream. It is not appropriate to determine the significance of the potential water-quality impacts based on a net quantity (i.e., discharge minus amount that might be recovered and recycled or disposed of by conscientious dredge operators). That is, beneficial removal from the stream of a larger quantity of waste in one location or one period of time does not reduce the potential effects that might occur from dredging-related discharges of a smaller quantity of wastes. The wastes discharged to a stream can still cause adverse water-quality effects. Moreover, as identified in the DSEIR, Impact WQ-1 was determined to be less than significant; therefore, no change to the analysis or conclusions presented in the DSEIR is warranted in response to these comments.

MR-WQ-17: Levels of Methylmercury Are Low in Streams in which Suction Dredging Occurs, and the Literature Supports that Suction Dredging Does Not Increase Levels of Methylmercury in and around the Dredge Site. Furthermore, Oxygenation Occurring during Dredging Should Make Methylation Less Likely.

Substantial methylation of mercury is not expected at most suction dredging locations, though it is possible that areas do exist near suction dredging locations where methylmercury production occurs. The assessment largely considered the discharge and transport of inorganic (i.e., nonmethylated) mercury bound to ≤ 63 μm particles to environments that are favorable to methylation, where the particles may be deposited.

Potential oxygenation of the water in and around the suction dredge site is not expected to substantially affect methylation potential in downstream environments where methylation potential is high (e.g., Englebright Reservoir and the Sacramento–San Joaquin Delta [Delta]).

MR-WQ-18: The Proposed Regulations Are Not Consistent with TMDL Requirements for Thermal Refugia in the Klamath Basin.

The specific authority for the Department to regulate suction dredge mining is provided in Fish and Game Code Section 5653 et seq. In general, see MR-GEN-6 for a detailed overview of that substantive authority. Consistent with that authority, Section 5653, subdivision (b), provides that "If the department determines, pursuant to the regulations adopted pursuant to Section 5653.9, that the operation will not be deleterious to fish, it shall issue a permit to the applicant." Other legal authority, including the Porter-Cologne Water Quality Control Act (Wat. Code, § 13000 et seq.), may also apply to suction dredge mining. However, with respect to the Department and controlling legal authority in the Fish and Game Code, the Department is directed to issue suction dredge permits under a narrow set of prescriptions. The Department itself does not have the legal authority to expand those considerations.

The Department has reviewed all the public comments on the draft suction dredge regulations and available information on fish distribution in the Klamath River system. Having reviewed those comments and relevant information, the Department has determined that additional restrictions are warranted for tributaries of the Salmon and Klamath Rivers, the most downstream segment of the Salmon River, and additional thermal refugia at the confluence of certain tributaries with the Salmon and Klamath Rivers.

These modifications do not include all of the recommendations made by the commenter, either in terms of the list of the stream-specific recommendations or the size of thermal refugia established by the Klamath River total maximum daily load (TMDL) adopted by SWRCB. The Department's determination reflects the exercise of its independent judgment based on controlling legal authority set forth in Fish and Game Code Section 5653.

Finally, it should be noted that the potential for suction dredging activity to affect water temperature is considered minimal (as discussed in the DSEIR under Impacts WQ-3 and BIO-FISH-8). The comment does not provide any scientific evidence supporting the concept that the thermal refugia buffers in the proposed regulations are inadequate to protect against effects on water temperature and related effects on coldwater species. The Department considers the proposed regulations to be functionally consistent with the thermal refugia requirements in the North Coast Regional Water Quality Control Board (RWQCB) Basin Plan and associated TMDLs.

Biological Resources

MR-BIO-1: Suction Dredging Does Not Harm or Kill Fish; Fish Are Not Frightened by Dredging, and Often Congregate around Dredges.

The Department interprets these comments to assert that dredgers generally do not harm or kill juvenile or adult fin fish. Several impact statements and findings in the DSEIR address

the effects of dredging on juvenile and adult fin fish, most notably Impact BIO-FISH-4. This impact analysis demonstrates that entrainment through the pump intake or dredge nozzle is feasible (see Table 4.3-8 of the DSEIR). Nevertheless, as several comments note, direct entrainment is uncommon and unlikely to occur. The Department recognizes this, and regulations generally allow for the interaction of suction dredging with juvenile and adult fin fish. However, the Department has proposed additional operational requirements that minimize the potential for entrainment to occur, including screen requirements on suction dredge intakes (see Chapter 3, "Section 228(k)(3): Pump Intake Screening," for further discussion of this topic).

In addition, the Department has imposed spatial and temporal restrictions that prohibit dredgers from operating in streams (or a portion thereof) when doing so would adversely affect action species to the extent that impacts would be deleterious, as defined in the DSEIR, Section 2.2.2. In some instances, even minor impacts on fish, such as modifications of habitat, behavior, or prey resources, have the potential to result in a deleterious effect. The Department agrees that suction dredging is not the principal cause for the decline of these species, but the SEIR must consider the incremental impact of the activity (see MR-BIO-11).

Finally, it is important to state that under the proposed regulations, the Department does not expect that suction dredging is likely to directly kill or harm juvenile or adult fin fish. The vast majority of streams in the state are proposed to be open to suction dredging when fin fish are in juvenile and adult (nonspawning) life stages. Spatial and temporal restrictions on suction dredging largely prohibit dredging during sensitive spawning periods and early life stages (e.g., egg and larvae development)[11].

MR-BIO-2: Suction Dredging Improves Spawning Conditions for Fish by Loosening Stream Substrate and Providing Clean Gravel.

In the DSEIR, Impact BIO-FISH-1 directly addresses this issue. The DSEIR acknowledges that "the act of dredging has the potential to reduce substrate embeddedness in areas impacted by other human activities such as stream regulation and input of fine sediments associated with watershed development" (page 4.3-24, lines 13–15 of the DSEIR). The DSEIR goes on to note that "the loose substrate often found in dredge tailings may be too unstable; embryos may experience reduced survival under these conditions due to increased scouring (Thomas 1985; Harvey and Lisle 1999), which can be exacerbated as embryo development frequently coincides with periods of high flow which mobilizes streambeds (Holtby and Healey 1986; Lisle and Lewis 1992)."

The Department continues to acknowledge the potential benefits dredging may have in loosening and cleaning spawning gravel. Several comments cited the Scott River as an example of where this has occurred. However, the Department cannot categorically determine that the activity would be beneficial in all instances. The Department has

[11] Based on the comments received, it is believed that most of the commenters were referring to fin fish. However, according to the Fish and Game Code Section 45, "*Fish*" means wild fish, mollusks, crustaceans, invertebrates, or amphibians, including any part, spawn, or ova thereof. The analysis and consideration of deleterious impacts were based on the Fish and Game Code definition of *Fish*.

proposed operational restrictions that require dredgers to level tailings piles (Section 228(l)(15) of the proposed regulations) to minimize potential adverse impacts associated with instability of tailings piles. Under this scenario, the potential benefits of suction dredging (e.g., loosening and cleaning substrate) will remain when tailings piles are leveled. Finally, it is important to note that in no instances are dredgers excluded from streams for the sole reason of potential adverse modification of spawning substrate.

MR-BIO-3: Suction Dredging Is Beneficial to Fish because It Feeds Fish and Creates Holes in which Fish Can Rest or Hold.

Several comments stated that suction dredging has a beneficial effect to fin fish. Dredgers often note that fish will feed at the end of the sluice box or near the nozzle. The Department acknowledges that dredging may provide a short-term increase in the availability of prey resources for fin fish by dislodging periphyton and invertebrates. However, this short-term increase in prey resource abundance is often followed by a decrease in prey diversity and abundance as a result of the impacts of dredging on the local benthic community. While recolonization of the benthic community is likely rapid (see page 4.3-38, lines 7–16 of the DSEIR), any short-term benefits are offset to some degree, or even outweighed, by the temporary reduction in prey base following the dredging event.

Comments also noted that the holes created by suction dredgers may provide habitat for fish and may expand thermal refugia. The Department acknowledges this in the DSEIR by stating "other effects on habitat were found to be potentially beneficial, such as the loosening of compacted substrates and providing additional fish holding and resting areas with dredging holes" (see page 4.3-19, lines 23–24 of the DSEIR). In no instance do the proposed regulations exclude dredgers from streams solely to avoid the creation of dredge holes. Further, while the dredge hole may benefit fish in certain circumstances, this is not the intent of the activity and the activity has not been evaluated for this specific purpose. In particular, the Department has not been able to locate any research showing that dredge holes are beneficial to fish. Furthermore, in addition to creating dredge holes, dredging may also fill existing holes through displacement of stream substrate. The extent to which suction dredging may result in a net increase in fish holding and resting areas is unknown.

MR-BIO-4: Impacts on Foothill Yellow-Legged Frog

The Department received numerous comments regarding stream-specific regulations to minimize potential impacts on the foothill yellow-legged frog (FYLF). Upon reviewing the broad range of comments received on this topic, the Department has determined that, in most cases, a Class D restriction is an appropriate level of protection to prevent deleterious effects on this species. The Class D restriction will largely exclude dredging from streams with the potential to support FYLF during the breeding season and egg development periods. This determination is consistent with the species-based restrictions published in the DSEIR, although some streams in Department Region 2 that were designated Class E in the DSEIR have been revised to Class D. This revision is based on additional review of data (e.g., Federal Energy Regulatory Commission [FERC] relicensing studies) and the Department's own determination on the potential for significant impacts on the species. The Department recognizes that the onset of FYLF breeding is variable from year to year, and

that Class D restriction would not necessarily protect all FYLF populations in all years, particularly when breeding is delayed as a result of atypically late spring runoff. The Department considers delayed breeding seasons to be periodic anomalies, and that the Class D restriction for FYLF would prevent deleterious effects that may result from suction dredging. For isolated or high-risk populations of FYLF in select locations, more restrictive regulations are proposed to protect these FYLF populations.

Several comments noted that the Department has not conducted specific studies on the effects of suction dredging on FYLF. The comments are correct that no new research was conducted for the DSEIR. The conclusions of the SEIR are based on the best available information, which is consistent with CEQA requirements (see MR-GEN-4). Similarly, several comments expressed frustration with the broad scale of the restrictions for FYLF. The Department acknowledges that the restrictions for FYLF include some streams that may not provide suitable habitat for the species. Information informing the Department's assignment of use classifications for particular waters included intensity of suction dredging (from the Department's socioeconomic survey), information on species life history, distribution, abundance, population trends, and official listing status. The Department also considered the locations of historic and current gold mining in California as indicators of potential future mining activity. The Department utilized the best available data to develop the proposed regulations. Further refinement of the known distribution and spatial extent of suitable habitat for FYLF (e.g., through field studies) was not feasible for development of these regulations and related CEQA process.

Several comments noted that suction dredging is not the principal cause for the decline of FYLF and that hydroelectric projects and other activities have an equal or (much) greater potential to affect the species. The Department agrees that suction dredging is not the principal reason for population declines in FYLF. However, the focus of this particular study is on suction dredging (see MR-GEN-15). The Department must consider the specific incremental impacts of suction dredging under the Proposed Program, and has found that the proposed restrictions on suction dredging are appropriate to prevent deleterious effects on FYLF and reduce related impacts to "less than significant" as defined by CEQA.

Finally, some comments stated that the proposed regulations will not adequately protect FYLF from impacts of suction dredging. As noted above, Class D restrictions will largely exclude dredging from streams with the potential to support FYLF during the breeding season and egg development periods. Operational restrictions, including exclusion of dredging within 3 feet of the water's edge (Section 228(l)(3)) and willful disturbance of tadpoles and adults (Section 228(l)(16 and 17)), would further minimize potential impacts on FYLF. With these restrictions in place, and more restrictive regulations on populations of FYLF at high risk, the Department finds it unlikely that suction dredging would adversely affect FYLF populations and therefore would not cause deleterious effects. Again, for purposes of CEQA, the Department believes related impacts are less than significant.

MR-BIO-5: Impacts on Sierra Nevada (mountain) Yellow-Legged Frog

The Department received numerous comments regarding stream-specific regulations that avoid potential impacts on Sierra Nevada Yellow-Legged Frog (SNYLF). Upon reviewing the broad range of comments received on this topic, the Department has determined that Class

A restrictions for the range of SNYLF are necessary to prevent deleterious effects on this species and to reduce impacts under CEQA to "less than significant." This determination is consistent with the species-based restrictions published in the DSEIR, particularly given the current status of SNYLF as a threatened species under CESA. Specifically, on February 2, 2012, the California Fish and Game Commission determined there is sufficient scientific information to indicate that listing the SNYLF under CESA is warranted. (See Fish & G. Code, § 2075.5(2).) In so doing, the Commission voted to designate the SNYLF (*Rana sierrae*) as a threatened species and the southern mountain yellow-legged frog (*R. muscosa*) as an endangered species under CESA. Collectively, the two species are commonly known as the mountain yellow-legged frog. The Commission must now complete related rulemaking under the California Administrative Procedure Act (APA) to add both frog species to the list of animals protected by CESA. (See generally Cal. Code Regs., tit. 14, § 670.5.) In the interim, both species remain protected under CESA as candidate species, as they have been since October 2010. (Fish & G. Code, § 2085; Cal. Reg. Notice Register 2010, No. 40-Z, p. 1601.)

Several comments noted that suction dredging is not the principal cause for the decline of SNYLF and cited the Department's hatchery and fish stocking programs as having greater impacts on this species. The Department hatchery operations are the subject of prior CEQA review, and the Department has made a number of related operational adjustments to minimize impacts on SNYLF. That said, the focus of this particular SEIR is on suction dredging. The Department must consider the incremental project-specific impact of suction dredging on the species and has determined that the proposed restrictions on authorized suction dredging are needed to prevent deleterious effects on SNYLF. The Department is required to reduce related impacts under CEQA to "less than significant."

Several comments expressed frustration with the broad scale of the restrictions for SNYLF and noted that SNYLF habitat does not exist in large areas that are proposed for Class A restrictions for SNYLF. The Department acknowledges that the restrictions for SNYLF include streams that may not provide suitable habitat for the species. Information informing the Department's assignment of use classifications for particular waters included intensity of suction dredging (from the Department's socioeconomic survey), information on species life history, distribution, abundance, population trends, and official listing status. The Department also considered the locations of historic and current gold mining in California as indicators of potential future mining activity. The Department utilized the best available data to develop the proposed regulations. Further refinement of the known distribution and spatial extent of suitable habitat for SNYLF (e.g., through field studies) was not feasible for development of the regulations and related CEQA process.

MR-BIO-6: Impacts on Mollusks

The Department received several comments regarding impacts on freshwater mollusks. The Department also received comments from USFS on the density of mussels reported in the literature. In the FSEIR, the Department has revised the definition of a mussel bed from 40 individuals per square yard to 10 or more per square yard (Section 228(l)(13)), to reflect the information provided by USFS. Comments also noted that species addressed in the references cited in the DSEIR do not provide a suitable proxy for several species of mollusks that have the potential to be affected by program activities. The Department acknowledges that some mollusks species would be more vulnerable to impacts from dredging than

others. However, the Department has not received data or comments that suggest that the distribution and population viability of any freshwater mollusks species, when considered in conjunction with the known focus and extent of the Proposed Program, would be substantially altered by Program activities. Furthermore, operational restrictions are included in the proposed regulations, which prohibit the willful entrainment of mollusks (Section 228(l)(17)). For purposes of CEQA, related impacts are considered less than significant.

MR-BIO-7: Impacts on Western Pond Turtle

The Department received comments regarding impacts on Western Pond Turtle (WPT), specifically with regard to indirect impacts resulting from bioaccumulation of mercury. While the Department finds that direct impacts on WPT are less than significant, indirect impacts resulting from bioaccumulation of mercury are potentially significant. This finding is consistent with the conclusions presented in Chapter 4.2 of the DSEIR, which states that "methyl mercury body burdens in aquatic organisms may be measurably increased thereby substantially increasing the health risk to wildlife" (see page 4.2-53, lines 30–37 of the DSEIR). This impact was found to be significant and unavoidable.

Note that after further consideration and review of available information, the Department has determined that the conclusion, that health risks to western pond turtle and other wildlife species (including *Fish*) are significant, is not warranted. Specifically, no methodology exists to quantitatively link increased mercury loading to increased methyl mercury formation. As such, while it is reasonably foreseeable that mercury mobilized by suction dredges would lead to bioaccumulation in wildlife, no evidence supports a conclusion that such bioaccumulation would be great enough to lead to increased health risks to wildlife. Accordingly, the text on page 4.2-53, lines 31–37, of the DSEIR has been changed as follows:

> Available evidence suggests that these processes associated with suction dredging in the Sierra foothills, for example, may increase Hg levels in reaches/water bodies downstream of suction dredging areas by frequency, magnitude, and geographic extent such that MeHg body burdens in aquatic organisms may be measurably increased, thereby substantially increasing the health risks to ~~wildlife (including fish) or~~ humans consuming these organisms.

The conclusion related to humans above was not changed, because consumer fish consumption advisories related to Hg already exist. The Department therefore considers any increase in MeHg consumption to pose a substantial increase in health risks to humans. Similar information was not found during preparation of the SEIR to support the idea that the species of wildlife most likely to be subject to increased bioaccumulation of Hg as a result of dredging have existing health risks.

MR-BIO-8: Impacts on Lamprey Species

The Department received several comments regarding impacts on lamprey species. Several comments noted that suction dredging mining is likely to harm or kill lamprey ammocoetes

(larva). The Department agrees with this assertion; however, the Department maintains that the level of impact on lamprey species would be less than significant for purposes of CEQA. The Department bases this conclusion on several factors, including (1) lamprey ammocoetes are most common along the margins of channels in fine sediment deposits, whereas suction dredging activity is concentrated in pools and riffles with shallow bedrock exposures; (2) Section 228(l)(14) requires the permittee to take reasonable care to avoid dredging in silt and clay materials; (3) the proposed regulations restrict the number of permits that may be issued annually (Section 228(g)), which effectively minimizes the level of impact; and (4) the regulations limit dredging in most waters inhabited by lamprey species to July 1 through September 30 (Class F), which limits the window during which impacts could occur.

The Department acknowledges that very little is known about the distribution and abundance of lamprey species in areas that are commonly the focus of dredging activities, such as the lower Klamath River (Close et al. 2010). The comments suggest that in the absence of data, the Department must take a conservative approach (see MR-GEN-8) and prohibit dredging in areas that are known to provide habitat for lamprey species. The Department, as a resource agency, is often tasked with making management decisions in the absence of complete scientific information. The Department has not received data that suggest that the distribution and population viability of any lamprey species would be substantially altered by Proposed Program activities. Thus, for purposes of CEQA, related impacts are considered less than significant.

MR-BIO-9: Spread of Aquatic Invasive Species

The Department received comments regarding impacts associated with the spread of aquatic invasive species (AIS). These comments generally contend that the analysis presented in the DSEIR failed to fully consider the potential adverse impacts associated with the spread of AIS, and that a less-than-significant determination was not an accurate characterization of potential impacts on biological resources.

The Department's experts on AIS have revisited the analysis of impacts associated with the spread of AIS and concluded that the regulations as presented in the DSEIR were not sufficient to control the spread of AIS. As such, the Department has amended the proposed regulations. Section 228(l)(20) has been added, as follows:

> Before relocating a suction dredge to another waterbody, water shall be drained from all equipment for at least two weeks or the suction dredge and associated equipment must be decontaminated. Decontamination must include pressure washing with water greater than 120 degrees Fahrenheit and/or chemical decontamination of all surfaces using bleach, vinegar, ammonia or potassium permanganate solution.

These requirements are consistent with those used by the Department for other water craft. The proposed revisions to the regulations further reduces the risk associated with the spread of AIS, which was already concluded to be less than significant for purposes of CEQA.

MR-BIO-10: Impacts on Special Status Plant Species

The Department received comments regarding potential adverse impacts on special-status plant species. Impacts on special-status plants were addressed in Impacts BIO-PLANT-1 and BIO-PLANT-2 of the DSEIR. These impact analyses considered the potential for adverse impacts to occur based on the distribution of all special-status plant species and their relationship to the historical geographic focus of suction dredging, as well as in the context of the proposed regulations. These impact analyses concluded that suction dredging was not likely to cause significant impacts on special-status plant species.

The USFS stated that the analysis in the DSEIR "fails to demonstrate the conclusion for a determination of less than significant." More specifically, USFS expressed concern for potential adverse impacts on Slender-Horned Spineflower (*Dodecahema leptoceras*) populations in Big Tujunga Canyon. Slender-horned spineflower is an annual species that occurs on alluvial fans, floodplains, and terraces. The landforms on which slender-horned spineflower grows are typically benches and terraces away from active channels in areas receiving little surface disturbance from flooding (USFWS 2010). These features may be vulnerable to erosion from lateral channel migration or avulsion. Suction dredging is unlikely to occur on these landforms and the regulations prohibit dredging within 3 feet of the water's edge, which would further minimize the potential impact from dredging. The USFS concerns are primarily related to access and egress to and from the stream and impacts associated with dredging encampments. In the proposed regulations, Big Tujunga Creek (Wash) is designated Class E (open September 1–January 31). The bloom period of Slender-horned spineflower is generally considered to be April–June (Hickman 1993). In nearly all years, this species would set seed before the onset of the dredging season. Therefore, a direct impact on individuals through access, egress, or camping is highly unlikely. Dredgers may cross or camp in suitable or occupied habitat during the dredging season, but this is not likely to occur because the species distribution is very limited in Big Tujunga Canyon. If these activities were to occur, it is unlikely that ground disturbance would adversely affect suitable habitat to a degree that would preclude germination of the species or significantly alter the soil structure or seed bank. Therefore, this impact remains less than significant for purposes of CEQA.

MR-BIO-11: Cumulative Impacts on Fish

The Department received comments suggesting that cumulative impacts on fish[12] were not appropriately considered in the DSEIR. USFS suggested that the DSEIR did not provide "adequate discussion to describe how the Proposed Program will avoid adding to these already significant cumulative impacts." USFS asserted that "The cumulative effects discussion fails to demonstrate that the incremental effects of the proposed program will not measurably contribute to the decline of any *Fish* species."

The Department developed the proposed regulations to prevent impacts that would contribute substantively to the decline of any fish species. The Department spent hundreds of hours identifying operational requirements and spatial and temporal restrictions on

[12] Section 45 of the Fish and Game Code defines "fish" to mean "wild fish, mollusks, crustaceans, invertebrates, or amphibians, including any part, spawn, or ova thereof."

suction dredging. Neither USFS nor other comments provided substantive information to indicate the contrary. Therefore, the Department believes that the contribution of suction dredging under the Proposed Program to any cumulative impacts on fish would not be considerable, and the impact would be less than significant.

Cultural Resources

MR-CUL-1: Cultural Resources

This response is divided into five sections.

Significant and Unavoidable Impacts on Cultural Resources

Several comments questioned whether the significant and unavoidable conclusion regarding impacts on cultural resources was appropriate. As stated in the DSEIR, suction dredge mining may be conducted in the vicinity of cultural resources, including historical resources, Traditional Cultural Properties (TCPs), and archaeological resources. The DSEIR also states that it is less likely that significant archaeological resources are located within the river bed and the immediate area of impact of suction dredge mining. However, there is a high potential that significant prehistoric resources are located on the adjacent river banks and surrounding vicinity. Some types of significant historical resources may be in or immediately adjacent to waterways. TCPs may include specific waterways within their boundaries. The DSEIR also states that without location-specific data generated by archival research at the California Historical Resources Information System or the California State Lands Commission (SLC) and field surveys by qualified archaeologists and/or architectural historians prior to dredging activities, specific locations of cultural resources that could be affected by suction dredging would generally not be known. The Department does not have the jurisdictional authority to require dredgers to conduct archival research or site-specific surveys. (See generally MR-GEN-6.) Therefore, suction dredge activities may affect historical and unique archaeological resources. CEQA states that "a project with an effect that may cause a substantial adverse change in the significance of an historical (or unique archaeological) resource is a project that may have a significant effect on the environment" (Pub. Resources Code, § 21084.1). Because suction dredge mining may have an effect on historical resources (including TCPs) and unique archaeological resources, and because the Department does not have the jurisdictional authority to mitigate such impacts, the Department correctly concluded that this impact would be significant and unavoidable.

Best Management Practices

In addition, several comments were concerned that the proposed Best Management Practices (BMPs) manual would be likely to encourage, rather than reduce, looting of cultural resources. It is unclear how this conclusion was reached, as the specific BMPs have not been finalized yet. The Department will be careful to ensure that the design of the BMPs will result in reducing, rather than increasing, the potential for adverse impacts.

Plants with Medicinal or Cultural Uses

Several comments were received that questioned why the DSEIR did not analyze the potential for suction dredging to have adverse effects on plants with medicinal or cultural uses. The DSEIR evaluated impacts on traditional cultural properties. As noted on page 4.5-7 of the DSEIR, traditional cultural properties, including Riverscapes, comprise contributing

elements such as spatial organization, topography, vegetation, wildlife (including fish), water features, as well as sites, structures, and objects. Impacts on traditional cultural resources were found to be significant and unavoidable.

Furthermore, the Department is not aware of, nor did the comments provide, any evidence to support the notion that impacts on these plants would be more than infrequent and incidental, let alone widespread.

For these reasons, the Department did not feel it was necessary to include a detailed analysis of this issue.

Environmental Justice

Several comment letters from tribes requested that an environmental justice analysis be included in the SEIR. Environmental justice issues, per se, are not physical impacts on the environment, and therefore are not required to be analyzed under CEQA unless there is a potential for a related physical effect. However, the DSEIR did conclude that the mercury bioaccumulation in fish from suction dredging could have significant and unavoidable human health impacts, a finding that has an obvious nexus to environmental justice issues related to subsistence fishermen. As such, the Department believes that it did appropriately consider environmental justice in its impact analysis.

Consultation with Tribes

Several comment letters suggested that the Department should have consulted with various tribes in the preparation of this SEIR. The NOP of the SEIR and the Notice of Availability of the DSEIR were disseminated widely in an effort to solicit input from a broad range of individuals, agencies, and interest groups, including tribes. Input from various tribes was received at both of these stages in the process, indicating that this outreach had been effective. Because the Proposed Program is statewide, and given the number of tribes in California, consultation with individual tribes was considered to be infeasible for logistical and funding reasons.

4.2 Individual Responses to Comments on the DSEIR

This section presents a copy of relevant pages from each comment letter to which an individual response has been provided, bracketing the individual comments related to the relevant topic (e.g., water quality) in numeric order. The comment letters are reproduced in full in Appendix A. Responses to issues raised in each letter follow immediately after the letter, sequentially. Note that responses to those letters for which all topical comments have been addressed by one or more Master Responses are not included here; the applicable Master Responses for those letters are presented in Appendix J. Similarly, within the letters below, responses have only been provided for those comments within each letter that were not entirely addressed by one or more Master Responses. Master Responses relevant to the letters below are identified in Appendix J.

Responses to Individual Comments Related to Water Quality

Responses to individual comments received regarding water quality are provided below.

Note that the comments related to water quality in the letters 050911_(b) 050911_(b) (6), and 050911_S(b) (6) duplicate the information submitted in the letter from (b) (6) dated May 2, 2010; for responses to water quality comments in those letters, please see the responses to 050211(b) (6) below. Similarly, (b) (6) gave a presentation at the May 10, 2011 hearing, a transcript of which is contained in Appendix K of this FSEIR. The material contained in this presentation repeats the results of the analysis contained in 050211(b) (6). For this reason, responses to the presentation are not provided; please refer instead to the responses provided to 050211(b) (6).

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(b) (6)

(b) (6)
Tampa, FL 33629

California Department of Fish and Game
601 Locust Street
Redding, CA 96001

6 March 2011

Dear California Department of Fish and Game;

Thank you for the recent notification of the availability of the Draft Subsequent Environmental Impact Report and Draft Dredging Regulations made available through the internet.

I would like to comment on several issues. It appears the 2011 SEIR has substantially the same results as the 1994 results but the impact on the regulations is disproportionately different. If the intent was to close as many rivers as possible – this has been achieved.

<u>The SEIR data supports no changes to the current regulations.</u>

If the intent of the SEIR was to base the regulation and permitting of dredging on a factual based analysis, then there are multiple flaws in the conclusions from the data. I'm going to focus on Chapter 4.2 as the issue seems to center on mercury (Hg and MeHg) discharges from a dredge.

- The SEIR correctly states that dredging on California Rivers has been ongoing for over 40 years, but then assumes the results from Test Pit #2 (Freck) would be equally distributed. As the SEIR notes the dredgers in the 1970's did very well, but this is because so much virgin pay layer existed. It doesn't exist anymore. The percentage of material on bedrock that is un-dredged is a fraction of the total amount – you cannot extrapolate the data to be evenly distributed.
- The SEIR leads you to believe that the re-suspension of Hg and MeHG causes it to travel all the way to the delta – but the report also states that turbidity issues are almost zero 100 meters from the dredge, this would indicated that Hg, being heavy, would precipitate out much faster than light particulates.
- The SEIR almost completely discounts the effects of impoundments along the course of the river. It is completely erroneous to assume that 50% of Hg would pass over the dam. In the SEIR they state that a large percentage of the Hg or MeHg would settle in the shallow layers, and the SEIR states that at depths virtually no Hg was found. This is inconsistent.
- The SEIR completely disregards an important and fundamental conclusion of the 1994 report – dredging removes mercury from the environment – there is a net reduction of mercury from dredging either through the collection of Hg associated with gold or the evaporation of MeHg when exposed to oxygen and sunlight. There can be no argument that dredging removes

mercury from the watershed – yet it isn't mentioned at all, even though the 1994 report came to this conclusion.

- The data and the conclusions from the data are inconsistent. When you read the national reports on mercury you find the rivers where gold dredging is taking place have lower levels of mercury – across the food chain, than the national averages for mercury.

As you know one test site was sampled, there is very little data available as the SEIR states. That dredges cause the re-suspension of Hg and MeHg is clear from the data, but after that point the analysis is not based on facts. Specifically I believe the following inconsistencies should be addressed:

From the literature review of the SEIR I do not see an important report prepared by the US Environmental Protection Agency (EPA), Mercury Study Report to Congress, EPA-452/R-97-003. Table 2-1 below is extracted from the report in comparison with Table 4.2-3 from the SEIR.

Effects of Hg as measured in fish tissues

The two tables are important in that the purpose of the SEIR is to determine the environmental "impact" of the activity. Impact of mercury release from dredges can best be categorized by the measurement of accumulated MeHg in animal tissues within the watershed – it's tough to argue against that as a measurement for impact. Based on this simple test the results indicated that not only is the impact negligible but contrary to the report's conclusions the mercury levels measured are at the extreme lower levels of all fish mercury measurements across the US. It seems clear that the impact from dredging on mercury levels in fish is negligible, and arguably statistically not significant.

Page 4.2-47 reports that Rainbow Trout measured Hg levels were .17ppm versus the national average of .11ppm, however the SEIR report is misleading as the averages provided by the US EPA provide wide bands of averages. To select only the lowest amount is deceptive and tends to skew the readers opinion of the issue. Given 40 years of dredging it appears the actual impacts on fish species are quite low. If the effects on re-suspension were as drastic as the report claims we would expect to see much higher levels.

Table 2-1
Range of Average Mercury Concentrations (ppm) for Major Fish Species in the U.S. in 36 States and DC, 1990-1995

Carp	0.061 -0.250	White sucker	0.042 - 0.456
Channel catfish	0.010 - 0.890	Largemouth bass	0.101 - 1.369
Smallmouth bass	0.094 - 0.766	Walleye	0.040 - 1.383
Brown trout	0.037 - 0.418	Northern pike	0.084 - 0.531

Table 2-1. US EPA Averages for Hg Concentrations in fish nationwide

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

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

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

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

Table 4.2-3. SEIR table showing measured levels of Hg within California

Although Table 4.2-3 provides the results in mg/kg the numbers have the same meaning as ppm.

The interpretation of the two tables above demonstrate that the measurements within California are all at the lower or middle of the national averages for the same type of fish – in areas that do not have dredging. As the EPA report points out there are significant environmental factors that contribute to Hg in the environment with the largest contributor being power plants – not dredges.

Cadisfly and Stonefly Analysis

The studies on the levels of Hg in cadisfly and stonefly larvae appear to be statistically insignificant yet they are provided as statistically significant with a N=1 or 2. Even with such small samples the results do not indicate a degree of variability that would indicate that dredging is the proximate cause, nor that the variation can specifically be attributed to dredging. The worst case results in a difference of one one millionth of increase – yet the report can't discount water flows from the spring as causing this. The report actually discounts the cause of a spring flow event by using anecdotal evidence of "hydrologic conditions were very similar between these two years p.4.2-46, line 41."

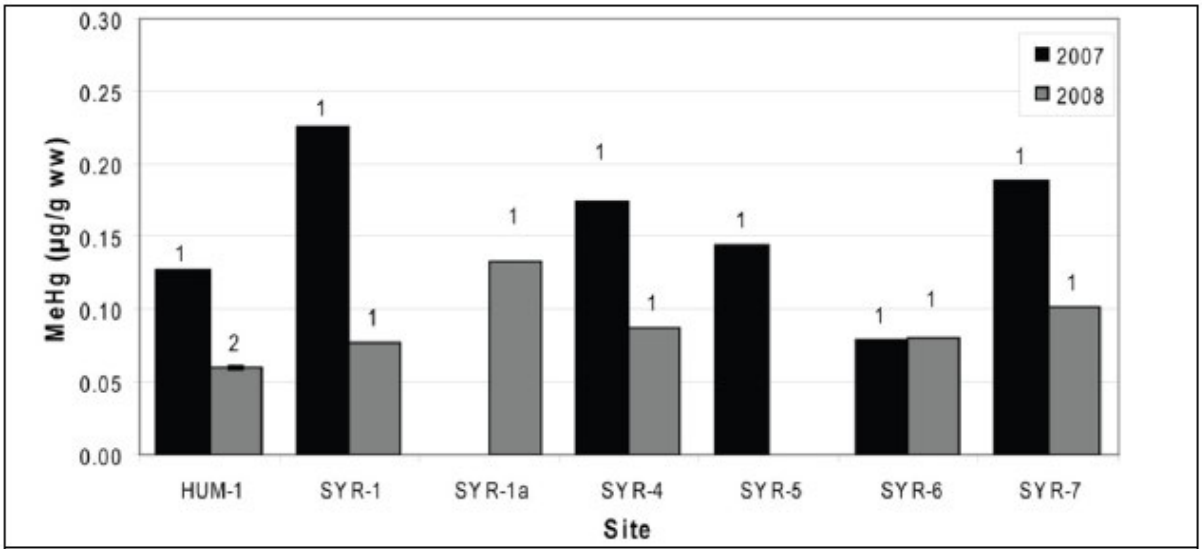


FIGURE 4.2-17. METHYLMERCURY (MeHg, µg/g, WW) IN COMPOSITE SAMPLES OF WATER STRIDERS (ORDER HEMIPTERA, FAMILY GERRIDAE) (N = 1-2) COLLECTED FROM THE HUMBUG CREEK/SOUTH YUBA STUDY AREA IN SEPTEMBER 2007 AND SEPTEMBER 2008

(Fleck et al., 2011)

Figure 4.2-17 from the SEIR used as evidence that dredging increases levels of Hg

Had the authors of the SEIR simply checked the flow data from the USGS station at Goodyears Bar they would have seen that the two years are anything but alike. In 2007 there was a significant high flow event in February that was well above the mean and from the graph below (drawn from the USGS data) you can clearly see this was a very rapid rise event that would result in flushing of Hg into the river by disturbing the substrate. The exact opposite is true of 2008. The 2008 data (as shown in the graph) provides a below normal year for flows and not a single high flow event. Although the results from the samples are still statistically questionable, the proximate cause cannot be simply attributed to dredging while discounting the extreme differences in flow events between the two years

The 2007 graph below shows the flow rates as measured by the USGS monitoring station at Goodyears Bar.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,200 ft^3/s and (or) maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)
Feb 10	2215	*5,850	*10.04
No other peak greater than base discharge			

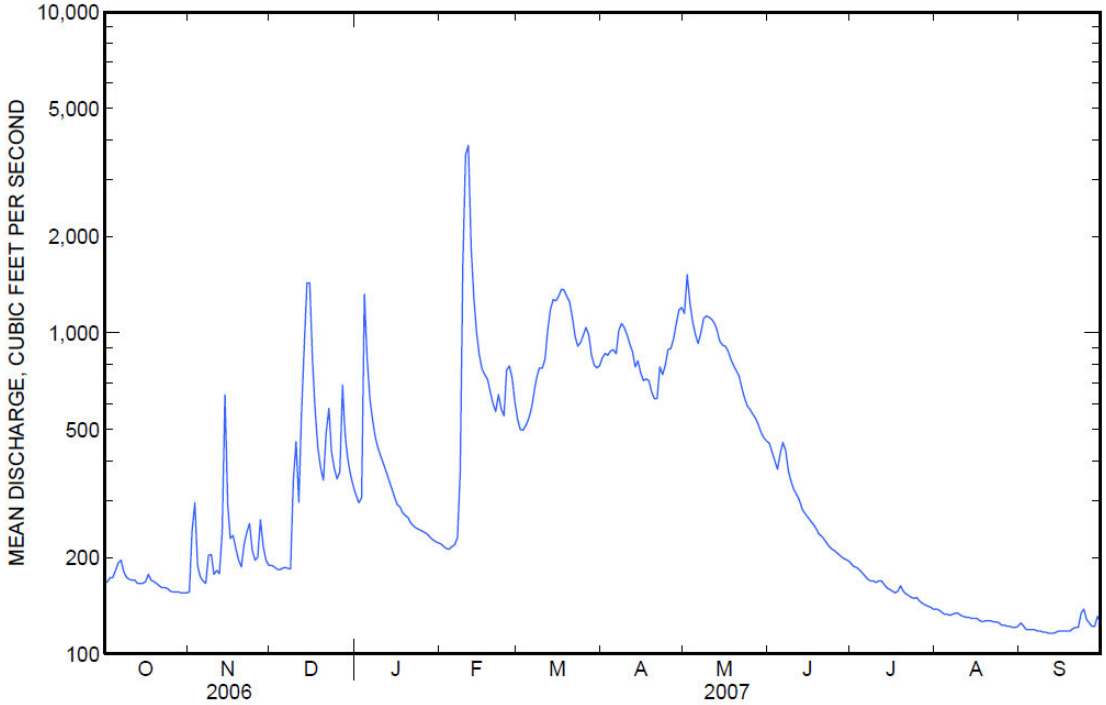
Peak Discharge for 2007 at Goodyears Bar monitoring Station

Graph showing water flows for 2007.

11413000 North Yuba River below Goodyears Bar, CA—Continued

SUMMARY STATISTICS

	Calendar Year 2006		Water Year 2007		Water Years 1931 - 2007	
Annual total	438,235		164,753			
Annual mean	1,201		451		757	
Highest annual mean					1,566	1982
Lowest annual mean					141	1977
Highest daily mean	8,140	Jan 1	3,840	Feb 11	29,600	Jan 2, 1997
Lowest daily mean	155	Oct 29	116	Sep 11	60	Sep 7, 1977
Annual seven-day minimum	156	Oct 26	117	Sep 8	60	Sep 7, 1977
Maximum peak flow			5,850	Feb 10	45,500	Jan 2, 1997
Maximum peak stage			10.04	Feb 10	25.65	Jan 2, 1997
Annual runoff (ac-ft)	869,200		326,800		548,100	
10 percent exceeds	3,060		1,000		1,850	
50 percent exceeds	749		244		334	
90 percent exceeds	174		126		128	



Graph of 2007 Streamflow at Goodyears Bar

Table providing 2008 maximum discharge at Goodyears Bar.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,200 ft³/s and (or) maximum (*):

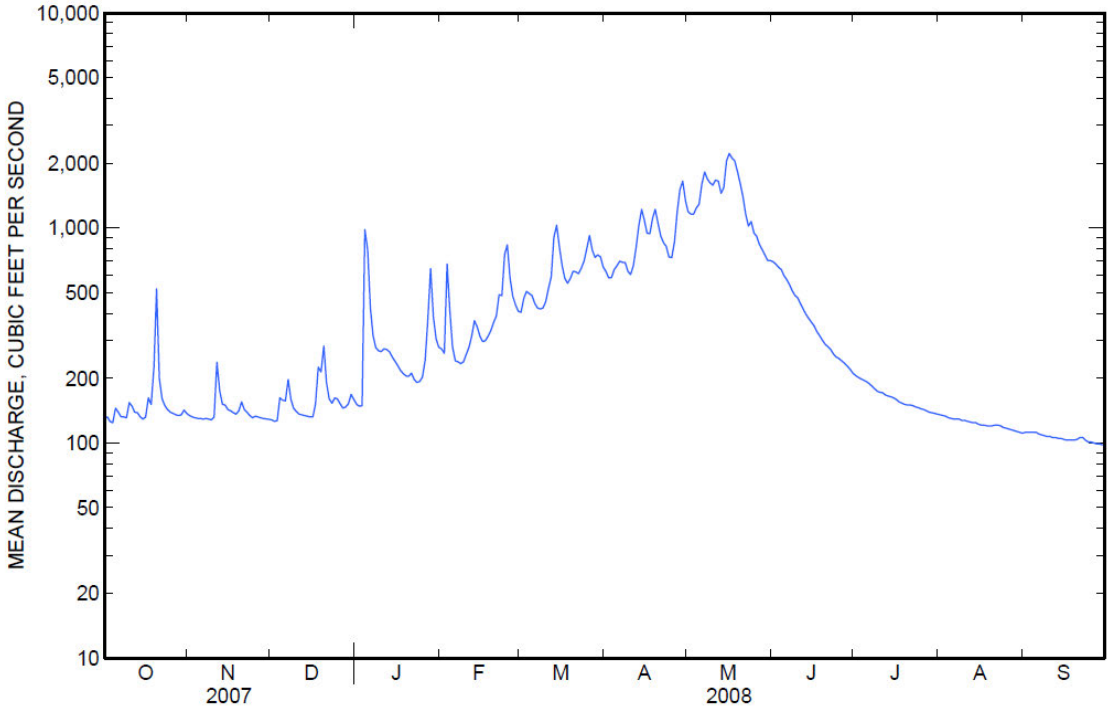
Date	Time	Discharge (ft³/s)	Gage height (ft)
May 15	2100	*2,660	*7.21

Water-Data Report 2008

11413000 North Yuba River below Goodyears Bar, CA—Continued

SUMMARY STATISTICS

	Calendar Year 2007		Water Year 2008		Water Years 1931 - 2008	
Annual total	152,426		147,732			
Annual mean	418		404		752	
Highest annual mean					1,566	1982
Lowest annual mean					141	1977
Highest daily mean	3,840	Feb 11	2,220	May 16	29,600	Jan 2, 1997
Lowest daily mean	116	Sep 11	98	Sep 29	60	Sep 7, 1977
Annual seven-day minimum	117	Sep 8	99	Sep 24	60	Sep 7, 1977
Maximum peak flow			2,660	May 15	45,500	Jan 2, 1997
Maximum peak stage			7.21	May 15	25.65	Jan 2, 1997
Annual runoff (ac-ft)	302,300		293,000		544,700	
10 percent exceeds	990		957		1,840	
50 percent exceeds	206		202		331	
90 percent exceeds	126		117		127	



Graph showing 2008 Water flows at Goodyears Bar

It is clear from the two graphs and the high flow events that the sampling discounts the effects of a flood event on the river. Secondly, the extremely limited number of samples calls into question the statistical significance of the data.

A third area of contention with the analysis of the data is provided in the extracted Figure 4.2-14 below. The SEIR attempts to estimate how many dredgers it would take to equal 10% of the assumed background Hg levels reaching the delta. The set up of this analysis is flawed, wildly unsupported and at best could be called spurious.

On page 4.2-42 the authors do not provide substantiation for how so much mercury laden sediment manages to transport over 30 miles to the nearest lake, given that earlier in the SEIR they clearly state that turbidity is zero within 100 meters of the dredge. It's not clear how the authors of the SEIR believe that a specific amount of Hg would reach the lake and what percent of this Hg would settle out during the course of the river, they do not discuss this, but instead leap to the conclusion that apparently 100% of the Hg reaches the lake where only 50% is dropped out, yet the other 50%, I assume it's MeHG is floated on top of the water, passes over the dam and manages to not precipitate or evaporate out at all during the remaining 100 miles of river. This is the assumption they base the graph on to declare that somehow dredging can produce the entire background load of Hg annually.

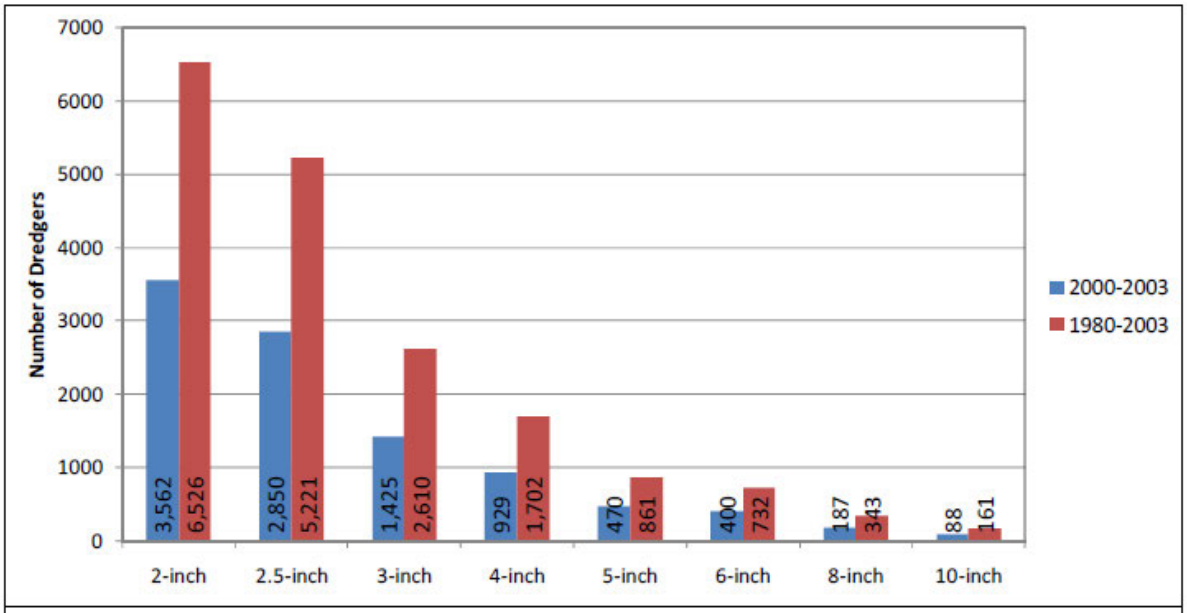


FIGURE 4.2-14. NUMBER OF DREDGERS REQUIRED TO DISCHARGE 10% OF ANNUAL DELTA THg LOAD BASED ON ESTIMATES FOR 2000-2003 AND FOR 1980-2003 DREDGING PIT #2:BC SEDIMENT MERCURY LEVELS *(Wood et al., 2008)*

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

Figure 4.2-14 from the SEIR

This analysis and conclusions appear to be the weakest part of the SEIR and utilizes strikingly weak data and analysis. The only conclusion the reader can reach is the authors of the SEIR are attempting to bolster a weak argument by preparing charts and graphs based on zero data, but instead are based on wild assumptions and guesses. The charts relating to the amount of Hg introduced into the river should be completely removed from the SEIR as they lack even a minimal amount of substantiating data and clearly show a bias towards results that apparently the authors want to achieve.

If the argument is to be made relative to dams, then the effect of length of river; evaporation of MeHg under different conditions; the settling of Hg; and the effects of multiple dams must be considered. I believe this analysis again shows the cherry picking of data to achieve a pre-determined end.

I am concerned that drastic changes to the dredging regulations are being emplaced when the data appears to show that ***no changes are warranted***. The draft SEIR is clearly biased towards reaching the conclusions it wants to reach. My reading of the SEIR shows that dredging does resuspend Hg/MeHg but it settles out quickly and the absorption of MeHg into animals is really quite low compared to the alarmist writing of the SEIR. The facts simply do not support the conclusions and the resulting changes to the regulation and it would appear that they are quite challengeable by a person with basic statistics knowledge.

In effect the changes to the regulation will result in the taking of hundreds of legal Federal mining claims when an EIR from 1994 found no significant impact, and a 2011 SEIR found no significant impact yet focuses on the impact of Hg/MeHg with essentially spurious data.

Finally, the report completely disregards one important fact which the 1994 EIR considered – suction dredging, regardless of how you measure it – removes Hg from the river. The net effect of dredging is the reduction of existing Hg, both from physical removal of Hg attached to gold and the evaporation of some part of the MeHg that is produced. The study, while it mentions that MeHg will evaporate when exposed to sunlight, fails to mention that all dredging is done during daylight and what percent of MeHg is actually being removed from the river.

Of final concern is that the SEIR ignores previous US Government reports that confirm that suction dredging removes mercury from the stream. Pointedly, the SEIR ignores all reports that are favorable to the removal of mercury by suction dredging and bases its entire conclusion on the sampling of one hole, while disregarding the "impact" which is the measurements of MeHg in fish is quite low compared to national averages. A quick search of the internet turns up numerous previous studies, but the SEIR claims there is no other supporting data except the one test hole. In fact, the US EPA Region 9 came to the exact opposite conclusion:

"Studies and a trial program prove the effectiveness and benefits of the recovery of mercury during suction dredge mining operations. The US EPA Region 9 **(San Francisco, CA office)** <u>has recognized the benefits associated with suction dredger mining as a method of aiding their efforts in environmental</u>

cleanup at no cost to the tax payer and have touted the benefits of suction dredgers removing mercury from the environment."

An environmental impact study should focus on impact, not conjecture or the gross extrapolation of limited data to a global finding. The data used is extremely limited, the analysis is conjecture and the resulting regulations are an extreme reaction to wrongly interpreted and biased data.

Thank you for allowing my comments; I hope you will carefully consider these issues prior to finalizing your regulations. I have multiple claims that will be affected by your "A" classification. These changes will in effect make my claims worthless; please bear in mind that making these changes, on such limited data and analysis will impact hundreds of claim owners negatively and likely will result in continued lawsuits. The data from the SEIR supports the 1994 conclusions.

Very Respectfully,

(b) (6) [redacted]

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030611(b) (6)

Response to Comment 1
See MR-WQ-5. It is not known what percentage of virgin pay layer existing in the 1970s currently exists, but it is known that areas enriched in mercury do currently exist, as documented in Humphreys 2005 and Fleck et al. 2011.

Response to Comment 2
See MR-WQ-7 and MR-WQ-14.

Response to Comment 3
The assumption of 50% mercury migrating past Lake Englebright is based on literature estimates provided in Alpers et al., in prep., as discussed on page 4.2-41 of the SEIR.

Response to Comment 4
See MR-WQ-1.

Response to Comment 5
Rivers in which suction dredging takes place generally contain trophic level 3 fish (generally a trout species) as the highest trophic level species. Reservoirs and rivers downstream of where dredging takes place contain trophic level 4 fish, including warm-water species such as bass and catfish, which accumulate higher levels of mercury owing to a higher position on the food chain. These water bodies in California have fish with levels comparable to those nationally. See also MR-WQ-2.

Response to Comment 6
The assessment does not attribute decreased mercury levels in invertebrates to the lack of suction dredging. However, given that these are the only data that exist, and results were statistically significant (as stated in Fleck et al. 2011), the possibility cannot be discounted that prohibition of suction dredging contributed or caused the decrease. Overall hydrologic conditions at the site in water years (WYs) 2007 and 2008 were very similar, as measured by annual mean flow and exceedance probabilities (10%, 50%, and 90% exceedances), although as the comment points out, there was one large storm in February 2007, which produced a peak flow greater than any experienced in WY 2008. The possibility that this event contributed to higher mercury levels in biota cannot be discounted. Indeed, there is no way to definitively determine the cause of the decrease. The assessment does not rely on these data to make conclusions, but considers them in the context of all available evidence.

Response to Comment 7
See MR-WQ-14. As stated in the assessment, data from Figure 4.2-7, which depicts the mercury bound to the ≤ 63 µm particle size discharged from suction dredging, were used for these calculations. On page 4.2-40, justification is provided for why it was assumed that ≤ 63 µm particles are transported to Lake Englebright, based on data from Curtis 2005. See also MR-WQ-3 and MR-WQ-7.

Response to Comment 8
See MR-WQ-6, -7, and -9.

Response to Comment 9
See MR-WQ-1, -2, and -7.

(b) (6)

dredge right down the middle. I don't see the basis for this decision in the SEIR. The report states the impact from erosion is less than significant – why is this new change required? The existing rule should remain – the high water line.

Third – limiting the number of permits issued to 4,000 I don't believe will have the intended effect. It would be more effective to limit the number of dredges allowed per claim and not limit the number of permits. By limiting permits you can still allow a high density of dredges in areas, while not allowing legitimate claim owners the right to work their claim. I ask that you reconsider the limitation on permits and consider limiting the number of dredges that can be working a claim at the same time.

Of utmost concern is the closing of hundreds of miles of rivers based on the very small amount of data collected and the poor analysis of that data while not considering multiple other documents that have researched the mercury issue and found results directly opposite – including US EPA and USGS studies. These studies were not reviewed or cited in the draft SEIR. I believe the analysis of mercury in the SEIR needs to be thrown out. The conclusion, based on "impact" is that the fish in gold dredging rivers are actually far healthier than the national average. Based on impact, and 40 years of gold dredging the impact from mercury is insignificant both locally and cumulatively. I ask that you re-examine this data, consult other scientific studies that reach different conclusions and explain how two different outcomes from the 1994 to 2011 study can be presented even though measured levels of mercury are less than national averages.

(b) (6)

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030611 (b) (6)

Response to Comment 1

The assessment used the best available information to make conclusions. It is unclear what studies the comment is referring to that were not considered. See also MR-WQ-1 and MR-WQ-2.

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(b) (6)

document continually states there is no additional harm, and suction dredging is not deleterious to fish and so on.

Your Proposed Regulations don't make any sense. There will be a drastic economic impact on already suffering small rural counties. In addition, the dates you propose on a lot of the streams, rivers and tributaries will cause more environmental damage than the current regulations will. Take the Middle Fork of the Feather River and the tributaries. To have the season open when you propose would only impact the environment far greater by people attempting to access these areas during times that are almost impossible to access. Maybe that was your plan; extend the season to periods no one can access, thus eliminating most of the season? Also, having the Middle Fork open from July 1 through January 31 and the tributaries open Sept 1 through January 31 is a joke. It absolutely doesn't make any sense. Have them both open the same time (July 1 through January 31). It is the same water, the same terrain and same habitat... So why the confusion?

There is plenty of evidence that suction dredging is beneficial to both the habitat and the environment. There is solid scientific evidence that the amount of mercury in fish has remained the same or even decreased during the past century. Researchers from Princeton University, Duke University and the Los Angeles County Natural History Museum have all compared specimens of fish preserved between 25 and 120 years ago with current samples of the same species. In these studies mercury levels in the fish had stayed the same or decreased.

Dredges remove ninety percent the hazardous and toxic materials. You have chosen to ignore this fact or twist it around to make it what you want. Mother Nature can do more damage to the environment or in high water than all the dredging could do in a lifetime of dredging. Also, studies have proven that the

mercury levels have not elevated in fish over the past 20 to 30 years. Did you choose to ignore this fact as well? I wonder what else you chose to ignore.

You state the preferred alternative is to drastically reduce or permanently prohibit all suction dredging to protect the environment. Everything your Agency gets involved in turns into a royal mess. Look at Lake Davis in Plumas County. The more you get involved in this issue, the bigger a cluster it becomes. This is where the Suction Dredge proposal is headed as well. You're Agency

Leave the current (1994) regulations in place. Your proposed regulations are unnecessary, over restrictive and not based on factual evidence. These proposed regulations close 80 to 90 percent of the waterways in California to dredging which is ridiculous. Suction dredging is a late spring and summer activity. Your restrictive timeframes l allow for limited dredging in fall and winter months when access is next to impossible. I believe that was on purpose so you can say you opened the waterways when in essence they are closed due to access issues. In addition, access during these times would cause more environmental damage than the current regulations ever could.

Furthermore, if you have a problem, deal with those issues on a case by case basis. If you have a certain area or miner that is causing problems, deal with them and not punish the entire state.

Your multi- million dollar fishing industry creates more environmental and habitat damage than any More hazardous and toxic materials are spilled by boats than any dredge could in a lifetime. Boats also carry unwanted and dangerous species from waterway to waterway which is not the case in suction dredging. Makes you wonder what is going on?

032211 (b) (6)

Response to Comment 1

Whether or not fish tissue mercury levels have decreased, increased, or stayed the same since the Gold Rush era is not relevant to the assessment. See MR-WQ-1, -2, -4, and -6.

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From: (b) (6)
To: dfgsuctiondredge@dfg.ca.gov;
Subject: Comments on SB-670 and the DSEIR
Date: Thursday, March 24, 2011 12:41:43 AM

Mr. Stopher,

I have been a permitted, rule abiding recreational dredger for several years. I am also a naturist, avid recycler and a tax paying business owner. It is my opinion that the current closure of recreational dredging was a knee jerk reaction that could have avoided many issues and losses to all those involved. Especially the state in these troubled times.

It is my understanding that the two primary concerns which led to the closure of the dredge season were: The disturbance of mercury from the bottom of the rivers causing a decline in the salmon population and the permit fees for dredging did not cover the cost to enforce the dredging regulations.

The cost of the dredging permits could have been raised to a level where they did cover the expenses. Most fellow recreational dredgers I associate with would have paid 3-5 times the previous years rate to continue their hobby.

The concerns of mercury could have been addressed by random sampling through out the dredging season at suspect hot spots and in the off season during run off and flooding. It is my belief that this would have shown that as no dredging was allowed during spawning season, the minute amount that dredgers may have disturbed vs. the amount natural forces disturb is well below the allowed water EPA clarity standards. In my years of dredging I have encountered mercury only once. It was a bb size amount which I still have in a jar. As with all dredgers I know, we always remove any mercury found from the river systems, not only to be environmentally sound but also as it contains dissolved gold which is what we are there dredging for. Also take into account the many pounds of lead from fishing weights and bullets removed annually by dredges as well.

Though I feel like a victim of special interest groups in this matter with my hobby being banned, I feel the state and people of it are the biggest looser. In the 5 years I have dredged I personally have spent over $8000 in equipment, $3000 in gas, $1200 in vehicle and equipment maintenance, and $3500 in food. This is for me alone going on 10-12 1 day trips per year with a 2.5" mini dredge. That is over $3000 per year that I am now not spending, the state is not getting sales tax on and the business that I used are not obtaining these funds on which they had to pay income tax and keep employees for. If you take into account the number of dredging permits issued, how many of them are commercial or individuals that go more frequently you will quickly see that the state has lost out on millions in revenue from this ban.

I am aware the salmon industry is huge but from all the reports I can find and read, none of its decline is due to mercury but instead climate change, dams, farming pesticides and over fishing.

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Response to Comment 1

The assessment was based on the best available information. See also MR-WQ-1 and MR-WQ-7.

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DREDGES FRIGHTEN FISH, AND CAUSE THEM STRESS.

Actually, the opposite is true. In a dredge hole six feet wide by six feet deep it is not uncommon to see over a dozen juvenile fish in the hole in close proximity to the operator. They are usually looking for edible tidbits that are unearthed by the dredger or they have ducked into the hole to rest from the currents. I have observed this countless times. There are hundreds of hours of media videotapes showing this.

The motor on a dredge is almost not audible underwater. Many times, the only way that a dredger knows that his/her engine has run out of gas is by the fact that their air supply quits and the dredge hose stops suctioning. This requires a mad scramble to the surface. The most prominent sound when operating a dredge is a "whooshing" sound made by aggregates going up the dredge hose. This is much like the normal rushing sound that you will hear underwater in any stream. Fish routinely swim all around a dredge and it's operator looking for food. They are not a bit frightened of it. Fish are normally spooked only by fast-moving, ominous objects such as a kayak, canoe, or other watercraft, swimmers or waders, or an obvious predator.

DREDGES RAISE THE TEMPERATURE OF THE WATER, WHICH KILLS FISH.

This claim is completely false. First of all, the only thing that is warm or hot on a dredge is the engine. Absolutely no water comes in contact with the air-cooled motor or its hot exhaust. Dredges are not like outboard motors where the hot (and oily) exhaust is vented underwater and the engine is cooled by water. If a dredge has any effect on the temperature of water at all it probably cools it slightly due to the aeration and evaporation of the water as it flows over the riffles of the sluice.

Scientists have measured water temperatures of numerous streams and rivers above and below a dredge and were unable to measure any difference whatsoever with the instruments that were available to them.

DREDGING CREATES TURBIDITY IN THE STREAM

Of course it does. Any activity in a stream creates turbidity whether it be a fisherman wading in a stream, animals walking in the stream, a group of children frolicking in their favorite swimming hole, or a tree or rock falling into the stream. The important concerns are how severe the turbidity is, how widespread it is, and how prolonged it is.

First of all, dredging is only permitted within the wetted area of a stream. Dredging into a "loamy" area along stream banks and excessive clouding of the water is forbidden by dredging regulations. The streambed materials that are suctioned by a dredge are materials that are constantly washed by stream currents. Therefore, these materials are mostly free from

the finer particulate material that can "cloud-up" the water and remain suspended for a prolonged period of time. Most of the material that comes out of the back of a dredge sinks immediately, within two or three feet. Some of the finer particles can travel further downstream in a narrow plume that is occasionally visible from above the water. Depending upon the speed of the flowing water, this visible plume largely dissipates within 25 to 50 feet downstream of the dredge and it is relatively rare for it to extend beyond 100 feet.

To get some idea of the level of turbidity that is usually created by a dredge we must understand some facts about dredging. A dredger cannot operate in water where there is an appreciable level of turbidity at all. When visibility is impaired, dredgers cannot see what they are doing. They cannot see the gold that is trapped in crevices, and rocks that are overly large will get suctioned by the dredge nozzle and plug the dredge hose. These plug-ups are very difficult to remove. In addition, dredgers cannot see the looming danger of boulders that could tumble in on them and injure or kill them.

It is common for dredgers to set up within 50 or 100 feet downstream of each other with no visibility problems, yet events such as dam releases or thunderstorms will cause the level of turbidity in the entire river to rise to the level that dredgers have to abandon their activity for several days. Even within the area of a normal dredge plume the level of turbidity is only a tiny fraction of what is created by naturally-occurring and long-enduring events such as storms and winter floods which fish routinely endure. One single thunderstorm creates many times the turbidity in a given river or stream than is created by all dredging activity for an entire year.

DREDGING POLLUTES A RIVER.

Absolutely false. A dredge adds nothing whatsoever to the waterway. The material that comes out the back of a dredge is the very same material that was lying on the bottom of the waterway. It has simply been moved a few feet. However, as mentioned previously, a dredge does remove many pollutants from a waterway. While we are on the subject of pollution, this would be a good time to discuss one of the most lethal pollutants in a waterway….. mercury. Mercury is a very heavy, highly toxic metal that exists in a liquid state and usually concentrates in "blobs" in any depression. Mercury will readily adhere to gold and various other metals and coat them. It will also cause small particles of these metals to bind together, much like the fillings that dentists put in our teeth.

One of the greatest concerns with toxic mercury is its ability to enter the food chain, such as in fish. It does not do this as a blob but rather as microscopic particles. When mercury is sitting in a waterway, disturbances and agitation such as tumbling boulders smashing this blob, or gravels scouring this blob, can cause a few microscopic particles to break away and become mobilized in the waterway. This is known as "flouring". As long as this blob remains in the waterway, it is prone to flouring from constant disturbance until it flours away completely and becomes a toxic poison to many living organisms. The only way to stop this contamination is to remove these blobs of mercury and other mercury coated metals from the waterway. This

is exactly what a small scale dredger does! A recent scientific study showed that a small scale dredge captured 98% of this toxic mercury from a waterway.

These are just a few of the marathon claims that environmentalists have alleged against dredgers, but they are among the most important. Now, let's look at the other side of the coin. I previously mentioned that dredgers provide several benefits to fish. They do, and they are very important to the survival of fish and will be discussed in detail. Most of the discussion will be as it pertains to salmon, as it is this species that is at the heart of the present controversy. When a dredger searches for gold in a stream he/she basically creates three alterations to the streambed. These alterations are….. the dredge hole, a tailing pile, and a cobble pile.

THE DREDGE HOLE

Environmentalists do not generally give a lot of lip service to the dredge hole itself aside from the fact that it can be considered an eyesore and a challenge for persons wading in a rocky stream. Some even acknowledge that the dredge hole can have a benefit for fish. The annual spawning migration is a very strenuous trip for fish and there can be a significant mortality of fish during this migration. The fish become weakened by their constant struggle against strong water currents. Also important is the fact that fish migrate during the time of year when the water is near its warmest. Warmer water contains less oxygen, heightens the chance of disease, and saps the strength of fish. Fish will often pause in an area of river where a cooler side-stream enters the river to regain their strength. These areas are known as thermal refuges. Dredging is often prohibited within a certain distance of these refuges. In between these natural refuges, migrating fish will frequently duck into vacant dredge holes where the water is calm and the temperature is stratified with the cooler water being near the bottom. Frequently, a dozen or more adult fish can be observed using dredge holes. In many instances, fish seem to prefer dredge holes over natural refuges, possibly due to the depth and calm water.

Prior to the migration season, these dredge holes are extremely important to juvenile fish. As the summer wears on and water levels drop, predation of these small fish increases immensely, due in large part to numerous bird species. It is at this time that these smaller fish seek shelter in deeper pools if they can find them. These dredge holes are an ideal refuge.

TAILING PILES

These are the piles of gravel-like aggregates that come out the back of a dredge. These tailing piles are also one of the present focuses of mining opponents who are desperately searching for a valid indictment of small-scale dredging. A streambed is an environment that is constantly being changed by water flow. Each year, the streambed erodes a little bit more and

OTHER BENEFITS PROVIDED BY DREDGERS.

There are a couple other benefits that dredgers provide that I will mention. One of them is rather insignificant and the other is quite important. During the fall migration of spawning adults, the water is warm and holds less dissolved oxygen (DO). There is pressure on the oxygen content by the struggling dwellers that live there. Dredges force voluminous amounts of water down over the sluice section, mixing this water with air and this helps to aerate the water and increase the oxygen content. This is, of course, miniscule compared to the area of a river and is a mere drop in the bucket compared to the aeration provided by natural rapids in the waterway and boulders that ripple the water, but every little bit helps. In a smaller stream, this effect would be greater.

One other benefit that is provided by dredgers is extremely important. It is not uncommon to find dozens of juvenile fish swimming around an operating dredge. They swim into the dredge hole as well as swimming through the dredge plume. They are there because as a dredger suctions streambed material, he/she unearths thousands of invertebrates and suspends them in the water. Finding adequate food is one of the most important aspects in the life of a juvenile fish. The better the fish are fed, the more likely they are to survive, due to healthy growth and a diminishing predator pool. There is also a direct scientific correlation between the amount of time juvenile fish spend foraging and their susceptibility to predation. The faster the fish can feed, and then hide, the better off they are. When food is scarce, predation increases. This is another benefit that opponents of the dredging industry are careful not to mention. It does not take a genius to question the fact that when fish are being fed grain in a hatchery, it is considered an ultimate act of conservation, yet when native fish are feasting on their natural diet in the plume of a dredge it is somehow biologically unimportant. A dredger who spends a couple months in a given section of a river has provided a lot of food to the native fish population. Incidentally, biologists have observed that these invertebrates rapidly re-colonize, usually within three to four weeks.

Native, juvenile, and migrating fish must find sufficient food, shelter from predation, reprieve from harsh temperatures, a place to rest from swift currents during their exhausting migration, and suitable spawning habitat. Small scale dredging provides all of these. And, dredgers are the only waterway users who provide any of these important benefits that the fish so greatly need. It is almost unimaginable to me that environmentalists who are attacking dredgers aren't the real friends of fish at all. If the environmentalists were truly concerned about fish and really wanted to do something to help them, instead of sitting around and suing everybody, they would get up off their fannies, jump in the water, dig pools, pile cobble for refuges, provide food, and spread out gravel for spawning beds in our streams….just like the dredgers do with their sweat, back, and labor. As this essay is being written, our government is spending millions of taxpayer dollars to, among other things, spread out countless tons of gravel for spawning habitat in the Trinity River in California. Incidentally, you wouldn't believe the staggering amount of turbidity that is being created by the behemoth earthmoving machines that are being used for that project.

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Response to Comment 1
See MR-WQ-3.

Response to Comment 2
See MR-WQ-1, -6, -7, and -10.

Response to Comment 3
The Department agrees that dredging-related operations may beneficially add dissolved oxygen (DO) to the water column when DO levels are below saturation levels in the water column. Dissolved oxygen is not adversely affected by dredging-related activity; thus, the effects of Program implementation on this parameter were not assessed.

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The fact is that dredgers do remove 90% of toxic materials such as mercury, and trash from the areas worked, we have found mercury ourselves just panning. There is scientific evidence that the amounts of mercury in fish and crustaceans either has remained the same or even decreased since first introduced into the water systems. I believe it was Fish and Game that introduce toxic substances into Lake Davis in Plumas County seeping into tributaries poisoning fish that were native in order to eliminate an introduced species. Well guess what? That did not work, creating chaos in our county. Then D.F.G. spent money on stocking a lake that they have since poisoned again.

The current regulations are sufficient as they already create a responsible miner if they want to keep the area they dredge and their permit. Remember each winter obliterates any trace of mining and most have to start from the beginning each spring moving rock and overburden.

We have seen streamsides cleared of small brush and left in slash piles to burn during the winter. Some of the piles are partly burned, some are missed all together creating piles of dangerous fuel during late summer months. They are unsightly creating a fire hazard in late summer and erosion during the winter months.

Disabled persons should still be issued a permit and it is hard to designate a specific person as an assistant as one certain person cannot always be depended upon to be there for the disabled person with the permit. As a person who is disabled I have had to use a different person depending upon the day, time and month. It depended upon who was available to help me dredge. We did have the permit or a facsimile in our possession at the time.

I recommend that before regulations are changed or put into effect, anyone involved ought to try suction dredge mining at least once so they actually experience dredging before they turn innocent people into criminals and remove a California tradition.

Exactly how accurate are the reports, have all of the rivers and creeks actually been tested or is it someone looking at a map or from the shore and judging. I believe that education is the key and ignorance is not bliss. I remember when I was a kid I was told that a stream or creek will clean itself after so many feet.

Revenue is lost to the government agencies, counties and the miners due to catering of the special interest groups that our EX- Governor S. favored and the brash stop to all suction dredging without substantiated studies or facts. I am sure that if added up it would be surprising the amount of money each agency collects to start a claim and each season.

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032711(b) (6)

Response to Comment 1
See MR-WQ-1. See also 032211(b) (6) Response to Comment 1.

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Suction Dredging Questions for CDFG

Can the people petition the new governor to rescind the past governor's executive order and allow the CDFG to begin selling suction dredge permits again?

Considering many of the studies used in this report are about human recreational impact, not just dredging impact and more than 2 million fishing licenses are issued in the State of California each year, why are you requesting the suction dredge permits be limited to 1,500 or 4000?

What do you mean by the use of the term "potentially significant"? I could "potentially" fly to the moon in my Tundra pickup as soon as I master the power of dark matter. After all, anything is possible given the correct information and tools required. Doesn't using the term "potentially significant" give the appearance of harm, when there is not necessarily harm occurring?

Do you have standards of how much in "amount" statistics would be significant when referring to mercury or heavy metals in the water being re-suspended?

Page ES-12 How much mercury have you determined has been moved by suction dredgers? From which study did you get those numbers? How much mercury is naturally moved by spring runoff? From which study did you get those statistics?

Page ES-12 Where are the "identifiable" HOT SPOTS associated with past mining operations? Please name several of these specific locations.

Page ES-16 Please identify which specific river areas are of concern for high mercury level?
Is mercury re-suspension a naturally occurring event with the natural river turbulence associated with spring runoff? How can you determine how much is caused by the flow of the river itself, and how much is caused by the dredgers?

Page ES-17 If you have identified the locations of impaired water bodies for mercury and can put restrictions on those areas, why is the reduced intensity alternative better than the water quality alternative? The Reduced Intensity Alternative would allow dredging in "identified" mercury impaired waterways. How is that better? And why are you suggesting it as the solution?

Dredgers actually reduce the amount of mercury and heavy metals in the water by removing the mercury covered gold, removing nails, pieces of iron, and scrap. Wouldn't it be helpful to allow them to continue to remove those harmful chemicals from the waterways, even though it is in minute amounts?

In the CEQA process why was there no suggestion of an alternative that is better than the 1996 Alternative? Why only less than 1996? If CEQA requires you to formulate four alternatives then throw out the lowest, and the second lowest becomes the recommendation, it's only fair to provide as many better than present conditions as you provide less than present condition alternative. You are automatically disqualifying the 1996 (most recent) regulations by not providing a "better than 1996" option. The reasonable man theory would say, if it's not broken, don't fix it. Just by the way the report is written, it becomes deleterious to dredgers, local economies, and the CDFG budget and punishes suction dredgers when the findings of the report find no significant fault with the way they have been operating in the past. By reporting the finding as is, Horizon Water & Environment LLC has stacked the deck against the suction dredgers unfairly.

Page ES-16 How many dredging permits will be issued if the Water Quality Alternative is chosen?

Quantitatively, how much negative impact on aquatic life and mercury/heavy metal re-suspension has been PROVEN using scientific method? Or is it mostly conjecture and opinion? Most of the reports cited in the DSIER say mercury "can" "could" "possibly could" be re-suspended in the waters. Nowhere did it say mercury "is" re-suspended. So the

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Response to Comment 1

The specific amount of mercury moved by suction dredgers is unknown. Watershed loadings were calculated in Alpers et al., in prep, and cited in the DSEIR.

Response to Comment 2

There has been no extensive survey of sediment mercury concentrations. That said, references such as Churchill (2000) make a compelling case that massive amounts of mercury were lost to the environment wherever extensive hydraulic gold mining was conducted. As such, and in combination with the fact that both mercury and gold are heavy metals that tend to settle out of the water column in similar locations, the Department feels confident that a strong correlation exists between the locations of mercury and the locations of gold in stream sediments. Also, see MR-WQ-6. Relative watershed versus suction dredger loadings are estimated on pages 4.2-33 through 4.2-44 of the DSEIR.

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and will continue to be pursued in lawsuits filed by the Public Lands for the Public and this litigation will continue to be pressed forward regardless of the outcome of these proposed new regulations. Notwithstanding the violations and legal entanglements referenced above, let us address the alleged "Significant and Unavoidable Impacts" referenced in Chapter 6.2.3 of the DSEIR:

<u>Impact WQ-4: Effects of Mercury Resuspension and Discharge from Suction Dredging</u>: This impact details analysis of Hg (Mercury) discharge and transport resulting from both dredging operations and watershed sources such as rainfall and runoff. Nobody disputes that there is mercury present in historic gold mining areas as a result of earlier gold mining efforts. But, as the report indicates, this mercury continues to slough into the river without regard to dredging activity. The report clearly points out on Page 4.2-38 that, "…*In contrast to Hg discharged from suction dredging; the majority of HG is from background watershed sources during the winter wet season, when runoff conditions contribute to high flows that scour sediments laden with Hg.*" Yes, every winter Mother Nature creates a "significant disturbance" and dredges without a permit. The report further cites a series of mercury samples that were taken once a month in the summer while preparing this Report. The conclusion at the bottom of Page 4.2-38 was that, "…*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."* The Report itself stipulates that there are uncertainties as to the cause of HG loading that is present. So, the conclusion stated clearly in the report is that nobody knows anything for sure about movement of HG in streambeds. Even more indicative of this conclusion, on Page 4.2-40 it is reported that HG particles less than 63 um, "…*do not remain suspended during summer low flows and are thus deposited back into the river."* This conclusion is no surprise to dredgers. Even further, on Page 4.2-41 it is finally concluded that, *"Transport of elemental Hg that is floured and discharged from suction dredging is largely unknown as floured HG has been observed to float initially but subsequently sink or float until they are dissolved."* Yes, what goes up must come down and nobody knows how much mercury is discharged by suction dredging but the report makes

clear that Mother Nature is the biggest contributor. The report also defines the low flow, summer months of dredging as between March and October. Therefore, the question presents itself as to why the proposed regulations are striving to cut short the dredging season for most dredgers to three months between July and September? WQ-4 is unfounded and should be corrected to read a finding of "less than significant."

<u>Impact WQ-5: Effects of Resuspension and Discharge of Other Trace Minerals from Suction Dredging</u>: This area details results to determine the impact of other sediments encountered when dredging such as copper, lead, zinc, etc. Again, the conclusions on Page 4.2-58/59 are that dredging has a *"negative impact."* It is reported that suction dredging would not be expected to increase levels of trace minerals nor result in substantial, long-term degradation of trace metal conditions that would cause adverse effects. Finally, it is further reported that the potential to mobilize the trace metals would not substantially increase health risks to wildlife. Everything sounds good for dredgers so far. However, then the report begins to speculate. It reaches out in desperation to suggest that, *"If"* dredging at known metal hot spots actually contained acid mine issues, low pH levels, high sediment, and pore metal concentrations, there *"may be"* a potentially significant impact. There are too many "ifs" and "maybes" in that assumption. Yet, despite the lack of data or knowledge to accurately identify where such conditions might exist, the report suggests that the "unknown" itself presents a significant and unavoidable impact. This is pointless analysis at its worst. The conclusion imagines that the perfect storm of conditions might exist out there somewhere to affect trace mineral conditions. That's like saying, "Somewhere in those mountains, there is gold." Impact WQ-5 is unfounded and should be corrected to read a finding of "less than significant."

Impact <u>BIO-WILD-2: Effects on Special-Status Passerines Associated with Riparian Habitat</u>: This impact details the results to determine whether dredging impacts special-status passerine species by altering behavior, movements, and distributions. Passerines were defined as birds that are adapted for perching. This means that they primarily live

anthropogenic activities, and not a single causative agent or project." **The word "anthropogenic" means "caused by humans." So the Report is already saying that it's not "dredging"** ***per se*** **that impacts non-fish or bird species but a lot of "unknown" human factors. The Report acknowledges that there are other influencing factors besides dredgers affecting the environment. And, let's not forget that "dredgers" are in the water and birds are in the trees. Yet, this report contends that out of all the other thousands of bird, plant, and non-fish species discussed in the report, the eight non-fish species listed on Table 4.3-3 are in danger to dredging operations. This is like pulling out the mythical "needle from the haystack." It is the position of miners that these eight species are no less impacted or at risk than the hundreds of other species determined in the Report to be "less than significant." This impact is not based upon any scientific proof but mere conjecture. Consequently, impact CUM-2 is unfounded and should be corrected to read "less than significant."**

<u>Impact CUM-6: Turbidity/TSS Discharge from Suction Dredging</u>: This impact considers alleged turbidity impairments from dredge discharges impacting fish. It is a shame that the writers of this report have not actually dredged themselves or they would know firsthand the ridiculous nature of this argument. Fish surround dredgers when they are dredging because they know that food is on the menu again. Yet the false premise that turbidity from dredge discharges hurt fish has spawned into an argument for closing or restricting dredging operations. Reference is made again to the Report itself in Section 228 of the DFG Proposed Amendments to the Regulations related to suction dredging where it makes the bold statement that, ***"…the Department finds that suction dredging…will not be deleterious to fish"*** **Further on Page 5-28, the Report references past, present, and future turbidity sources of turbidity which include: agriculture, aquaculture, effluent pollution, recreation, urbanization, timber harvest, and wildfire, fire suppression, and fuels management. In essence, the Total Maximum Daily Load (TMDL) of turbidity touted in the Report has many causes and the least of which is from dredging. This impact is overstated and embellished to serve its masters rather than speak the truth. Impact CUM-3 is unfounded and should be corrected to read "less than significant."**

<u>Impact CUM-7: Cumulative Impacts of Mercury Resuspension and Discharge from Suction Dredging</u>: This impact considers how dredging affects existing concentrations of Mercury present in the sediments of historic gold-mining and gold bearing regions. There is no getting around that Mercury was left behind by historic miners and mining operations. However, as previously discussed under in Impact WQ-4 and detailed on Page 4.2-8 of this Report, *"the transport of elemental Hg that is floured and discharged from suction dredging is largely unknown but floured HG floats initially and will subsequently sink or float until they are dissolved."* Now the Report suddenly mentions a new mysterious field study conducted by USGS scientists in the Yuba River system. First, who are these alleged "scientists and Hg experts" and what are their qualifications? Quite candidly, this new field study just seems too obvious and convenient. It is also too premature to be accepted as reliable data. On Page 4.2-19 of this Report, it clearly states that the information provided by these unknown experts was *"preliminary results."* In other words, this study (if it is one) has not undergone any peer review or been validated. And validation is necessary since the USGS chose a location where Humbug Creek meets the confluence of the South Yuba River. This is a prejudicial site for any representative field test since this is the location of the Malakoff Diggins where heavy hydraulic mining occurred and is not likely to result in data that can be repeated in other field research. Point in fact, on Page 4.2-23 of the Report, it states, *"…The South Yuba river watershed experienced the most intensive level of hydraulic mining, in which mercury-contaminated hydraulic mining debris was produced, and discharged in the watershed.* Reasonably, this is not a scientifically representative location from which to extrapolate a conclusion about effects of mercury Resuspension. This explains why on Page 4.2-54 of the Report, it concludes, *"…because not all locations of elemental mercury deposits are known, the feasibility with which sites containing mercury could be identified at a level of certainty that is sufficient to develop appropriate closure areas or other restrictions for allowable dredging activities, is uncertain at this time."* Further on the same page, the Report states, *"… a comprehensive set of actions to mitigate the potential impact through avoidance or minimization of mercury discharges has not been determined at this time, nor is its likely effectiveness known."* So, we don't know

exactly where all this mercury resides and, even if we did, the effectiveness of trying to mitigate impact is unlikely. And finally, on Page 4.2-36 of the Report, it states, *"…modern equipment may result in less flouring"* when discussing the impact of mercury. So, the data used to support this impact is based upon inconclusive field results and the whole problem itself may be admittedly an insolvable one. But we do know that material disturbed in any waterway will find its way to the bottom and Mother Nature does more to disrupt Mercury sediments that any dredger ever could. Impact CUM-7 is unfounded and should be corrected to read "less than significant."

Somewhere between the "1994 Regulations Alternative" and the "Reduced Intensity Alternative" there exists an alternative that would allow CFG to continue to do its job as well as allow miners greater access their claims. But, only data that can be scientifically supported should be considered. Meanwhile, dredging should not be restricted or prohibited in those areas and during those times of the year when dredging would not pose problem to the environment. All miners are open to some better dredging practices but dredgers should not be scapegoats.

Sincerely,

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032811 (b) (6) and 032811 (b) (6)

Note that these letters have identical contents. For this reason, only 032811(b) (6) has been reproduced here.

Response to Comment 1
See MR-WQ-6.

Response to Comment 2
There is substantial evidence that hot spots of trace metals in sediments exist, primarily in association with historic mining activity. Impact WQ-5 was determined to be potentially significant based on the potential for dredging-related disturbance at known locations, such as 303(d)-listed stream segments, as well as for the potential of dredging activity to disturb unknown locations. On this basis, the DSEIR's significance conclusion relative to this impact is considered appropriate.

Response to Comment 3
See MR-WQ-3.

Response to Comment 4
See MR-WQ-5 and MR-WQ-6.

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Earth Justice
States, that the staff of the water control resources board calls for more water and also supports two federal biological opinions that call for more water to prevent the extinction of federally protected fish species as well as the Chinook salmon.

The Pacific Coast Federation of Fisherman's Associations
Claims, one of the biggest problems for water quality in Klamath river is the operation of the Klamath irrigation project. The water release from the dam is so hot and laced with pesticides and nitrates from agricultural waste that it"s often fatal for salmon.

Nowhere did I read anything in regards to dredging polluting the water and killing fish. To me it seems someone has a grudge on someone and wants him or her out of the way so they can control the Klamath Rivers, but they need your help to do it.

The facts I see are clear. Dredging creates holes for fish to swim down to colder water, creates spawning pools, loosens up hard pack gravels for egg layers and helps remove some toxics in the water. So what's the real reason for the dredge regulation change? To take away miners rights because an Indian tribe wants control over a river?

I tried to find out how many people died from mercury- poisoned fish from rivers and streams, but no luck, because there were none.

In closing, I want to Thank You for taking the time to read this, I am not a writer but when my rights are being jeopardized I want to make sure we are all working on facts and not making decisions on a lot of might, could and maybes.

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040611(b) (6)

Response to Comment 1

As discussed in the assessment, federal criteria for fish-tissue mercury levels are based on epidemiological evidence for neurological impairment in humans. Fish in many water bodies in California are already above these criteria.

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(b) (6)

April 10th 2011

Public comments CDFG / SDEIR

Attached is a copy of my appeal costing some $185,000.00 compliments of my USFS buddies.

Mr. Stopher,

I object to these proposed rules in their entirety, and especially because USFS will still be harassing us under the guise of regulation simultaneously with your insane regulations. It is an outlandish ill conceived and makes no environmental sense whatsoever.

This has gotta be a Homer Simpson Plan!

I also find it worthy to note that for all the scary environmental harms that you have all fabricated about mercury, and all the scientists and experts collaborating to protect the fish from mercury in your regulations, you never bothered to mitigate in your regulations. What do we do if we happen to find a pool of mercury? I have no doubt that there must be some concern, yet you fail to even attempt to mitigate.
Considering that you mitigate woody debris, logs, stumps, fish entrainment, frog eggs, spawning fish, tad poles and the like, I find it far more than egregious that apparently you don't give a damn about blowing mercury out the tailings after all! Even if your geniuses fixed that problem now, in the final EIR, the courts couldn't see this multimillion dollar 3 year collaborative SDEIR effort as *harmless error or mere oversight.*

Also, the SDEIR discussed naturally occurring native elements like arsenic and miscellaneous others that might be polluting the water. I want to point out that any element or sulfide with specific gravity greater than the average sand, we tend to recover. This is very important because these minerals are greater near old hard rock mines in small streams - (that these proposed rules prohibit us from mining) - and we tend to collect them along with gold. Bummer.

Question? Another thing, why is it that CDFG has never bothered to find a solution to allow us to bring you lead, mercury, and heavy metals, sulfides etc?

Hypothetical situation and Question; If **3500** suction dredge miners all came to Plumas NF to dredge 6 months strait out of the year under the old rules, and no major flood events redistributed the entire stream bed, taking into account the vastness of the watershed and the massive amount of gravel available, *how long would your scientists reasonably estimate it would take to mine all the gravel*, a *decade*, or *two decades*, 50 years?
Question; Considering the number of linear miles of streams and rivers in Plumas NF, how many miners using 4" - 6" in small streams, 6" – 10" in the larger streams, how many miners would that amount to per 1/8th mile of river would that be?
I'm just looking at the perspective here.

Questions:
Can you tell me *how many public toilets* are available within Plumas and Tahoe National forests - along the rivers, and highways for the forest / river users to use?
Estimating of course all the average number of daily users use days – and correlate with the number of public bathrooms – and how likely it that there will be one near when nature calls?
Are these harmless fishermen and swimmers, and tubers etcetera going to dash to their vehicles and drive to find a crapper, 20 miles from river to unknown location of the next toilet?
I just thought I would bring it up because the reality is that compared to 3500 miners with tools, compared to millions of use days and tiny fraction of toilets, the fact is the crap everywhere and pee everywhere, but SDEIR doesn't want to go there. Just pick on the miners!

Question: How much money has it cost to date - to prepare all the work on this SDEIR since it began?

Question, Will you officially state for the record that your SDEIR proposed regulations **do** or **do not** apply to full-scale commercial – production suction dredge gold mining?

Question: How many CDFG officers do you have now to handle all the new duties you are so eager to take responsibility for under theses SDEIR proposed regulations?

I won General permission to mine my claim as you can see, and the USFS did their EA for a mineral withdrawal, and for my hearings, and the courts (2) adjudications (levels of intense environmental scrutiny) found no plausible reason to stop me from suction dredge mining this river and that is recorded in this case in detail and all of the environmental work is a matter of public record with the USFS in Plumas National Forest.

The Judges had to look at the realities that I had the right to work with whatever was lawful at that time, and since I proposed running 2 - 6" nozzles side by side, uncontested I believe under these circumstances this short stretch of river should remain as it was under the 1994 CDFG regulations, at bare minimum, because of the extensive environmental work the USFS did and found no adverse affects.

Two dredges necked down to 6" mining in this river with six inch nozzles and a Power winch, or a10" dredge necked down to 8" for production with out clogging the hose would be acceptable (if I believed that a limit on commercial dredging was even lawful which I do not). Nozzle size - to be reasonable - should be based upon the geological and size range of the aggregate intended to be dredged, not an absolute limit by an arbitrary rule. I own a mine, not a dive shop or a swimming hole. Unreasonable is when validity exam destroys and takes a rich placer mine. In light of the intense decade long battle, and having won General Permission to Mine based upon the USFS EA's etc, I reject the

041011(b) (6)

Response to Comment 1
See MR-GEN-6, MR-WQ-1, and MR-WQ-16.

Response to Comment 2
In Chapter 4.2 of the DSEIR, Impact WQ-1 assessed potential water-quality effects of encampments and dredge site development and found the impact to be less than significant; thus, no mitigation is required for this potential impact related to activities that would occur under the Program.

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river by the flood. The data would approximate how many cubic yards or tons of *foreign materials* (road fill base) were used to rebuild the roadbeds and the RR track beds, which would provide an accurate estimate of how many hundreds of tons of foreign materials were introduced into the river. If DFG searches out the data referred to here, it will stagger the imagination how many hundreds of tons of toxic asphalt and how many Thousands of tons of foreign material washed into the North Fork Feather River alone.

Taken a step further, this was not an isolated flood event. During the flood events of 1986, countless other major rivers and streams flooded in a similar fashion throughout Northern California. There can be no doubt that thousands of tons of asphalt and concrete entered the NF Feather River alone as a result of one flood event. If DFG investigates this issue, and calculates the total volume of asphalt, concrete, and road/RR fill material that was washed into all the rivers and streams in Northern California during any one flood event, then the DFG can analyze the probable long term adverse environmental impacts to various species and water quality as a direct result of introducing massive amounts of asphalt, concrete and road/RR bed materials into the active stream beds. Further, DFG should also calculate how many thousands if not millions of tons of Road bed base and RR bed base washed into all the river systems throughout Northern California, and then analyze what harmful environmental effects these foreign materials may be causing.

Please take note here that up to this point I have only addressed the introduction of road bed and RR bed materials, and the associated asphalt and concrete that has been introduced into the active riverbed as a result of floods.

But, then we still must consider and estimate the vast volumes of all the other *foreign materials* (AKA earthen materials) that were deposited into the river as a direct result of flooding on the NF Feather River drainage, and by extension, DFG should estimate how much of this more natural earthen material entered all the rivers during each flood event.

Flood Events, Foreign materials, and Garbage

After the 97 flood, I hiked through many small streams that I was very familiar with in the recent past. I observed numerous small streams that in the summer typically run 4 feet wide and a foot or so deep that were unbelievably altered by flooding. On tiny streams like this I saw log dams created by the flood that were thirty or more feet high and 80 feet in width which were composed of downed timber and filled with gravel. I saw areas that the year earlier had several feet of streambed material, but the flood stripped away the entire gravel bed down to bare bedrock. I saw areas along small streams as described above where I could count approximately twenty trees leaning or laying across the stream in an area perhaps 150 feet in length. The trees are all sizes, but I am not talking about trees the size of bushes, no, the trees ranged between 8 inches to 2 feet in diameter. The floods scoured the banks, undercutting the tree roots causing the trees to fall toward and across these streams.

The floods also destroyed gravel and dirt roads, and in many locations, the flood ripped out numerous culverts ranging in size from perhaps 2’ to 10’ in diameter that were used to construct roads across small streams. Many of those galvanized steel culverts were

simply blown down stream, crumpled up and partially buried in streambed gravel. You can bet that these culverts are still located where the flood pushed them.

The point is that natural erosion within the river drainage system caused mass erosion and transport of massive volumes of *foreign materials;* stream bed materials, river bank materials, sand, silt, clay, gravel, vegetation of all kinds along with trees and bushes. Here, DFG should look for available data from whatever source available to determine how many hundreds or thousands of tons of stream bed and *foreign materials* were introduced into the watershed of the NF Feather River as a direct result of one major flood event. Once that is done, DFG should expand this investigation to determine how many hundreds of thousands or millions of tons of *foreign material* was introduced into the river systems throughout Northern California as a direct result of one major flood event. Once this is known, DFG should analyze the adverse environmental impact to species as a result of all this foreign material co-mingling with the asphalt, concrete, oils, creosote, road base, and RR base which all mix with native stream bed materials.

Major flood events have occurred throughout Northern California nearly every decade since the 1850's. Plainly DFG has access to credible data and statistics proving this point. Since the mid 1800's humans have built homes, sheds, cabins, and businesses along rivers and streams in the Sierra Nevada. Major floods have completely destroyed many of these structures along with all their contents and washed it all into the rivers. Some property owners rebuilt after a major flood, only to be wiped out again in yet another flood. One very important point is that if we consider a dozen or so major flood events spanning the past 160 years, we must acknowledge that hundreds if not thousands of homes, cabins, sheds, vehicles, and structures have been washed into our rivers along with all contents such structures contained. As these structures were ripped apart by the power of the water, virtually all the contents of these structures that do not float obviously sank and became mixed with gravel and the bulk of all that garbage still remains under the river gravel. During these flood events, the streambed goes into suspension moving vast amounts of gravel and boulders; the best way to describe this is equating a flooding river to a massive grinder. If you toss a refrigerator into this grinder, it will tumble, and be crushed over and over, and any open cavities will fill with sand and rock, and ultimately it will be found in the future as a crushed mass under river gravel. Therefore importance of flood events and the cumulative quantities of foreign materials, asphalt, heavy metals, and general garbage should not be overlooked.

The DFG - and perhaps the environmentalists who dream of destroying mining rights - appear to believe that the rivers and streams are somehow **pristine and natural** and in need of protection from evil suction dredgers. The river systems in California are in fact loaded with garbage and heavy metals. The problem is that most of the garbage and heavy metals are out of site and out of mind. Personally I would be amazed if I dredged a day and did not find any garbage. Even DFG appears to turn a *blind eye* to the vast amounts of cumulative trash and heavy metals flowing through our rivers.

The DSEIR is void of any meaningful investigation or analysis pertaining to the quantity of garbage in the rivers, and void as to an analysis of the types of garbage in the river, and void as to providing any genuine analysis of how the; break down, corrosion, oxidization, rusting, and leaching of these heavy metals and toxins might effect the

aquatic species and water quality. All the flood events spanning the past 160 years have washed virtually anything and everything imaginable into the riverbeds. Floods wash and grind entire homes and estates into the riverbed. I say estates to cover the storage of campers, boats, trailers, vehicles, garden equipment and all the typical things one would find on any estate located along our rivers. All "experienced dredgers" have uncovered vast amounts of heavy metals and garbage in pretty much every river that the public has had access to.

A description of the **garbage** dredgers encounter routinely includes but is not limited to this brief list; Crumpled automobiles, automotive frames, engine blocks, transmissions, wheels, wheels with tires, tires, car batteries, bridges, culverts, guardrails, road signs, silverware, nails, nuts, bolts, rivets, threaded rod, steel rebar, bailing and barbed wire, old pull tab cans, aluminum and steel cans, broken and unbroken bottles of every description, hubcaps, welding slag, small engines, aluminum ladders, metal buckets and tubs, copper and steel pipe and fittings, and virtually anything else you can imagine.

The smaller **heavy metals** that we routinely encounter include but are not limited to the following; lead fishing sinkers, lead split-shot of all sizes, brass swivels and fishing lures, broken fish hooks, bullets, lead/copper projectiles and spent ammunition cartridges, buck-shot, lead balls, steel ball bearings, bb's, lead pellets, metal zippers and grommets, silverware, occasional coins, copper wire and plumbing pipes, solder, mercury, gold, amalgam, lead from auto batteries, pull tabs, bottle caps, tacks, zinc and galvanized nails, garden tools, shovels, rusty nails and scraps of rusty iron of every description.

Basically, our rivers and streams are loaded with trash and garbage of every description. And, the river will deposit much of its garbage and heavy metals in pay streaks along with the gold. To me, a river or stream is a sluice box. In fact, during major flood events, when the entire streambed goes into suspension and flows downstream, all the higher specific gravity materials (gold, metallic garbage and heavy metal) drop down to bedrock and settle together in what is known as a *pay streak*. Most experienced dredgers have learned that if you want to find gold, follow the trash.

Having covered the topic of flooding above, I am keenly aware that it can be argued that floods are often construed as an act of God, or may be described as periodic and natural events. However, flooding is also a re-occurring event that can be predicted to some degree, and there is no doubt that the next major flood(s) will cause precisely the same problems previous floods have caused. Hwy 70 and the RR tracks have not been moved to new locations or elevations since the last flood, thus there is no doubt the rivers will flood again and flooding will introduce another massive volume of *foreign materials*, road base/RR base, stream bank materials, garbage and debris, and yes more estate property will wash into the active stream and river beds.

If the DFG is genuinely concerned about gold miners "panning" which would introduce relatively miniscule amounts of *foreign materials* into the watershed as a result of panning samples, then the DFG must incorporate a careful analysis of the cumulative impacts of 10 year flood events in the DEIS for the proposed dredging regulations. The Environmental Impact Statement must make reasonable efforts to analyze the adverse environmental impacts resulting from past flood events which introduced natural

streambed materials, stream bank materials, road fill base, RR fill base, asphalt, concrete, garbage and other contaminates into the river systems. The DEIS must then presume that a future flood of similar magnitude will cause similar results which will have some adverse impact on the aquatic species in the aquatic environment and water quality. This year in particular, we have near all time high snow pack in the Sierra Mountain Range. Depending upon how quickly this snow pack melts, and considering the last flood was 1997, it is highly probable that flooding will occur this spring.

Another reason we have such vast amounts of garbage in our rivers is that there were no environmental laws related to the early day construction of highways, RR, Bridges, tunnels, dams, and roads. Today, anyone could set up a dredge below or slightly downstream of a bridge and you will find massive amounts of scrap steel, rivets, metal straps and so forth.

Wrapping up the significant issue of flood events in relation to how floods have caused vast volumes of foreign materials, earthen materials, asphalt, and garbage into our rivers over the past 160 years, I have a few more points to make and several questions.
DFG has been informed for decades that individual dredgers conservatively remove 10 – 20 or more pounds of heavy metals (primarily lead) steel, and mercury, mercury amalgam during a single mining season. We generally only add up the weight of the small pieces we find in our recovery systems, we do not add the weight of all the other large scrap metal and garbage we remove. Assuming that in one year, 5000 dredgers removed similar quantities of heavy metal, then it is safe to say that dredgers remove 50,000 to 100,000 pounds or 25 – 50 short tons of heavy metal from our rivers in one season, and this figure does not include the weight of all the other garbage we remove. Now, estimating that dredgers have been removing these heavy metals for nearly 40 years, and converting pounds to tons, it appears that dredgers have been responsible for removing between 1000 and 2000 short tons of heavy metals from our rivers and streams.
Question; Over the past 40 years, how many pounds or tons of heavy metal has DFG removed from our rivers and how much money did it cost you to remove these heavy metals?
Question; Has the DFG ever seriously analyzed the amount of garbage suspended in the streambeds of our rivers or developed a plan to clean up our rivers?
Question; is there any other user group that is actively removing streambed garbage and heavy metals from our rivers?
Question; I understand that the DFG at one point attempted to collect mercury from miners. So, after all the years DFG has "regulated" suction dredging, why is it that DFG has not created a simple way for dredgers to turn in their heavy metals and mercury for disposal?
Question; Has DFG ever conducted a study or analysis to determine how much asphalt has washed into our rivers, and if so, has DFG made any determination(s) regarding the adverse environmental impacts to species and water quality?
Question; Has DFG analyzed the adverse impacts to aquatic species and water quality as a direct result of all this asphalt breaking down over time and releasing toxins?
Question; Has the DFG considered or developed a plan to remove asphalt from the riverbeds?

Further, since these are suction dredging regulations, and not "placer mining or lode mining regulations," then I fail to see how or why DFG has created a **separate inspection and approval provisions** for dredges over 4" diameter and less than 8" diameter, and for winching boulders. These extra steps, seeking various inspections of (dredge equipment, nozzle restrictor ring size, dredge permit numbers, intake screen size), application for power winching and approval process for winching, and various other approvals are overly cumbersome, they will take considerable time to arrange, schedule and ultimately approve or disapprove. Therefore this multi-level application/approval process is unnecessary, and amounts to unreasonable regulation that impermissibly encroaches upon the rights given to miners by Congress.

This lengthy process will also require the DFG to spend vast amounts of time and money traveling all over the State to make inspections and ultimately to approve or disapprove certain equipment and requests; for example winching and oversize dredge. With our economy in such sad shape, I cannot believe the State of California can afford to perform all these inspections and approvals in a timely manner. If you have not addressed the State budget of both *time* and *money* for all these unnecessary activities, you simply will not be able to fulfill your obligations to the miners who apparently will be required to wait for your inspections and authorizations.

The **4" dredge restrictor ring** limit is going to cause injury and death. If DFG limits the nozzle to 4" then you have pretty much regulated profitable mining out of existence.
If a miner can not obtain a permit for anything greater than 4" and he must work 6' - 10' - 15' of overburden, it goes without saying that most dredgers are going to take a lot more risks, they will make their cut slopes nearly vertical, and as a result these walls (cut slopes) will cave in on dredgers and mark my words, dredgers are going to be injured or killed as a result of DFG's half-baked idea of reducing nozzle size and compelling miners to use only hand winches.
The question that plagues me is why DFG wishes to restrict the size of nozzle to 4 inches? Here I will provide a hypothetical situation; Assuming a six inch dredge will move nearly twice as much material per hour, and assuming it will take a miner 2 months to mine a particular area with a 4 inch dredge, then the same job should be completed in one month using a six inch dredge.
So again, why in the world would DFG find it more environmentally sensitive to require the miner to use a 4 inch dredge? The net result is that the miners will be compelled to; commute for an extra month and make the miner work harder. Dredgers that travel say 30 miles a day (one way) to dredge 5 days a week will travel 1200 more miles for the extra 20 days it will take to do the same job. At 20 mpg and nearly $4.00 a gallon, it will cost the dredger in this example another $240.00 in fuel for the commute alone. It will also take 25 to 30 hours to commute to the dredge site over the course of 20 days. As a result of being forced to use a 4 inch dredge the commute includes travel on gravel roads. There will be more traffic on these roads, more dust from the roads, more wear and tear on the

around such "woody debris" or move the debris slightly, we end up burying the debris with dredge tailings. If we are not recovering sufficient gold around woody debris we will move on of our own accord.

Disturb[ing] redds, actively spawning fish, amphibian egg masses or tadpoles. I object to this regulation on various grounds. First, the proposed regulation is broad and vague. I presume it all depends upon the definition of "disturb." Then, the proposed regulations instruct us to "cease operations and re-locate dredging operations." Again, the regulations are vague. So assuming we have actively spawning fish,… first of all I have dredged for years and I have never actually witnessed spawning fish. Having been not just an avid fisherman, but an absolute fishing fool, I was a fish slayer. Yet I don't know if I would recognize a spawning fish unless it happened right in front of me and I spent some time observing the fish behavior. And tadpoles move about at will, I simply can't understand what the concern is. And obviously, if we see amphibian egg masses, we generally avoid them anyway because dredgers are also very aware of our need to protect the environment.

DFG may close any water to suction dredging

The proposed regulations state that DFG can close any water to suction dredging. I strongly object to this rule if such a closure adversely affects mining claims on federal lands open to location and entry under the US mining laws.

Turbidity and Sediments

As a general comment to the DEIS concerning sediments and turbidity, *actual dredging experience* once again sheds light upon this issue. It must be fully understood that each and every river and stream is unique. As I pointed out earlier, the aggregate mix that is the streambed load is generally local and native. By aggregate mix I am referring to the analysis of the various sizes of the aggregate expressed in percentages for each size contained in the aggregate mix. My first hand experience reminds me of dredging on the upper reaches of a small creek that was draining a granitic pluton. In that stream, because the material had not been transported far enough to round off and smooth the rock, the rock was rounded a bit, slightly angular and rough. Granite does weather easily and it is common to see granite in this type of area that one might assume traveled enough to be rounded, but really, it is simply the nature of weathered granite outcrops that feed rock to streams. In that particular stream I noted the sand was really coarser than river sand. Turns out that really isn't sand as we know it, it is simply coarse granite granules along with impurities.

Now if we go downstream several miles, we discover that the streambed materials have changed. The change occurs because several other feeder creeks deposit their "native" gravel load into the main stream. Now, if a feeder stream originates in another type of country rock (for example slate) and deposits into the aforementioned granite stream described above, then you will observe that the main stem of the streams contains a mix of granite and slates of variable percentages. The local native slates generally break down and become thin, flat, somewhat rounded aggregate of every size. Wherever these

streams cut through tertiary channel, you will find the main streams now contain some percentage of the ancient gravel in the mix. Therefore you will find well-worn quartz aggregate in the stream, and walking upstream no more worn quarts. Hike up hill and you will find some evidence of the source (exposed ancient channel). So now I hope DFG understands that the example above we have a native high elevation stream, a brisk stream that started out as a granite aggregate mix with granite granules for sand and upon digging it contained precious little sand or sediment. And finally, as the stream flows down the mountain other streams, feeder creeks add their own streambed load into the mix. In my example stream above, the stream aggregate visually evolved, it became a new mix of varying percentages of slates, granite, some ancient channel, and some misc. stray rocks that likely weathered and rolled into the stream. And so it goes all the way down the entire watershed. Streambeds joining and mixing with other streambeds, and each time the new aggregate mix will pass through a certain size dredge and a different rate, perhaps faster, perhaps slower.

The above is crucial to understanding the amount of material a certain dredge can move per hour, and in determining the amount of sedimentation that is released from any given size dredge. Also, the amount of aggregate that can move through a given dredge per hour is <u>completely dependant</u> upon the nature of the aggregate, its shape, the percentages of oversized cobs in the way. Often dredgers find aggregates that contain sharp jagged slate slivers, and thin, flat, round slate discs, that often get hung up in the hose. And of all the clogs known to man, <u>flat round rocks</u> are absolutely the worst in terms of the time it takes to clear the hose. The flat rocks often lay in the hose in such a way that if the lighting isn't just right, you can't see the obstruction. Perhaps I beat on the hose, vary the throttle, jam a stick down the venturi jet, and I see some rock coming out with the water so I dive down and start to dredge but immediately it plugs up again. *Thus, estimating how much volume a dredge can move per hour in the real world is far more complex than DFG appears to understand.* For example, in high elevation streams where native materials are the general run of a streambed, the other issue becomes the type and physical <u>shape</u> of the rocks. Generally these streams contain a much higher percentage of sharp rocks, angular rocks, jagged and not well rounded because they are not well traveled. The problem is that there is no way to rush dredging these materials because the hose will clog, over, and over. The only way one can overcome this is to use a larger dredge and where possible, use a dredge hose one or two inches larger than the restrictor ring.

On the other extreme we can look to the Sacramento valley, perhaps rivers like the Consumnes. Rivers like this, far removed from the raging powerful waters of the Sierras also have a unique composition. Absent large boulders, deposits like this can often be mined with an 8 inch dredge. Basically 95% of the rock goes through the nozzle at a fast pace. Also, in such conditions the rocks are well rounded and smooth. Therefore an 8 or larger dredge will efficiently mine this type of gravel bed due to its unique composition of conveniently sized aggregate. I dredged the Ma Mong river in Cambodia, it was the size of the Yuba or MF Feather river. I found that every rock in the streambed aggregate passed through my precision 5 inch dredge. Admittedly, the gravel in Cambodia, and perhaps certain rivers located in the valley represent ideal dredging conditions.

With respect to sediments, the amount of sediment available in the streambed material is what dictates how much sediment will flow out of a dredge. Therefore the DEIS should expand the discussion and analysis concerning the alleged quantities of sedimentation released from various sized dredges. I believe that the DFG analysis concerning how many cubic yards a particular dredge can move per day and how much sediment each size dredge produces must also consider and document the type of materials in the gravel, the *percentages* of the various particle/pebble sizes contained in the aggregate, and must document the swiftness of the water expressed in the rate of flow.
For example, in swift water, there is precious little sediment contained in the streambed aggregate because the water is swift enough that sediments simply cannot settle into the gravel. This swift water does not have to be very swift, I don't have the formula for sediment deposition, however swift does not mean whitewater. Whitewater gravel contains very little sediment.
On the other hand, where the river has long quiet sections with precious little movement, they generally get an extra dose of sediment as the spring runoff recedes. The dirty and sediment laden water entering a long slow area will eventually drop a fair quantity of the sediments. The sediments tend to accumulate in these slower areas. Also, vast amounts of organics like leaves and pine needles also accumulate in the same locations. Thus if one is dredging samples to determine measurable sediment dispersal in the slower areas of rivers will likely produce the most sediment.

Wrapping it up

The proposed regulations do not provide an alternative method of retrieving gold (our property) from a river or stream. The proposed regulations plainly prohibit and/or unreasonably restrict miners from extracting their property (gold) and DFG has failed to provide other lawful alternative methods for miners to economically recover their gold from their mineral deposits.
DFG freely admits that 4" and 6" dredges are considered recreational in nature, and 8 - 10 inch dredges are commercial. Mining under the mining law is a commercial activity and DFG proposed regulations will prohibit miners from using the proper size commercial dredge for the safe and economic extraction of the minerals.
DFG proposed regulations are suitable for recreational activities on lands not subject to the mining laws. The dredge size restrictions and winching restrictions will lead to cave-ins, injury and death.

It is my understanding that a number of other forest user groups and environmentalists groups are diligently working very hard to ensure DFG imposes the *regulations from hell* in their gambit to stop all mining in *their* playground. Frankly, DFG has not defended the dredging community for decades. The plain fact is that dredgers are the only group of people who have a long track record of cumulatively removing vast amounts of heavy metals and garbage from our rivers. DFG simply has not educated the public as to the significant benefits dredgers provide at NO cost to the taxpayers or the government. We remove these heavy metals in the course of extracting minerals. And we are happy to do so. We don't do it for DFG, we do it because it is the right thing to do.

041211(b)

Response to Comment 1
Flooding events were considered as part of the background watershed loading of mercury. See also MR-WQ-4, -6, and -16.

Response to Comment 2
See MR-WQ-3 and MR-WQ-11.

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provisions of applicable law such as the California Endangered Species Act and the national Endangered Species Act. In addition, the DSEIR should describe what additional permits may be required consistent with other applicable laws, including Yurok Tribal laws mentioned above.

COMMENT # 5: PROPOSED REGULATIONS VIOLATE KLAMATH BASIN PLAN AND EXISTING STATE LAW

Reasoning

In many salmonid bearing streams, migrating fish, both out-migrating juveniles and returning adults, rely heavily on thermal refugia to survive. Thermal refugia are river zones characterized by water temperatures measurably lower than the main channel or surrounding area. The lower temperature of the refugial area results from inflow from a colder tributary or an underwater spring.

Although CDFG did propose significant restrictions in Klamath River cold water refugia, it failed to propose restrictions wholly consistent with the restrictions mandated by the Klamath TMDLs. The Porter-Cologne Act requires State Agencies to comply with State Water Quality standards:

> ***§ 13146. State agency compliance***
> *State offices, departments and boards, in carrying out activities which affect water quality, shall comply with state policy for water quality control unless otherwise directed or authorized by statute, in which case they shall indicate to the state board in writing their authority for not complying with such policy.*

Specifically, the refugial areas identified in the TMDL not identified in CDFG's proposed regulations are:

- Canyon Creek (Siskiyou county)
- Cottonwood (Siskiyou county)
- Little Horse Creek (Siskiyou county)
- West Grider Creek (Siskiyou county)

The following creeks have a 1500 foot thermal protection zone in TMDLs but only 500 foot protection zone in proposed Regulations:

- Aubry Creek (Siskiyou County)
- Clear Creek (Siskiyou County)
- Dillon Creek (Siskiyou County)
- Elk Creek (Siskiyou County)
- Grider Creek (Siskiyou County)
- Horse Creek (Siskiyou County)
- Indian Creek (Siskiyou County)

- Rock Creek (Siskiyou County)
- Swillup Creek (Siskiyou County)
- Ukonom Creek (Siskiyou County)

Additional Creeks have additional in stream restrictions on dredging described in the TMDLs that are not reflected in proposed CDFG regulations. A full comparison between proposed CDFG regulations and restrictions on dredging included in the TMDLs can be seen in the following list:

Klamath River Tributaries	**Refugia Protection proposed by DFG**	**Refugia Protection Provided by TMDL**
Aubrey Creek	500 ft radius	1500 ft radius + 3000 feet up the Creek
Beaver Creek	500 ft radius	1500 + 3000 feet up the Creek
Canyon Creek	0	500 ft radius
Cottonwood Creek	0	500 ft radius
Clear Creek	500 ft radius	1500 ft radius + 3000 feet up the Creek
Dillon Creek	500 ft radius	1500 ft radius + 3000 feet up the Creek
Elk Creek	500 ft radius	1500 ft radius + 3000 feet up the Creek
Empire Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Fort Goff Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Grider Creek	500 ft radius	1500 ft radius + 3000 feet up the Creek
Horse Creek	500 ft radius	1500 ft radius + 3000 feet up the Creek
Indian Creek	500 ft radius	1500 ft radius + 3000 feet up the Creek
Jenny Creek	0	500 ft radius
King Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Little Horse Creek	0	500 ft radius + 3000 feet up the creek
Little Humbug Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Mill Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Nantucket Creek	500 ft radius	500 ft radius + 3000 feet up the creek
O'Neil Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Portuguese Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Reynolds Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Rock Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Sandy Bar Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Seiad Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Stanshaw Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Swillup Creek	500 ft radius	1500 ft radius + 3000 feet up the Creek
Ti Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Titus Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Ukonom Creek	500 ft radius	1500 ft radius
West Grider Creek	0	500 ft radius
Scott River Tributaries		
Boulder Creek	none	500 ft radius
Canyon Creek	none	500 ft radius
Kelsey Creek	none	500 ft radius

Recommendation

The proposed suction dredge mining regulations should be consistent with California water quality laws such as the Klamath Basin Plan, as well as any other state or federal river management plans.

COMMENT # 6: THE DSEIR INAPPROPRIATELY DEFINES "DELETERIOUS EFFECT."

The DSEIR Page 2-5 states:

> *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.*

CDFG's assertion that this extreme definition of 'deleterious' (note Webster defines it as *harmful often in a subtle or unexpected way*) is consistent with the legislative history of Fish and Game Code 5653 is unreferenced and, we believe, patently false.

In fact, primary references and a summary of the documented legislative history of 5653 dating back to 1873 was provided to CDFG in a March 10, 2010 by Friends of the North Fork. In their letter, Friends of the North Fork pointed out that:

- In 1961, "deleterious to fish" found its way into the first California statute regulating suction dredge mining, Fish and Game Code Section 5653, in Assembly Bill 1459 (Arnold). In his letter to the governor requesting a signature on the bill, Assemblyman Arnold used terms like "damage" and "disturb." He said dredging should be done so as not to cause anything other than "minimal damage" to fish, from which he specifically excluded disturbing eggs, disturbing fish food organisms and stirring up silt to cause an "aesthetic problem" and cover eggs.

- The intent was clear. Any "damage" from dredging activities must be "minimal." Clearly, the author's view was that disturbing eggs, disturbing fish food organisms and stirring up silt to cause an "aesthetic problem" and cover eggs is more than minimal, and thus is "deleterious to fish."

- In an analysis of AB 1459 provided to members of the Legislature in 1961, the Legislative Analyst's Office said that, under the bill, "the department must then

determine whether the operation will be safe for fish life and if so it will issue a permit to the applicant." So, in that view of the intent of "not deleterious to fish," legislators were informed that it meant the activity is "safe for fish life."

- In a letter to the Governor requesting his signature on AB 1459, the Department of Fish and Game said, "The department shall issue a permit if it is judged that no damage will occur to fish, aquatic life, and the aquatic environment." So in information on which the Governor based his decision to sign AB 1459 into law, "not deleterious to fish" meant "no damage" to "fish, aquatic life and the aquatic environment."

- In the handful of bills since 1961 affecting this section, no legislation has ever used a term other than "deleterious to fish" nor offered any other interpretation of its meaning.

Thus we assert that CDFG has failed to justify its claim that the definition of 'deleterious effect' used in the DSEIR, that is *one which manifests at the community or population level and persists for longer than one reproductive or migration cycle* is consistent with the legislative history.

Recommendation

Adopt a definition for phrase 'deleterious effect' that is consistent with the legally acceptable dictionary definition of the word 'deleterious.' We suggest the following language be included in the Fish and Game Code:

> *A vacuum or suction dredge operation and activities associated with its operation are deleterious to fish, mollusks, crustaceans, invertebrates, or amphibians if either (1) it deposits, alters, flours or re-suspends any substance or material in the river, stream or lake that has a harmful effect on any life stage of "fish" or (2) alters the behavior of "fish" so as to have a harmful effect or (3) results in the modification or alteration of instream or riparian habitats in a way that has a harmful effect on the ability of "fish" to successfully feed, reproduce or evade predators.*

COMMENT # 7: THE HYDROLOGY AND WATER QUALITY SECTION FAILS TO ADEQUATELY EVALUATE DELETERIOUS EFFECTS OF RESUSPENDED MERCURY ON FISH AND IMPACTS TO PUBLIC HEALTH

Reasoning

Mercury is of primary concern because it not only poses an unacceptable toxicological risk to humans, fish, and wildlife but also because of its occurrence in the very aquatic sediments where suction dredging typically target- known streams and rivers where historic gold mining took place using methods that resulted in extensive areas of mercury enriched channel sediments. Furthermore, suction dredge mining has a high probability to increase the percent of methyl mercury (MeHg) that is more bioavailable and therefore more easily entered and assimilated

toxic constituent into the bioaccumulating foodchain of aquatic invertebrates, organisms, and terrestrial Hg-contaminated fish. This substantially increases the health risks to wildlife, fish, and humans consuming any of aquatic organisms exposed to the environment effected by section dredging.

The finding of the DSEIR concerning the human health risk cannot be overstressed and is quoted below.

> *Dietary MeHg is almost completely absorbed into the blood and is distributed to all tissues including the brain. In pregnant women, it also readily passes through the placenta to the fetus and fetal brain. MeHg is a highly toxic substance with a number of adverse health effects associated with its exposure in humans and animals. High dose human exposure results in mental retardation, cerebral palsy, deafness, blindness, and dysarthria in utero and in sensory and motor impairment in adults. Additional data on toxicity from low dose MeHg exposure (U.S. EPA, 2001) implicates cardiovascular and immunological effects.*

Mercury levels immediately downstream of dredging sites will increase the transport of fine, colloidal material for distances downstream and contribute to additional mercury risk and adverse human health outcomes. While DSEIR indicates changes to instream resuspension of sediments and related sediment-derived contaminants will produce localized effects limited to the area immediately downstream of the dredging activity, it fails to consider that via exposure from the deposited dredge material a second community of benthic organisms is exposed to the mercury in the redistributed sediments; extending and broadening the extent of possible toxic impact areas. This in effect brings the mercury, other trace metals, and associated toxins to entirely new and previously unexposed benthic communities. At every location where suction dredging is to occur, one population has been historically exposed and if any current suction dredging is allowed to proceed, completely new communities that lie downstream will be exposed. Although these are local, they are nevertheless important, far reaching impacts in the environment of smaller rivers and tributaries. Results of transport and transformation of mercury will ***increase the number of individuals and communities*** downstream that are affected when sediment is discharged from suction dredging and ***increasing the chance of human exposure.***

The DSEIR also fails to adequately address these same impacts of mercury carrying sediments in the mainstem of larger rivers such as the Klamath. Also, additional effects can only be expected from the settling of any resuspended toxins along the mainstem. Here, sediments laden with mercury will fall out in back eddies and slow moving coves that correspond to traditional and current fishing holes, thereby increasing mercury exposure on the system, and organisms already burdened by mercury levels and allowing increased risk to public health. Both freshwater mussels/clams and sturgeon are principal benthic subsistence food for the Yurok. The macroinvertebrates that the various salmon and steelhead feed on will also be impacted and can be expected to have an increased burden in mercury and toxin levels, which will be moved into these larger fish that are a mainstay to tribal Members diet and cultural continuance.

Based on the information discussed above, suction dredging has the potential to contribute substantially to: (1) watershed mercury loading to downstream reaches within the same

waterbody and an increase in impacted area, individuals, and communities (2) increased mercury bioaccumulation in aquatic organisms (including fish) in these downstream reaches and (3) thereby increased human health risks to people and wildlife that eat these organisms.

COMMENT # 8: THE DSEIR SHOULD INCLUDE A SECTION ON ENVIRONMENTAL JUSTICE

The Cultural Beneficial uses are described and documented in some detail in Chapter 2 of the North-coast Regional Water Quality Control Board's *Staff Report for the Klamath River Total Maximum Daily Loads (TMDLs) and Action Plan Addressing Temperature, Dissolved Oxygen, Nutrient, and Microcystin Impairments in California.*[5] The affect the Program would have on these uses were not evaluated.

Reasoning

Several California laws require that state agencies, and California EPA in particular, to consider how rules and regulations affect minority communities. These laws include SB 828, AB 1360, SB 89, and more.

Environmental justice (EJ) is defined in California law as *"the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws and policies."*[6]

In addition, on December 16, 2010, the United States officially endorsed the United Nations Declaration on the Rights of Indigenous People (DRIP).

Article 19 of the DRIP states:

> *States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free, prior and informed consent before adopting and implementing legislative or administrative measures that may affect them.*

It is our view that suction dredge mining under terms of the proposed regulations poses significant threats to water resources, subsistence resources, and leads to negative social and cultural impacts to indigenous groups.

Article 25 of the DRIP states:

> *Indigenous peoples have the right to the lands, territories, and resources which they have*

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5 http://www.swrcb.ca.gov/northcoast/water_issues/programs/tmdls/klamath_river/090619/Ch_2_PS_090619.pdf
6 Government Code section 65040.12

042211 YurokTribe

Response to Comment 1
See MR-WQ-18.

Response to Comment 2
The assessment of the potential effects of dredging-related disturbance, resuspension, and discharge of mercury is addressed in a comprehensive manner in Impact WQ-4. The comment states that the assessment fails to adequately address the effects of mercury discharges in relation to the following factors: potential for additional methylmercury formation; exposure of benthic aquatic organisms to redistributed sediments; and assessment of larger rivers, such as the Klamath River. However, each of these factors is considered in the assessment for mercury. Moreover, based on the assessment, it was determined that, under the Program, the effects of suction dredging activity on mercury discharge would be potentially significant and unavoidable impact.

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27 April 2011

California Department of Fish and Game
Attn: Mark Stopher
Suction Dredge Program Draft SEIR Comments
Department of Fish and Game
601 Locust Street
Redding, California 96001

Mr. Stopher:

Thank you for the opportunity to comment on the Draft SEIR and proposed regulations. I have read and reread your Draft SEIR. It is a very large daunting document. Hopefully, these comments/inputs will result in modifications that will enable you to prepare a better document and regulations that are more compatible for all including a level of protection for soil, water, plant, animal, and air resources of the State of California.

A few general comments:

Has any of the Staff that prepared the document spent any time gold mining or operating a suction dredge? A number of the suppositions imply that there is very little actual experience in either of the above.

Economics. I found the socioeconomic portion interesting. I do question some of the research. I am aware of a number of miners who make a living mining for gold in the Sierra Nevada. They are, best typified as "off the radar". Some utilize a section dredge. Also, if the study statistics are accurate then the majority of dredgers only dredge from 1 to 20 days per year. Why be so restrictive on the days available to dredge, the duration of operations, and the proposed numbers of permits?

Suction Dredge Size. Your document seems to more than imply that a significant number are utilizing 4" and above suction devices. There are a number of owners/utilizers of much smaller suction dredges or high-bankers. There are a number of reasons for these "smaller" devices. These include very small watercourses, distance from the nearest point of access (I challenge you to carry a 4 or 6 inch dredge and supplies some 3 ½ miles to a mining location). There are different degrees of impacts, much lesser typically, in a log of log curve relationship. There should be different standards for the smaller suction dredges.

Patented Claims. I did not see any reference to Patented mining claims. As you are aware the Federal government has decided, for whatever reason, the highest and best use of those lands within these claims is the extraction of minerals. You should address these claims and their recognized right to remove minerals in your documents.

WaterQuality - TMDLs. You made the comment that there may be environmental impacts to water quality. A significant number of the water courses where mining occurs in California have not been identified by either the Water Quality Control Boards or the US EPA as being impaired due to sediment. Furthermore, there are no established TMDLs for sediment on a significant number of water courses in

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(b) (6)

Response to Comment 1

See MR-WQ-3. Dams do capture mining tailings, and this is recognized in the DSEIR per the assumption that 50% of mercury entering Lake Englebright is deposited within the lake (based on Alpers et al., in prep.).

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(b) (6)

California Dept. of Fish and Game (CDF&G) 4/28/2011
Attn: Mark Stopher
601 Locust St.
Redding, CA. 96001

RE: PROPOSED REGULATIONS FOR SUCTION DREDGING PER SEIR

The draft Supplemental Environmental Impact Report released Feb. 28, 2011 by CDF&G raises questions that need to be answered before reasonable solutions can be suggested. It is the feeling of the Gold Dredging Community here that CDF&G "Intake meetings" are only scheduled to satisfy required regulations. I fully understand why CDF&G cannot answer questions that are under current litigation; however, take a few moments to consider why you are in litigation in the first place.

How does CDF&G intend to deal with (1) Waterkeeper Alliance Inc. v. Environmental Protection Agency, 399 F.3d 486 (2nd Cir. 2005) **?** *Suction Gold Dredges do not add pollutants to the water they work in.*

How can the CDF&G completely ignore the (Pro Dredge) opinions of retired EPA research biologist Joseph Green, and the prior EIR's that were submitted **?**

Where are the scientific 'Toxic Mercury Levels' published for our local fish **?** *In Yellow Creek where I mine, the chances of finding any Mercury is slim to none.*

Why did CDF&G turn a 'Blind Eye' to the Hydro Dams constructed above the Oroville Reservoir without any fish ladders **?** *There are no Salmon here now because the lack of fish ladders killed them and their ability to return, forever. The Maidu Indians fished for Salmon here for thousands of years, yet did not take the fish to extinction as the Hydro Dams on the N. Fk. Feather River did.*

Why has CDF&G produced a 1,000+ page SEIR with taxpayers dollars, (apparently written by 'Wanna Be' environmentalists), that is devoid of basic material facts **?** *The facts are that Suction Gold Dredges recover Mercury, feed fish, create cool deep water ' resting pools', and enhance spawning grounds.*

Why has the CDF&G chosen to hurt Federal, California and Plumas County economy by not encouraging a SEIR that embraces Gold Recovery, which include sale of equipment, purchase of food and fuel, the collection of taxes and permit fees from Suction Dredge Gold Miners **?**

Why is it the CDF&G has not been able to complete court ordered EIR's in a timely matter (as in 2008) **?** Is this why your former Director resigned, or did he feel guilty about the 'taking' of our dredging permits **?**

Why does CDF&G lean toward Politicians, News Media and Environmentalist that wouldn't know a Suction Gold Dredge from a Windmill **?**

Why is CDF&G suddenly in such a storm to re-regulate suction gold dredging laws that have worked well since I started gold dredging in 1982 **?**

Is it the intention of CDF&G to overturn the 1850 laws California agreed to, as well as the Federal Mining Laws of 1872 and all Suction Gold Dredge laws implemented since then **?**

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042811(b) (6)

Response to Comment 1
See responses provided below to the water quality comments from (b) (6) and (b) (6) (b) (6) in the letter 050311_(b) (6) .

Response to Comment 2
See MR-WQ-7.

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I would like to concisely review each proposed regulation I disagree with, the basis upon which the proposed regulation is proposed and the underlying studies that support the issue. As the DSEIR is over 1,000 pages long an appropriate, fact based response necessitates a more thorough response.

Proposed Rules:

S.228 (g) – Maximum Permits Issued Limited to 4,000

The DSEIR provides no basis for this restriction. The only conclusion you can reach for this limit is it is designed to limit turbidity, TSS, and the introduction of mercury into the rivers. However, CDFG has no authority to regulate any of the three as pointed out by CDFG so the basis for limiting the number of permits MUST be based on an authority CDFG has, however, nowhere in the DSEIR is the rationale for limiting the number of permits. All studies referenced in the DSEIR prove that turbidity, TSS and mercury have less than significant impacts. The proposed program claims that "mitigation" limits the impact of this but the 1994 regulations provided the same mitigation.

The DSEIR provides ample scientific evidence for the impacts of turbidity and reaches a conclusion that dredging – even dredging not restricted by permitted numbers – has no impact on fish. This is stated repeatedly in the DSEIR which leads to the question – if turbidity from a dredge is (1) very localized (2) has no impact on fish populations – what basis is CDFG using to limit the number of permits and the nozzle size of a dredge?

References

(1) Page 4.2-19, DSEIR – "**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." Emphasis added. As stated there is not a single scientific study that refutes this – please note these studies were conducted under the existing program.

(2) Page 4.2-21, DSEIR – "...there is very little new dredging-specific data available since the preparation of the 1994 EIR, and **no substantial changes** in the scientific understanding of the effects of increased turbidity/TSS from suction dredging operations with respect to water clarity." Emphasis added. Please reference comment (1) above. If there are no changes since the 1994 study and all scientific evidence shows turbidity effects are localized and not cumulative – again why the need for changes to the existing program?

(3) Page 4.2-28, line 38 – "Sediment re-suspension from suction dredging activity can increase water turbidity and TSS levels immediately downstream of the dredging site (i.e. near-field effects) and increase the transport of fine colloidal material extended distances downstream (i.e. far-field effects)..." This statement is not referenced and is in direct contradiction to (1) above ...All Scientific Studies. This

statement is not made on any existing scientific study and appears to be conjecture. It should be removed from the DSEIR.

(4) Page 4.2-28, DSEIR. ..."the available scientific studies of suction dredging **suggest**..." The wording should be "prove", not "suggest." "...that the effects on turbidity and suspended sediment concentrations on aspects of water clarity and physical effects to aquatic organisms are limited to the area immediately downstream of the dredging for the duration of the active dredging." The follow on statement is consistent with (1) above, but in disregard to the CEQA requirement quoted on the first page for "significant effects...based on fact" the DSEIR goes on to state "However, it also should be noted that the finer suspended sediment transported long distances downstream **may provide** a disproportionally higher amount of surface area and binding sites for other water quality contaminants (e.g. mercury, organic compounds) that also are important to beneficial uses." This statement is not based on fact and is contradiction to (1) above. This is conjecture and should be removed from the DSEIR.

(5) Page 4.2-28, DSEIR – "Also, observations of large dredges and many dredges in a water course **suggest** that turbidity increases can be large." Emphasis added. Again, this is based on observation and conjecture. This statement is not based on fact. As shown in (1) above the effects of this turbidity are highly localized and are at background levels within 160m of the dredge. There is no cumulative effect and it is erroneous to suggest that multiple dredges somehow create a cumulative effect.

(6) Page 4.2-30, DSEIR – "...with both analyses supporting the conclusion herein that turbidty/TSS plumes would not substantially adversely affect aesthetic and recreational resources." Again, in agreement with (1) above, no impact on water quality from single or multiple dredges that extends beyond the immediate area.

(7) Page 4.2-31, DSEIR – "Numerous scientific studies conducted over the past 50-60 years indicate there is no sharply defined concentration of turbidity or TSS above which aquatic communities are harmed." The remainder of this discussion in the DSEIR proves that under the current 1994 program there can be no level from a single or multiple dredges that would provide enough turbidity/TSS to harm fish – yet the proposed program restricts nozzle size and number of dredge permits based on not a single piece of scientific evidence or study.

(8) Page 4.2-32, DSEIR – "The turbidity plumes created by suction dredging likely may exceed the applicable Basin Plan objectives..." Again, conjecture. The opposite is likely true as the Basin Plans allow for averaging and dispersion distances of which neither would be exceeded by a dredge.

050111 (b) (6)

Response to Comment 1
Transport of colloidal material is not necessarily captured in measurements of TSS and turbidity. See also MR-WQ-3 and MR-WQ-14.

Response to Comment 2
See MR-WQ-3.

Response to Comment 3
See MR-WQ-3.

Response to Comment 4
The statement is incorrect. The CV Basin Plan turbidity objective itself does not address the allowable averaging period. Instead, the CV Basin Plan allows an averaging period to be considered in assessing compliance. Moreover, not all of the state's nine basin plans explicitly identify mixing zones for turbidity in the manner of the CV Basin Plan.

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Subject: Comments on mercury analysis in DSEIR

Date: Monday, May 2, 2011 7:40:14 AM PT

From: (b) (6)

To: dfgsuctiondredge@dfg.ca.gov

Please find attached my analysis of the mercury studies in the DSEIR. As the DSEIR finds that mercury is "Significant and Unavoidable" I would like to respond with an analysis that proves this finding is incorrect. The DSEIR should be changed to show that the effects from mercury related to suction dredging are "Less than Significant."

V/R

(b)

California Department of Fish and Game
Mr. Mark Stopher
601 Locust Street
Redding, CA 96001

2 May 2011

Dear Mr. Stopher;

This letter and attached analysis are in response to Chapter 4.2 of the DSEIR and the finding of "Significant and Unavoidable" in regards to the impact of mercury. I disagree with the finding based on the presented data and the referenced reports and in the attached analysis I show the actual impact of mercury re-mobilization from suction dredging. I show that in all cases and all realistic scenarios that suction dredging has a less than significant impact and I request that the results in the DSEIR be re-evaluated and the finding be changed to "Less than Significant." Further, I show in the analysis that no number of dredges or combination of dredgers and nozzle sizes could possibly impact the environment.

The referenced studies the DSEIR is based on do not support the conclusions. A detailed analytical review of the two most cited studies reveal serious errors in data collection and analysis as well as the conclusions reached by the authors. My attached comments show why CDFG's conclusions regarding Mercury are unsupported by the evidence and why the status of this section should be changed to "Less than Significant." My attached analysis of the data explains why mercury re-suspension is an invalid argument for limiting permits to 4,000 and limiting the dredge nozzle size to 4".

CDFG is obligated under CEQA (15384(a)) to consider the “whole record” before making a determination that a project may have a significant impact…… *“Whether a fair argument can be made that the project may have a significant effect on the environment is to be determined by examining the whole record before the lead agency”.*

To prepare this analysis I used the criteria of significance established in the DSEIR and the findings from the DSEIR. I then used the same source data as the DSEIR, the only two available government reports, and came to significantly different conclusions than the DSEIR reached which are based in fact and substantiated by the data.

Conclusions Proven in this Analysis of the DSEIR

- **Mercury – Impact WQ-4 should be "Less than Significant" even under the existing program**
- The analysis and conclusions of the DSEIR in regards to mercury emissions are incorrect
- No realistic number of dredgers could ever reach the natural load of the S. Yuba River
- Natural forces move mercury both during storm events and during normal flows (Fleck 2010 and Humphreys 2005)
- The levels of MeHg in biota are not proven to be the result of dredging (Fleck 2010)
- Suction dredges are not proven to "flour" mercury (Humphreys 2005)

I have attached my analysis of the effects of mercury to this letter that substantiates my conclusions. The flaws in the DSEIR analysis and the underlying studies of mercury would likely not withstand the scrutiny of peer review for either the construct of the experiment, the collection of the data or the analysis of the data.

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ANALYSIS OF THE EFFECTS OF MERCURY

The analysis of data presented and referenced in the DSEIR indicates that suction dredges have a positive and beneficial contribution to mercury removal at no cost to the Government.

Bias in analysis and the selective use of data in the DSEIR, results in incorrect conclusions about the impacts of suction dredging.

CDFG has stated they do not have the regulatory authority to limit mercury. While CDFG may not have regulatory authority in regards to the emissions from a dredge, when they are not deleterious to fish – it appears through the proposed program the mercury conclusions are providing the foundation for the crafting of the new regulations so I will highlight inconsistencies between the proposed program rules and the data and analysis relative to the limitation on the number of dredge permits and the restriction of nozzle size.

MERCURY – Impact WQ-4 (Significant and Unavoidable)

Based on the data the finding should be "Less than Significant" under the existing program.

Criteria for Significant as defined in the DSEIR (page 4.2-24)

(1) 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.

FINDINGS – All the data provided in the actual dredge test reports proves that a suction dredge, under no realistic scenario could violate **ANY** Federal or State water quality thresholds.

(2) 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.

FINDINGS – No evidence in the analysis of long term degradation – the opposite is shown. The long term effect of suction dredging is a reduction in mercury and a net benefit in water quality.

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

RESULTS – The reports do not provide a linkage between increased MeHg levels and suction dredging.

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The Humphreys Study – Beneficial Impact of Suction Dredging

A study was conducted in 2003 with a published paper in 2005 to determine the efficiency of an unmodified gold dredge in removing mercury from the watershed. This study is cited on page 4.2-36 of the DSEIR. Humphrey's came to the conclusion that a standard 4" suction dredge of a less efficient design (known to dredgers as a crash box versus a flare jet) is 98% efficient at capturing mercury. However, the conclusions he then presents and which the DSEIR uses, without considering the stunning efficiency of a gold dredge (surpasses any other known method of removing mercury from water bodies) appear biased and are shown here to be incorrect.

Efficiency graphs based on the Humphreys study [Humphreys 2005].

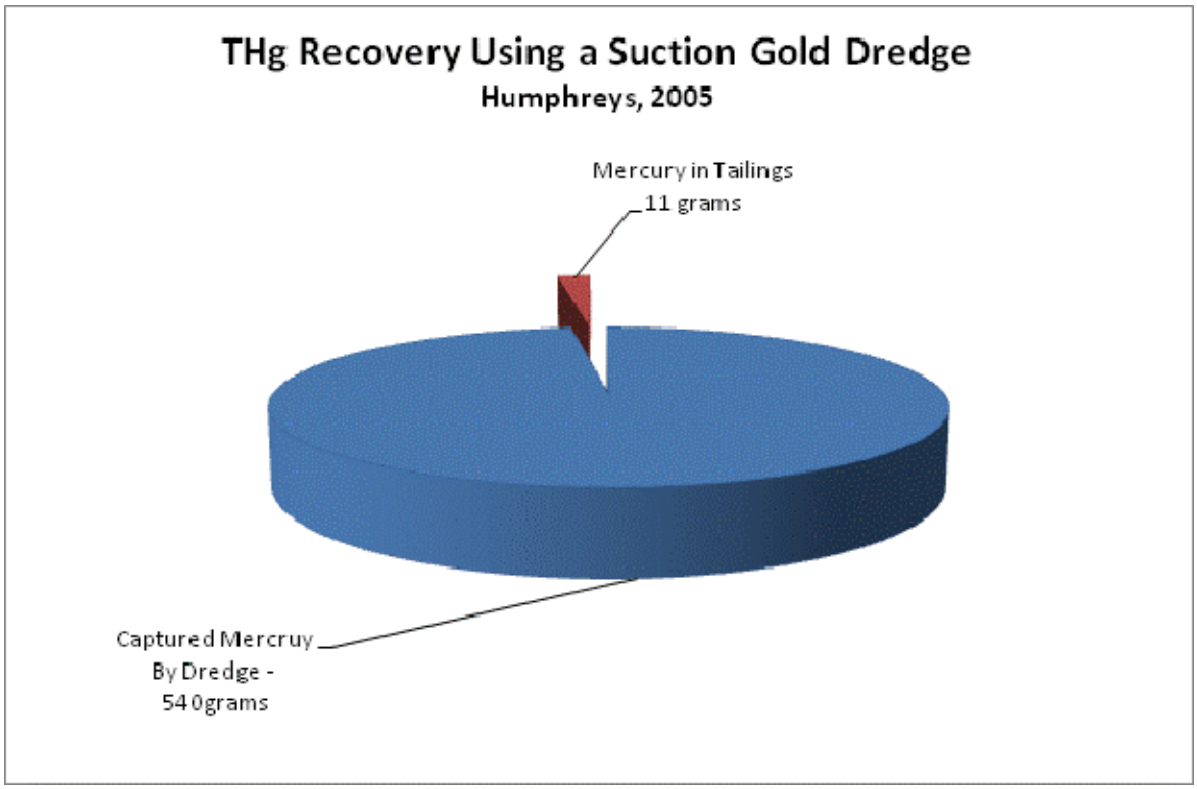

Figure 1. Humphreys Measured Hg

Figure 1 is based on the data provided by Humphreys. In the study he states that 540 grams of mercury were recovered **(removal of a priority pollutant – not increase).** This graph and the underlying data present a remarkable picture of the ability of suction dredgers to recover mercury.

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However, Humphrey's conclusions are just the opposite:

- A suction dredge loses too much mercury
- A suction dredge provides mercury levels in the water that exceed California standards
- A government program is required to remove mercury
- Floured mercury is created by the dredge

(1) Suction dredge loses too much mercury – this statement is surprising given the dredge had an efficiency rate of 98%. This rate is higher than any known process for stream Hg recovery.

The source data from Humphreys is provided below:

MERCURY CAPTURE RATES FROM HUMPHREYS STUDY			
Humphreys Sample	THg in mg/kg	THg from dredge test	Calculated Hg levels
		in grams	in mg/k
Source Material	1170	551	0.093389831
Dredge Capture	1550	540	0.348387097
Tailings	240	11	0.045833333

Table 1. Hg Rates from Humphreys Study

Humphreys measured in two different ways. First he took a sample of 63.5 kg and sent it off for measurement; the material was screened down to concentrates and measured. The following day he measured mercury amounts captured by the dredge and mercury found in the tailings.

Humphrey's measurements showed the dredge captured 98% of the mercury and the in-stream dredge test compared favorably with the measured samples. The difference from the sample to the measured was about 32% different due to a concerted effort to seek out mercury and dredge it (not what suction dredgers do by the way). From the calculations in Table 1 we can see that the Hg levels in the tailings are a mere .04mg/kg – well below the hazard threshold for California hazardous wastes while taking into account the dredge recovered 98% of the mercury present in the source material.

Interestingly the DSEIR does not mention the effectiveness of the dredge; rather it focuses on flouring of the mercury while not mentioning that a gold dredge recovered 1/2 kg of mercury from the water. The DSEIR mentions the Humphreys study but then goes on to hypothesize on the flouring of mercury which is not proven in the study..."*Flouring...which* ***may*** *affect transformation*...". [DSEIR p.4.2-36]. Humphreys study **proved** that the mercury was floured **prior to dredging and after dredging and** the dredge actually recovered 98% of the mercury that was floured.

It appears that Humphreys is basing his conclusion on the measured Hg levels in the suspended sediment. The measurements taken do not reflect the actual output from a gold dredge. On September 15th, 2003 Humphreys took a 63.5kg sample from the sediment and screened this sediment down to 30

mesh (.6mm) and smaller sizes. The laboratory took this concentrated sample and measured the suspension rates from a concentrated sample and determined the suspended sediment concentration was 298 ppm. It is incorrect to concentrate 63.5kg of material down to a fraction (2%) of the material, mix this material with standing water and draw a conclusion on the output from a dredge. It does not reflect the way a dredge operates, it ignores the concentrating and retention ability of the dredge (captures 98%) and it ignores the processes of the river in stream flow to prevent particle accumulation. The measurement of 298 ppm is later referenced in the DSEIR to show the output from a dredge, but this number does not in any way reflect the output from the dredge. Fleck (2010) found the Hg in the suspended sediment from an actual running dredge was below measurement detection levels.

(2) Suction Dredges Would Violate California Hazardous Waste Standards

"*Mercury concentrations in the waste and suspended sediment are over an order of magnitude higher than the minimum concentration necessary to classify as a California Hazardous waste (20mg/kg). " [Humphrey's 2005 – Results].*

Let's evaluate that statement based on Humphrey's data. Humphrey's dredged 5,900 kg of material so the calculations would be:

Material Moved in Kg	CA Limit in mg/kg	Humphreys Source Material in grams (Total Hg)	Tailings THg in mg	mg/kg rate in THg mg/kg	mg/kg rate required to Exceed Threshold	in source mtl in mg/kg %	Input THg in mg to Exceed Threshold	Output Material in THg mg/kg
6000	120000	570.00	11,400.00	1.90	20.0	11,526	6,704,082	134,082
4000	80000	380.00	7,600.00	1.90	20.0	11,526	4,469,388	89,388
2000	40000	190.00	3,800.00	1.90	20.0	11,526	2,234,694	44,694
1000	20000	95.00	1,900.00	1.90	20.0	11,526	1,117,347	22,347
500	10000	47.50	950.00	1.90	20.0	11,526	558,673	11,173
250	5000	23.75	475.00	1.90	20.0	11,526	279,337	5,587
10	200	0.95	19.00	1.90	20.0	11,526	11,173	223
5	100	0.48	9.50	1.90	20.0	11,526	5,587	112
1	20	0.10	1.90	1.90	20.0	11,526	1,117	22

Table 2. Increases in Input Material THg Required to Violate CA Hazardous Waste

Table 2 shows when correctly comparing the amount of mercury in the tailings to the total amount of material process (a mg to kg comparison) the **mercury content is only 1.9mg/kg**. This figure is only 10% of the California standard which allows up to 20 mg/kg. To exceed the threshold you would need over 6kg of mercury present in 6,000kg of material. It is improbable that a suction dredger would ever encounter a mercury pool of that magnitude – even Humphrey's dredging in a spot with visible liquid mercury could only achieve less than 10% of that amount in the source material.

The suction dredge used in the Humphreys study was 90% below the hazardous waste threshold.

Table 3 provides the rate of mercury in the tailings given Humphrey's 98% efficiency rate.

MERCURY CAPTURE RATES FROM HUMPHREYS STUDY			
Humphreys Sample	THg in mg/kg	THg from dredge test in grams	Calculated Hg levels in mg/k
Source Material	1170	551	93.39
Dredge Capture	1550	540	91.53
Tailings	240	11	1.86
THg in Tailings Compares to California Haz Waste Threshold			9%

Table 3. Mercury Discharge Rate vs. Threshold

Humphreys conclusion is based on the amount of concentrates and not the 5,900 kg of material moved. Table 3 shows that the emissions from a dredge were not ten times as high as the California standard for hazardous materials, but were in fact 90% below the allowable contaminant per Kg of material entering back into the river. Additionally, California water standards allow for averaging over a 30 day period ***– it is not even remotely possible that the standard would be exceeded by a dredge***.

Graph displaying the results from the Humphreys test and the amount of material moved relative to the California threshold for hazardous waste.

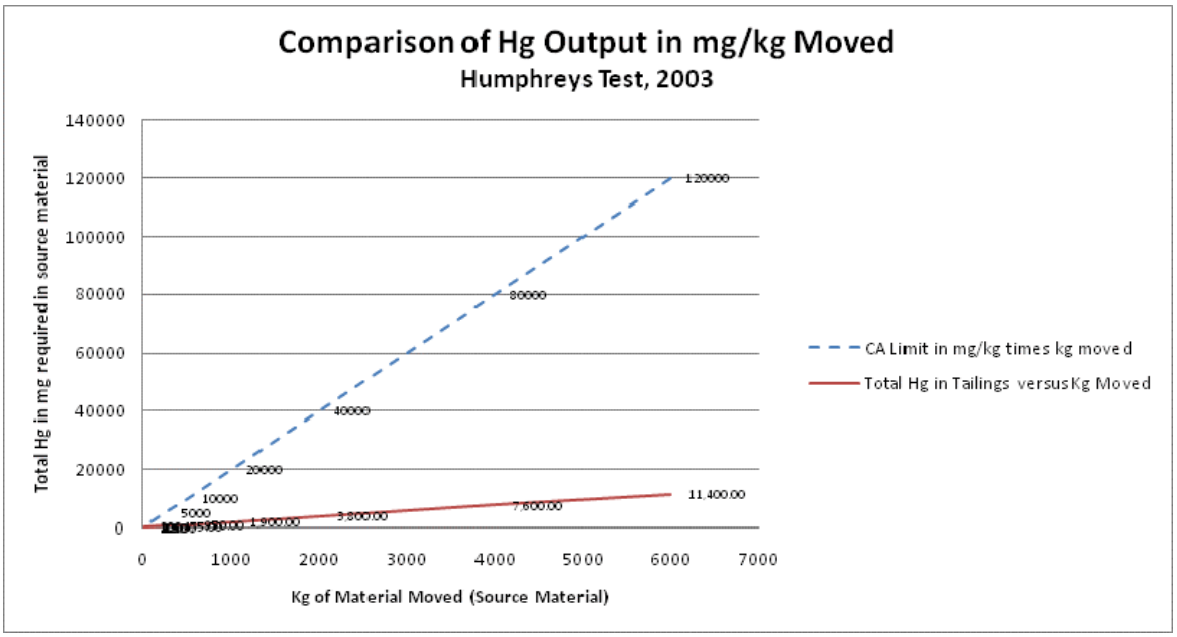

Figure 2. Comparison of Hg in Dredge Tailings to California Haz Waste Standard

(3) A government program is required

"It might be possible to design a shore-based recovery system for the Coloma hotspot and recover mercury annually. Such a system would need to minimize mercury loss. Recovery equipment would need to be held in storage during nonuse and operated by trained staff. Proper permits (e.g., in stream alteration, and, mercury disposal or recycling) would be needed. Such a project is more complex and costly in time, money, and commitment than previously considered projects." [Humphreys 2005 – Conclusions].

Suction dredgers have been recovering mercury with a 98% efficiency rate for over 40 years for free so it is incomprehensible how such a conclusion could be reached. The literature does not cite a single instance of a gold dredger being affected by mercury.

(4) Floured mercury is created by the dredge

While Humphreys mentions that a dredge may flour mercury – he also states that almost all the Hg in the test sample (pre-dredging) was in the 30 mesh (<.6mm) fraction. This shows that the efficiency test sample contained nearly all floured mercury prior to dredging. A remarkable statement in light of the DSEIRs conclusion that suction dredging may flour mercury. It is clear that mercury is floured prior to dredging ***and the suction dredge recovered 98% of the floured mercury***. Humphreys measured and proved that nearly ***all the mercury was floured prior to dredging.***

This key point is lost in the DSEIR. The DSEIR only accepts the position that it **may** be true while discounting the position that it may be false. Again, this is not consistent with the CEQA requirement to analyze the facts. Accepting only the "possible" while discounting the "probable" shows bias in the DSEIR towards a target goal of proving dredging is harmful.

DSEIR Statement, page 4.2-36, line 19-21; "...suction dredging has been observed to result in the "flouring" of Hg droplets...Humphreys, 2005; Silva, 1986."

(1) Actual Statement from Humphreys Report – *" Visual inspection of size fractions showed that almost **all the liquid mercury rested in the fraction that passed a 30-mesh sieve (0.6mm)**."* Speaking to the sample material that was not dredged but collected on September 15, 2003.

(2) Actual Statement from the Humphrey's Report now speaking to the tailings material (passed through the dredge – *" During the test, the USFS team captured sediment lost off the sluice in a catch basin for later analysis. Small mercury droplets and fine, barely discernable droplets (i.e., floured mercury) were characteristic of these samples."* Speaking to the material collected after dredging on September 16, 2003.

The post dredging test found exactly the same as the source material – extremely small droplets of mercury that passed through 30 mesh proving no difference in the source material and the tailings material in regards to flouring. It is shown that the dredge was not responsible for flouring the mercury.

One problem with the DSEIR and the referenced reports is the lack of perspective. It is interesting to see just what 30 mesh screen is and the size of a particle that would pass through this screen. Figure 3 provides a picture of 30 mesh screen.

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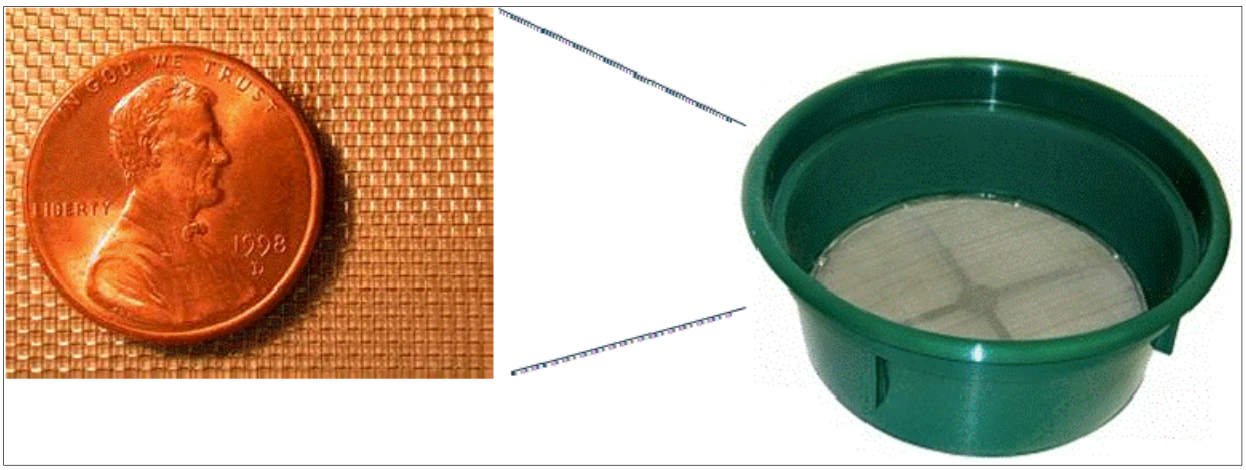


Figure 3. 30 mesh Screen

30 mesh screen results in a particle that would be the eye of Lincoln on the penny. If the input material with mercury was < 30 mesh then what defines floured mercury? What is the scientific standard to determine floured mercury? Secondly, if almost all the source mercury passed through the 30 mesh screen and the dredge caught 98% of this material isn't this direct evidence that a dredge is not producing floured mercury, but is actually capturing and concentrating it?

Where does the DSEIR form the basis for "suction dredging has been observed to flour mercury"? The Humphrey's report **does not say the dredge caused the flouring of the mercury**. The two statements above prove the mercury was in floured form prior to dredging as well as after dredging. The fact the dredge concentrated and removed so much floured mercury is the point the DSEIR should have reported – but didn't. But what is floured mercury? We seem to focus on it, and the possibility of a dredge creating it, but from the above picture of a 30 mesh screen I can't imagine smaller drops of mercury "discernable by the eye."

The second reference "Silva, 1986" that the DSEIR cites is an interesting selection. Here is the actual statement in the Silva report [See Reference – California Department of Conservation, Placer Gold Recovery Techniques, 1986] – ***" agitated mercury has a tendency to form very small droplets, known as "flouring." Floured mercury does not effectively collect gold particles and may escape the recovery system."***

The context in which Silva presents the data refers to industrial recovery techniques and the lead to the paragraph of this cite recommends the use of mercury to amalgamate gold (in 1986 an official publication of the State of California presented this as a method to increase gold recovery), the paragraph states ***" Mercury can be introduced to free gold in a number of ways. It can be placed in the riffles of sluices, dry washers, and similar devices to aid concentration of fine gold." [Silva, 1986].***

Is Silva an appropriate cite or expert source on mercury? The entire publication does not make a single reference to portable suction dredges but rather it discusses drag line dredges, interesting that it would be used as a cite for the potential flouring of mercury from a suction dredge. Should we accept Silva's thoughts on flouring, or should we accept Silva's thoughts on placing mercury into our riffles to capture gold? The DSEIR chose the former while discarding the latter and ignoring that Silva didn't once

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:

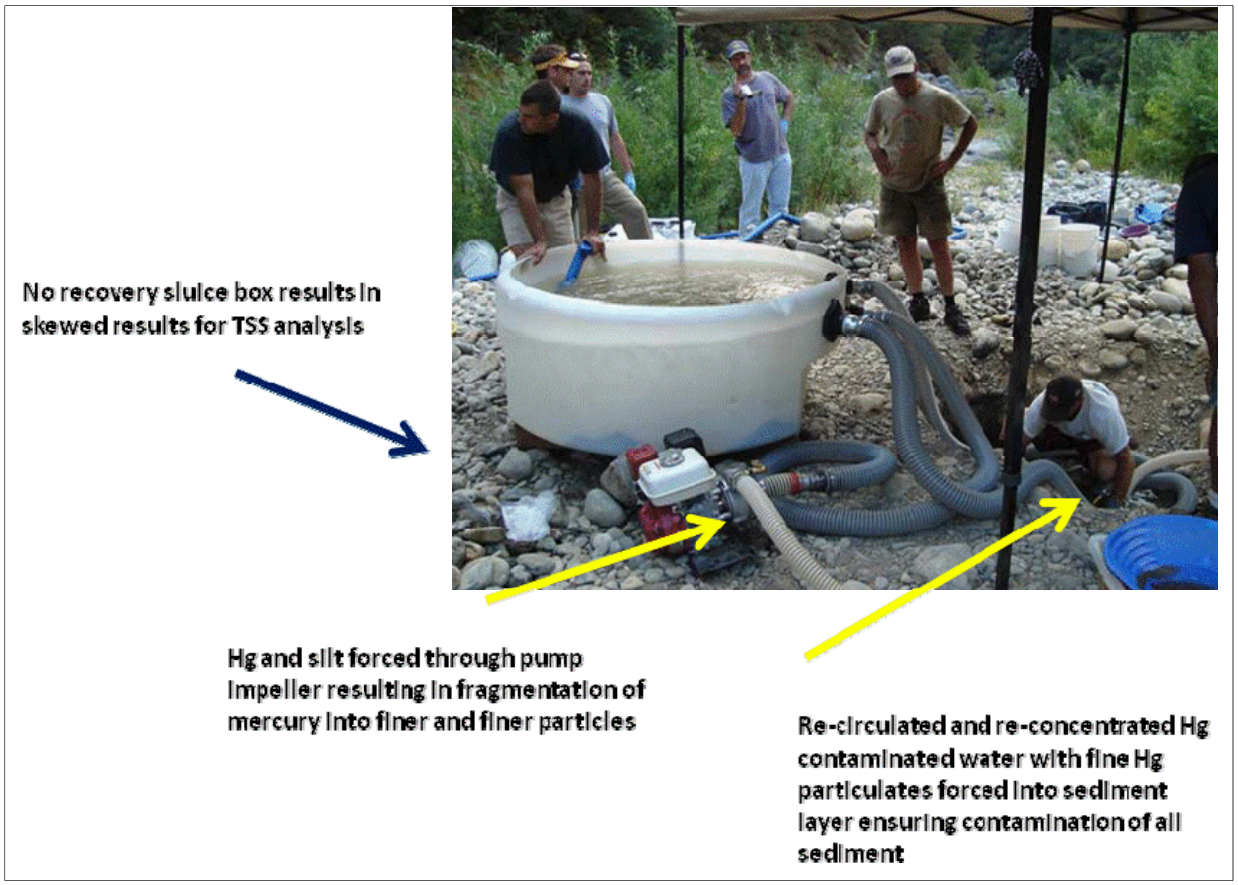


Figure 4. Experiment Setup for Alper's Re-circulating Test

Recommendations

(1) The DSEIR should reference the dredge mercury capture rate of 98% proven by Humphrey's and confirmed in the Fleck tests and use this rate in calculating mercury impacts.

(2) Both studies (Humphreys and Fleck) use flawed approaches to determine the suspended sediment mercury content, and both measurements should be discarded. The only actual measurement found trace amounts of mercury (Fleck 2007) orders of magnitude below the stated THg(ss) rates.

(3) The use of Dr. Alper's data should be discarded based on not representing actual suction dredge operation which was the intended purpose. Humphreys found that 98% of mercury was removed and additionally the circulation of mercury through the impeller of the pump does not represent how mercury is recovered and creates fragmentation rates that are not realistic. Any reference or analysis based on the Alper's results should be discarded from the DSEIR.

(4) A government program should be established to receive mercury from gold dredgers in convenient locations throughout mining country. The capability should include an on-the spot retorting capability to separate the amalgam. Such a program would be far cheaper than the program contemplated by Humphreys and would provide miners free retorting.

CEQA Pg 226
15384. SUBSTANTIAL EVIDENCE

*(a) "Substantial evidence" as used in these guidelines means enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions may be reached... **Argument, speculation, unsubstantiated opinion or narrative, evidence which is clearly erroneous or inaccurate**, or evidence of social or economic impacts which do not contribute to or are not caused by physical impacts on the environment does not constitute substantial evidence."*

It is inappropriate in light of the CEQA requirements to only evaluate the data in scientific reports that is negative while completely ignoring the evidence in the same reports that would lead to an opposite conclusion. An example of this cherry picking of data is provided above in the Alpers analysis. As represented the analysis was intended to depict the mercury emissions from a dredge under operating conditions while not replicating operating conditions in the least. The DSEIR uses this analysis as the basis for far reaching conclusions unsubstantiated by fact.

In the same Fleck report, the DSEIR ignores the results of the actual test of the 3" suction dredge in 2007 under normal conditions dredging a hole in the same vicinity as the hand dug pits 1 and 2. Other than the Humphreys effort this was the only evaluated dredge test in the literature. Two actual dredge tests and the DSEIR fails to mention the results – yet it finds sufficient data in other parts of the same reports to reach conclusions about actual dredging – while ignoring the conflicting data of the two actual dredge tests that used real equipment under real scenarios in the exact same hot spots.

Actual Dredge Test Results from 2007 3" Dredge Test [Fleck 2010]

"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) ..." [Fleck]

Figure 5 provides the results from the 3" dredge test. These results are stunning, yet the DSEIR doesn't mention that measured MeHg was zero in 3 hours of dredging. No Hg(II)r was produced and the fine THg was equal to the field blanks. The total Hg measured in nanongrams was less than 1 part per trillion.

The DSEIR and the Fleck report both state that the report would cover the effectiveness of using a suction dredge to recover mercury from the streambeds – but they don't. For over 40 years now suction dredgers have been recovering mercury for free so the question of the effectiveness of the dredge is a valid research topic relative to the creation of the regulations.

The results of the two actual dredge tests cited in the DSEIR provide highly positive results for the effectiveness of suction dredges and the extremely small amount of mercury released compared to the mercury recovered. Yet the DSEIR doesn't consider this in making a determination of "Significant and Unavoidable." This is clearly incorrect.

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)	$Hg(II)_{R-SS}$ (ng/g)	% $MeHg_{SS}$	% $Hg(II)_{R-SS}$	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

Figure 5. Results of 3" Dredge Test by Fleck et al 2007

Some important results from the Fleck test notably absent in the DSEIR:

- Particulate MeHg – not detectable
- MeHg – increased by 14 trillionths of a gram (14.2 ng/g)
- fTHg – decreased (.53 ng/l to .47 ng/l) after 1 hour of dredging – this indicates measurements in the threshold range of the detector have a degree of variability in measurement accuracy
- Hg(II)r – not detectable with a sensitivity of .40 ng/l

To further examine the flaws in the data and analysis you have to dig deeper into the actual results and the bias inherent in the results that created a wildly inaccurate portrayal of the cumulative effects of dredging.

FLAWS IN ANALYSIS

This section provides my analysis of the data presented by Fleck, reported by the DSEIR that results in a finding that very few suction dredgers would create sufficient mercury to equal the entire watershed load. To evaluate this finding required considerable time spent looking at the reported numbers. What I found was clear bias by selective analysis of data that favored the finding of "Significant" while avoiding other data that showed it was "Less than Significant."

First we'll look at the reporting of the results from the 3" dredge test. The report creates an impossible situation as the amount of mercury in the concentrates exceeds the amount of mercury that should have been in the input (heads material). A few of the problems encountered in evaluating the results of the test included no measurements of kg moved, cubic meters moved and the inaccurate measurements of Hg in the sampling. This makes it extremely difficult to estimate the THg in the material and validate the numbers.

To begin we need to estimate the total amount of material moved and multiply the point samples across the total kg moved. The estimate of material moved, using the Keene production rates (unmodified) is in Table 4. The material in concentrates is estimated from amount a 3" dredge should capture during the time period.

Estimate of Material Possibly Dredged - Fleck 3" Dredge Test			
	Kg/Hr Hr 0-1 kg/hr	Hr 1-2 kg/hr	Total Dredged in kg
3" Dredge	67	160	227
Concentrates			25

Table 4. Estimate of Material Moved

Now that we have an estimate of the material moved we need the point samples to estimate the amount of mercury present in the source, tailings and concentrate based on the reported sampling. This is provided in Table 5.

Sampling of Material from 3" Dredge Test			
	Size	THg (ng/g)	THg (ng/kg)
Source Gravel	<1.0mm	22.9	22900
Source Gravel	.063 to 1.0mm	55.8	55800
Tailings	<1.0mm	15.9	15900
Tailings	.063 to 1.0mm	18.6	18600
Concentrate	<1.0mm	137	137000
Concentrate	.063 to 1.0mm	4570	4570000
Concentrate	.0003 to .063mm	14300	14300000

Table 5. Measured Hg in the 3" Dredge Test

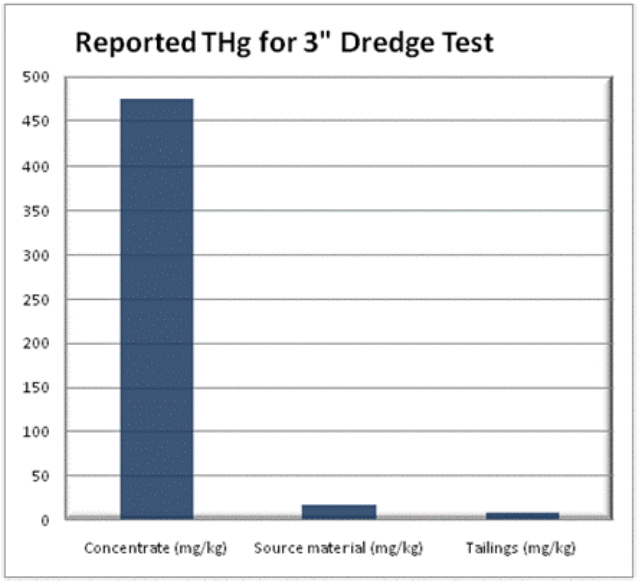
Next we need to multiply the amount of mercury in the point estimates times the total amount moved to derive the total mercury amounts present in each of the samples.

Estimated Total Mercury Present in Sample Material from 3" Dredge Test					
	THg (ng/kg)	x kg moved	THg in mtl (ng)	THg in (ug)	THg (mg)
Source Gravel	78,700	227	17,864,900	17,865	17.86
Tailings	34,500	227	7,831,500	7,832	7.83
Concentrate	19,007,000	25	475,175,000	475,175	475.18

Table 6. Estimate of Total Hg Present in Material By Sample

Based on the point estimates the total Hg as measured in mg is 17.8mg in the source material, the tailings estimate is 7.8mg and the measured amount in the concentrates is 475mg. These numbers reflect the total amount of mercury that should have been present if the sampling was correct. This is shown graphically in Figure 6.

Figure 6 reflects the calculations for how much mercury as a minimum must have been in the source material to result in the quantity of mercury found in the concentrates. Based on Humphrey's estimates for dredge mercury capture rates the numbers actually work out very well. The estimate for 2% in the tailings equals approximately 9 grams while the point estimate for the tailings was 7.8 grams. The Fleck test confirmed the results from Humphreys – a suction dredge captures 98% of the mercury, releases only 2% back into the tailings and at no point is the mg/kg exceeding the thresholds for hazardous waste.



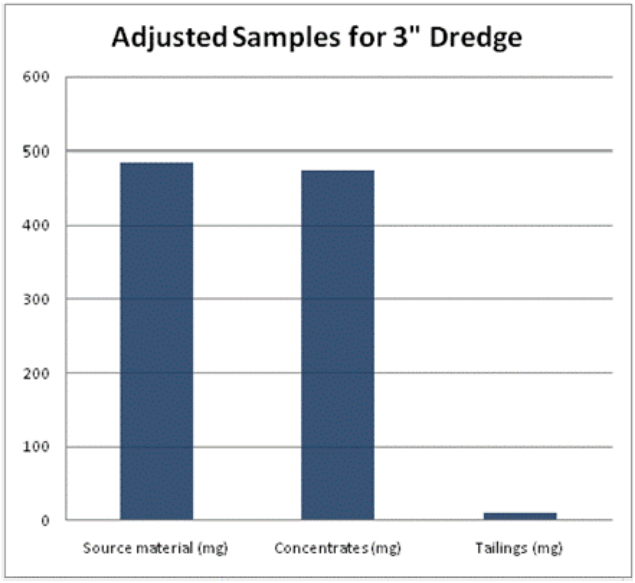


Figure 6. Fleck Reported Results for THg in 3" Dredge Test

The above graph compares the estimate provided in the report for source material mercury with the graph on the right which estimates the minimum amount of source mercury that must have been present. Fleck states the incoming material and the outgoing mercury had the same levels of mercury, but as shown above this scenario is impossible – the dredge ended up with far more mercury than was possible using the point estimates.

The only two actual dredge tests demonstrate the extraordinary ability of a dredge to capture mercury while limiting the emissions from the dredge to less than 10% of the California Hazardous Material Threshold levels.

Fleck takes the information above and states that "differences between heads and tails was minor..." Fleck, 2010 page 41). It doesn't look minor. The 3" dredge test confirms the Humphrey's data using a second, independent test in another mercury hotspot. Fleck used a 20 mesh screen to screen the sediment both prior to dredging, during dredging and for the concentrates providing confirmation that mercury interspersed with river gravel is typically floured.

Figure 7 provides the source material used to create the above tables and graphs.

Table 5. Mercury concentrations in sediment samples collected during the October 2007 dredge test, South Yuba River. All concentrations are on a dry weight basis.

[hr, hour; THg, total mercury; MeHg, methylmercury; $Hg(II)_R$, reactive mercury (II); %, percent; ng/g, nanogram per gram (or part per billion); <, less than; MDL, method detection limit; mm, millimeter]

Sediment type	Size fraction	Percent of total sediment in size fraction (%)	Time (hr)	THg (ng/g)	MeHg (ng/g)	Percent MeHg (%)	$Hg(II)_R$ (ng/g)	Percent $Hg(II)_R$ (%)
Heads	< 1.0 mm	1.14	0-1	22.9	< MDL	< MDL	1.55	6.75
Heads	< 1.0 mm	12.33	1-2	55.8	< MDL	< MDL	1.18	2.12
Heads	< 1.0 mm	2.17	2-3	13.9	< MDL	< MDL	0.34	2.43
Heads	0.063 to 1.0 mm	1.25	0-1	124	< MDL	< MDL	1.95	1.58
Heads	0.063 to 1.0 mm	12.22	1-2	46.5	< MDL	< MDL	1.01	2.18
Heads	0.063 to 1.0 mm	2.12	2-3	36.6	< MDL	< MDL	0.41	1.12
Tails	< 1.0 mm	32.56	0-1	15.9	< MDL	< MDL	0.79	4.96
Tails	< 1.0 mm	10.76	1-2	18.6	< MDL	< MDL	0.66	3.54
Tails	< 1.0 mm	9.12	2-3	37.1	< MDL	< MDL	0.58	1.55
Tails	0.063 to 1.0 mm	32.75	0-1	83.0	< MDL	< MDL	0.51	0.61
Tails	0.063 to 1.0 mm	10.58	1-2	25.1	< MDL	< MDL	1.35	5.37
Tails	0.063 to 1.0 mm	9.06	2-3	78.2	< MDL	< MDL	0.33	0.42
Concentrate	< 1.0 mm[1]	95.42	0-2	137	0.022	0.016	1.16	0.84
Concentrate	< 1.0 mm[1]	95.35	2-3	211	nd	nd	1.24	0.59
Concentrate	0.063 to 1.0 mm[1]	95.65	0-2	4,570	< MDL	< MDL	0.93	0.02
Concentrate	0.063 to 1.0 mm[1]	95.70	2-3	10,300	nd	nd	1.66	0.02
Concentrate	0.0003 to 0.063 mm[1]	0.23	0-2	14,300	1.1	0.008	83.2	0.58
Concentrate	0.0003 to 0.063 mm[1]	0.36	2-3	3,210	0.92	0.029	28.3	0.88

[1] Concentrate samples pre-sieved through 20-mesh screen.

Figure 7 – Fleck Results of 3" Dredge Test

As proved by Fleck the mercury is **<u>not being methylated</u>** – measured levels were zero (Fleck Table 4, page 40 and above). The measured Hg(II)r levels in ng/g were lower – across the board than the measured Hg(II)r levels in the incoming gravel. From Fleck's data it is **strongly** indicative that a suction dredge is both highly efficient at removing mercury and is providing no MeHg or Hg(II)r into the environment. It is striking that the DSEIR reaches just the opposite conclusion but not surprising as the DSEIR used large portions of the Fleck report to derive its conclusions. Notably absent is any mention that a dredge is removing 98% of the mercury from the environment (for free and without a government program) and that testing has shown extraordinarily small levels of Hg(II)r and no levels of MeHg.

The only conclusion you can reach is the DSEIR is intentionally avoiding the topic of how much mercury a dredge captures. As shown in Figure 7 above the measured MeHg downstream from the dredge was zero, but again this isn't mentioned in the DSEIR.

Recommendations

The mercury analysis included in the DSEIR is too limited and flawed to be used as a basis to conclude suction dredging results as "Significant and Unavoidable" impacts. The mercury study should be discarded from the DSEIR and simply replaced with a comment that says there is insufficient scientific information at this time to conclude suction dredging creates negative impacts. Further the evidence should be peer reviewed by both qualified personnel from the dredging community as well as government personnel prior to being released. I ask that CDFG consider the impact of releasing this type of flawed data based on such limited analysis that contains so many serious errors and omissions of important data relative to the conclusions. The conclusion reached in the DSEIR of "Significant and Unavoidable" is not supported by the facts.

EXAMPLES OF FLAWS IN THE ANALYSIS

The DSEIR uses the Humphreys 2005 paper to provide a mercury discharge rate of 298 ppm but fails to mention the dredge was purposely recovering liquid (elemental) mercury and the purpose of the study was to recover mercury – the operators were literally dredging mercury ***"Team members used special care to find and dredge large liquid mercury droplets as well as mercury-laden sediment from the site." [Humphreys Report, 2005***].

The Humphreys study measured the suspended mercury rate (discharge rate of 298ppm) by using a settling tank based on only the concentrated sediments sieved through a 30 mesh screen. It would be impossible for a dredge to discharge this amount of mercury. The 298ppm rate is based on discharging the concentrated material only – not the source material. It is incorrect to conclude based on sampling of the captured material, then putting the captured material into a still water tank that this would be the discharge rate from the dredge. The DSEIR seizes on this flawed data and then proceeds to construct an entire scenario that is based on theoretical leaps – not based on a real suction dredge.

As stated the bedrock contact layer in Pit #2 had high concentrations of mercury (Hg(II)r). In the DSEIR they state that the fine particles of pit #2 had 2-3 orders of magnitude more mercury mass than pit #1. The DSEIR then uses the data provided by Fleck to perform calculations for suspended mercury in regards to watershed loading rates. However, the Fleck study used a closed circuit test, not using a dredge with a sluice box and purposefully introduced the output from the bedrock material into a tank to study the effects of suspended particulates and mercury. It did not attempt to characterize what this effect would be in the real world. The DSEIR takes these results (no sluice box and standing water) and uses them to calculate THg loading. The DSEIR uses this material even though the Fleck test found no levels of Hg(II)r or MeHg were being output by the dredge with the sluice box.

The Fleck study found that in using the closed system test the suspended mercury tended to attach itself over time to the finer particles in higher and higher densities – this would indicate that the finer particles themselves would become denser and would precipitate out as they collected mercury from either the dredge or other sources. The Fleck report, being conducted in a closed tank, used a water body unaffected by movement which would indicate that the collection of mercury on the fine particles would not occur at these abnormally high rates during transport in the stream. All of the suspended particle analysis must be thrown out as the method used to create the fine particles included running contaminated water repeatedly through the impeller of a pump (not the way material is processed in a dredge), the material was likely run through the impeller over a thousand times according to witnesses of the test. ***The closed circuit test does not represent the results from an actual dredge test.***

MERCURY REMOBILIZATION

The issue of the release of mercury that would otherwise be "locked" in a sediment layer is used as an argument against suction dredging. The material from Pit 1 and 2 were collected by digging with a shovel and pick – not using a dredge so any measurements we use from these pits we must be cautious – none of the analysis provides a capture rate for the suction dredge [See Humphreys 2005].

The following section shows how completely different conclusions can be reached by using the exact same source data, but including the extraordinary ability of a dredge to capture mercury. For this analysis we will use Test Pit #2 from the Fleck study. The typical dredge hole is far wider at the top than the bottom, as Fleck reported it is 4x larger at the top than the bottom.

As Fleck and Humphreys found the majority of material in a dredge hole is >1mm – approximately 98% of material exceeds this size. During the Fleck study the team measured the amount of material in each layer and found the concentrated layer is about 2% of the total material moved. Taking into account the time required to move this material results in far different numbers than are provided in the DSEIR.

To consolidate the analysis I merged the Overburden layer and the First Contact Layer into one layer called Overburden. The DSEIR focuses on the particles sizes smaller than .063mm as they state these particles are most likely to be suspended.

In both referenced studies the conclusion are the same from the data presented suction dredges remove almost all of the mercury present (even floured mercury) and there is no reasonable scenario where a suction dredge would ever exceed the threshold for hazardous waste.

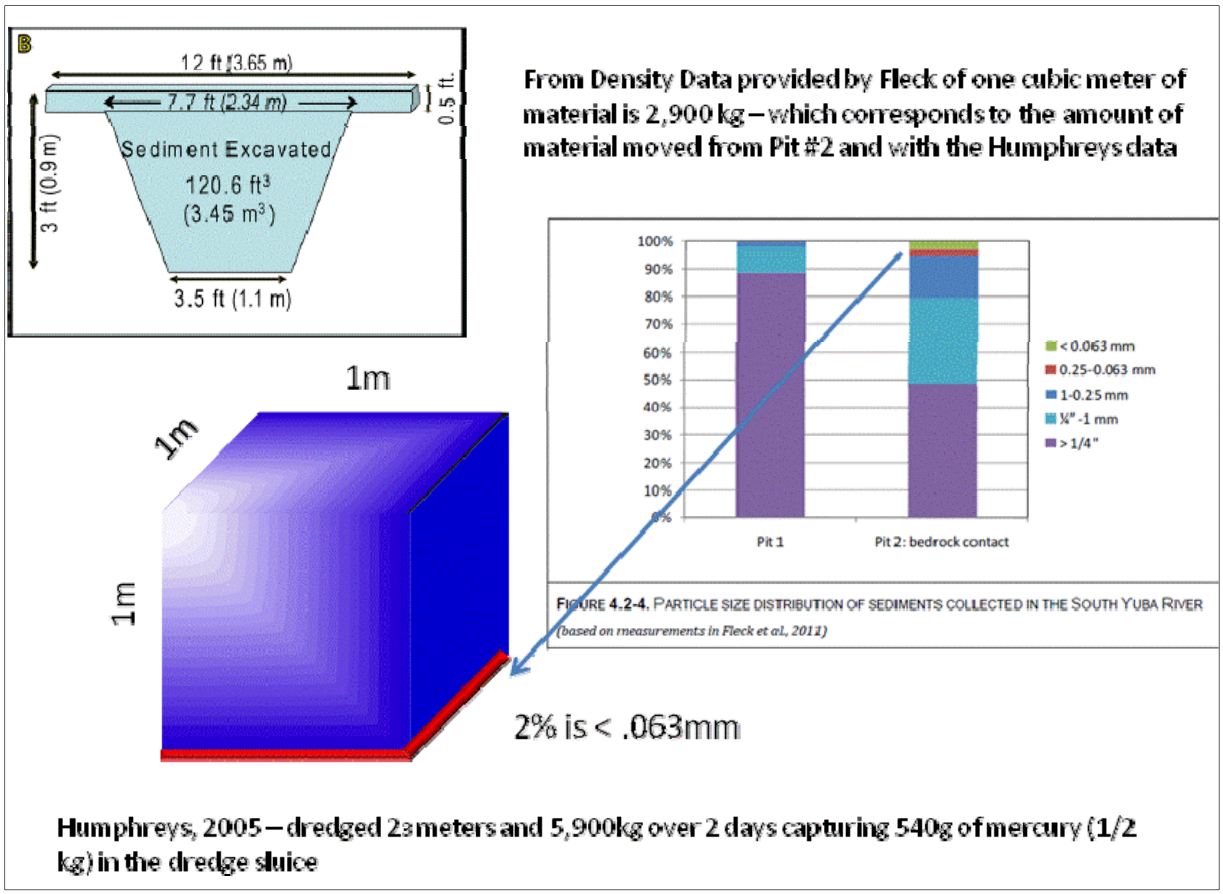


Figure 8. Construction of a Dredge Hole

The variables needed are the amount of fine particulates and the amount of time spent moving that material. As Fleck reports it is a fraction of the time, the DSEIR does not account for the fraction of time, but assumes that all material being moved is less than .063mm. To evaluate this we will deconstruct Fleck's test pit #2.

Figure 8 provides a graphical breakout of the material by layer from Pit #2. As expected there is far more material in the overburden layers than in the targeted layers.

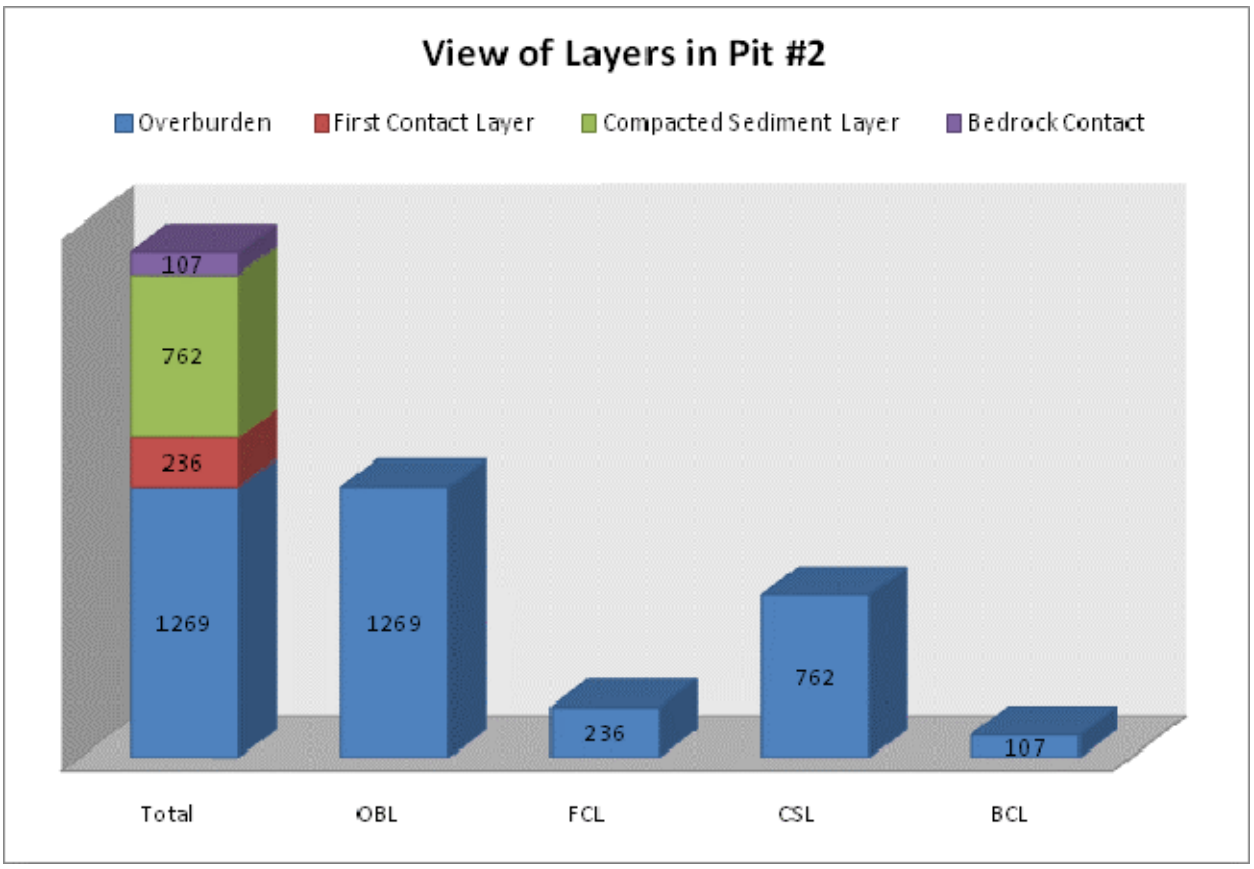


Figure 9. Composition of Test Pit #2

Figure 9 shows you have to move a lot of material to get to the bedrock zone. Moving this material takes time and to evaluate the release of mercury by suction dredges we have to estimate the material moved over time. Using the data provided by Keene Engineering for expected dredge material rates in different types of materials Table 7 is provided as a measure of time required to dredge each layer.

Layers	Amount of Material in Kg	% of Total	Keene Eng Reported Dredge Rates in kg/hr	Hours required to dredge
Overburden Layer (OBL)	1269	53%	112	11.33
First Contact Layer (FCL)	236	10%	128	1.84
Compacted Sediment Layer (CSL)	762	32%	266	2.86
Bedrock Contact Layer (BCL)	107	5%	290	0.37
Total Material From Pit #2	2374	100%		16.41

Table 7. Time Required to Dredge Pit #2 – If it was actually dredged

Graphically this is shown in Figure 10.

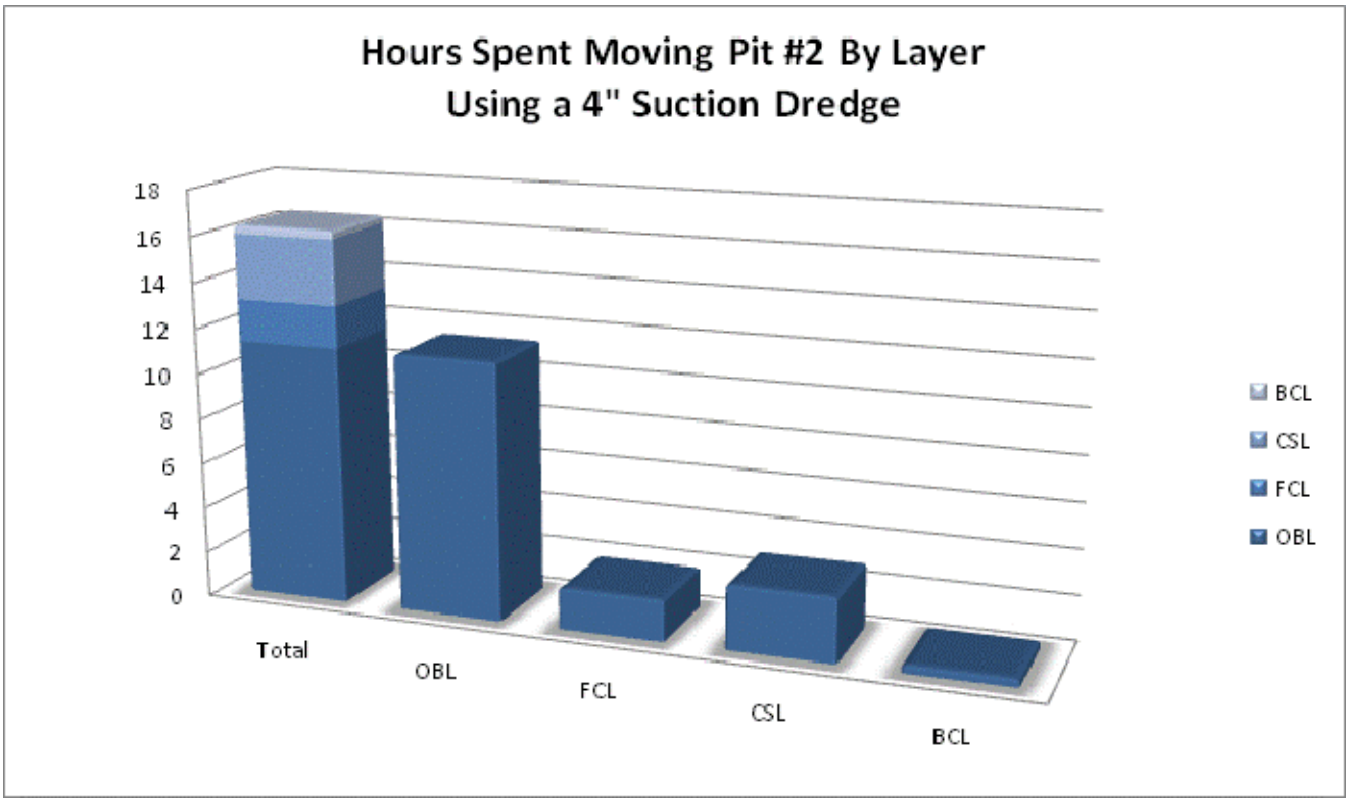


Figure 10. Time Spent Dredging Pit #2

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

time studies by Fleck or considered in the DSEIR. The DSEIR assumes that all the material moved is <.063mm.

We need to deconstruct each layer of the Test Pit #2 (Fleck 2010) to determine how much total mercury was available for extraction. All measurements are based on point samples from the layers provided in the data. The Overburden Layers includes the OBL layer and the First Contact Layer measurements.

Overburden Layer Breakdown

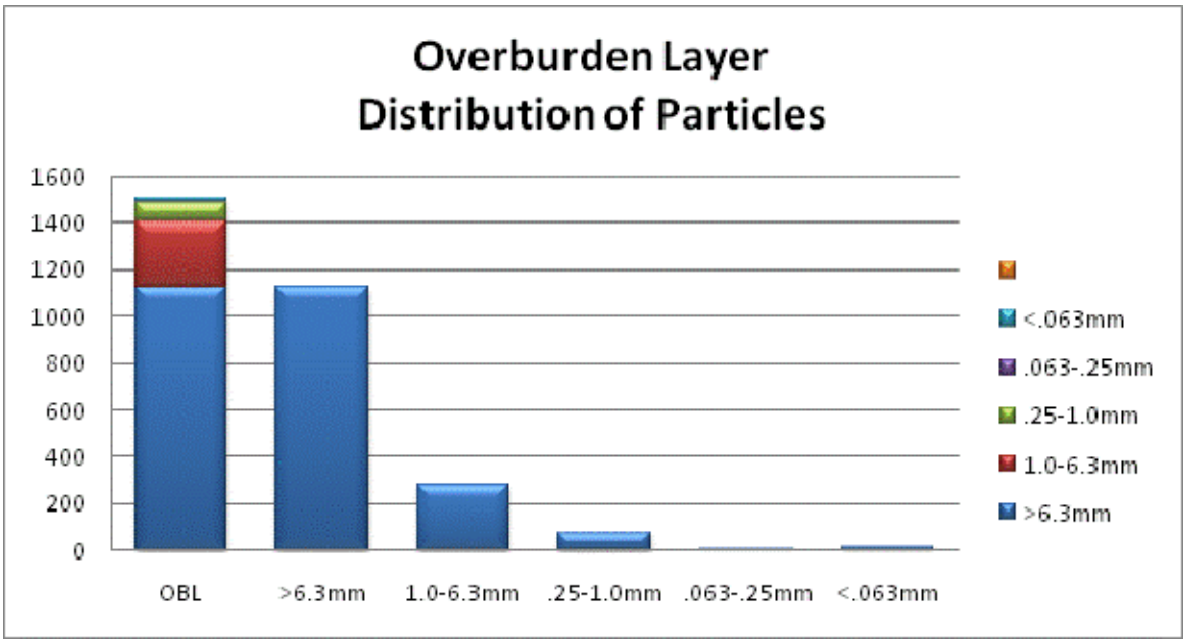


Figure 11. Distribution of Particles By Size in the Overburden

It took 13 hours to move the material in the Overburden Layer so the question becomes how much mercury did we mobilize? Table 8 provides the total mercury mobilized in this layer.

Overburden Layers - Analysis of THg Produced During Dredging						
	Kg of Mtl	THg in ng/g	THg in mg/kg	THg in mg	Dredge Rate kg/hr	Time in hrs
>6.3mm	1127	0	0	0	112.00	10.1
1.0-6.3mm	277.4	0	0	0	128	2.2
.25-1.0mm	77.2	227	0.227	17.5244	266	0.3
.063-25mm	7.5	743	0.743	5.5725	290	0.026
<.063mm	16.1	1689	1.689	27.1929	290	0.056
Total	**1505.2**			**50.2898**		**12.6**

Table 8. Total Mercury From the Overburden Layer Based on Kg Moved

The total mercury in this layer is 50.29 mg with an average mercury level of .03 mg/kg far below the threshold for mercury set by the California Department of Toxic Substance Control (20mg/kg).

Important to this analysis, and the conclusions in the DSEIR is we have spent over 13 hours dredging the overburden layer; we've moved 1,505 kg of material but we've only moved 16kg of material less than .063mm. The time we spent dredging that material was 3 minutes out of 13 hours.

The conclusions from the DSEIR is based on the entire amount of material and entire amount of time was spent moving material < .063mm AND a mercury contamination rate equal to the concentrated material. Based on time required to move material to reach this material – it is impossible.

Compacted Sediment Layer Breakdown

The distribution of particles from the Compacted Sediment Layer is provided in Table 9.

Compacted Sediment Layer - Analysis of THg Produced During Dredging						
	Kg of Mtl	THg in ng/g	THg in mg/kg	THg in mg	Dredge rate kg/hr	Time in hrs
>6.3mm	503	0	0	0	112.00	4.5
1.0-6.3mm	140.7	0	0	0	128	1.1
.25-1.0mm	85.8	455	0.455	39.039	266	0.3
.063-25mm	17	1630	1.63	27.71	290	0.059
<.063mm	15.5	10500	10.5	162.75	290	0.053
Total	**762**			**229.499**		**6.0**

Table 9. Mercury vs. Time for the Compacted Sediment Layer

After removing the overburden layers (13 hours of effort) we're finally in a layer that has a high density of material. Let's evaluate these findings against the threshold for hazardous waste. We have produced 229 mg of mercury the hourly rate for this would be 38mg per hour. Of the six hours spent dredging this layer we spent six minutes out of the total 6 hours of dredging time to move the material. How do we compare to the threshold limit for hazardous waste? Based on kg moved and THg recovered in mg we have a rate of **.3mg/kg again far below the threshold of 20mg per kg**.

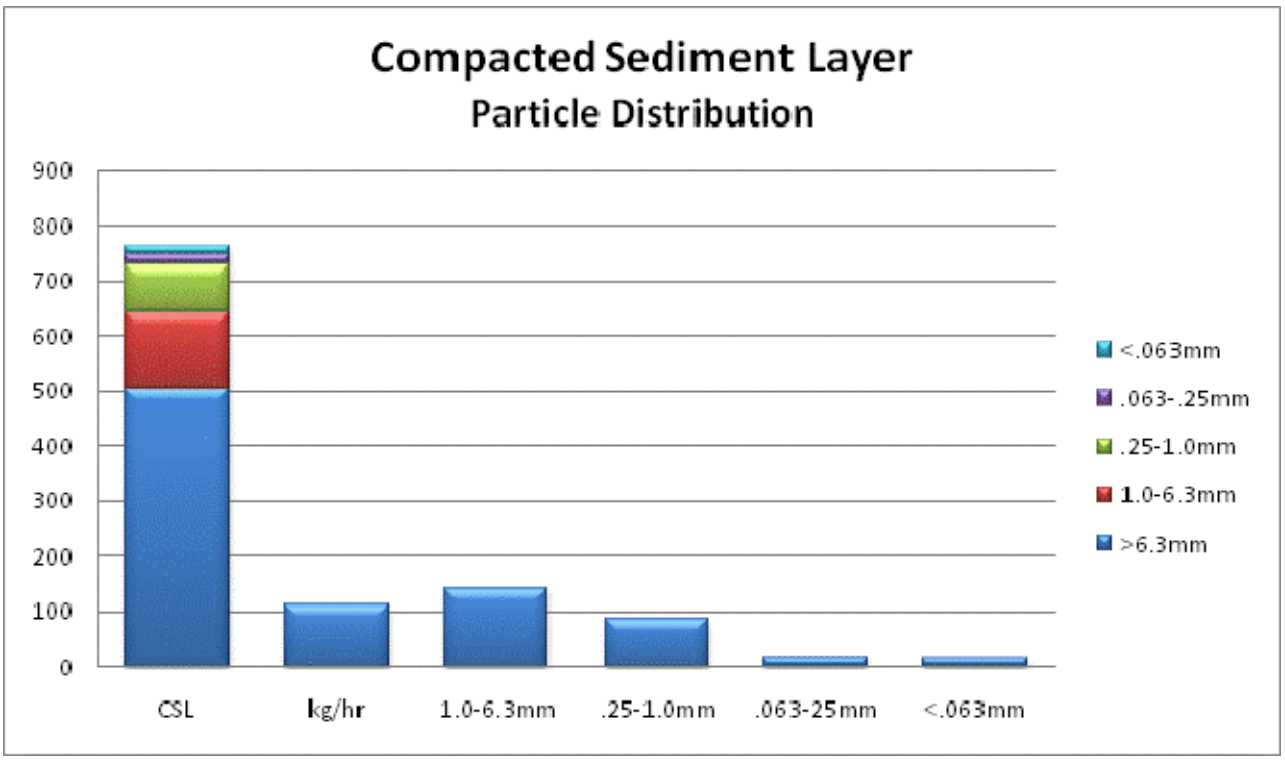


Figure 12. Compacted Sediment Layer Particle Distribution

Bedrock Contact Layer Breakdown

Bedrock Contact Layer						
	Kg of Mtl	THg in ng/g	THg in mg/kg	THg in mg	Dredge rate kg/hr	Time in hrs
>6.3mm	52	0	0	0	112.00	0.5
1.0-6.3mm	33	0	0	0	128	0.3
.25-1.0mm	16	515	0.515	8.24	266	0.1
.063-25mm	3	1150	1.15	3.45	290	0.010
<.063mm	3	11100	11.1	33.3	290	0.010
Total	**107**			**44.99**		**0.8**

Table 10. Mercury vs. Time for the Bedrock Contact Layer

After nearly 19 hours of dredging we have finally reached the layer the DSEIR bases its conclusions on – bedrock. In reaching this layer and cleaning it we have mobilized 45 mg of mercury. This equates to .42mg per kg moved – again far below the threshold. How long did we spend in the layers less than .25mm including the fine particulate less than .063mm? As shown in Table 10 the time required to move the material less than 1.0mm as a percentage of the total material was less than 1 minute.

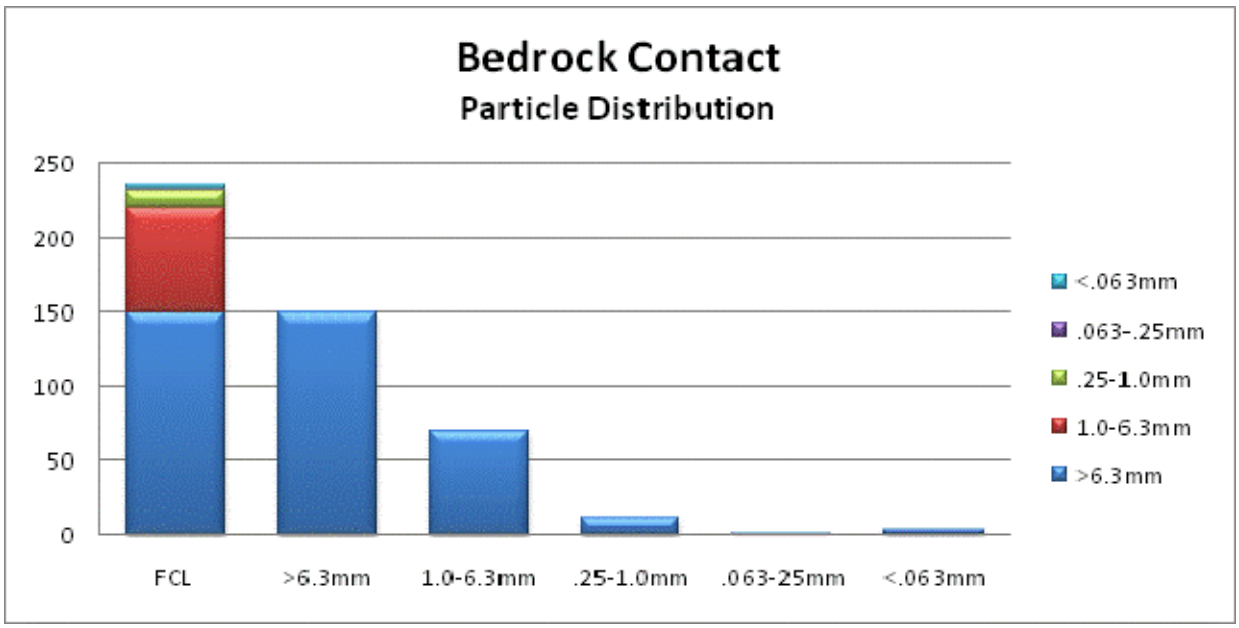


Figure 13. Bedrock Contact Layer Particle Distribution

Surprisingly, despite the DSEIRs alarmist writings we find that even in the lowest and densest material we still have only a fraction of the material that is less than .063mm. Of particular interest is this layer would require less than one hour of dredging time to completely recover all the material. The yield of total mercury from this layer is significantly less than the yield from the compacted sediment layer – likely this is due to the difference in material moved: 762 kg vs. 107 kg. If multiplied out the two yields would be relatively the same.

Of 19.4 hours dredging we spent less than ten minutes dredging material <.063mm. The DSEIR would have used the entire 19.4 hours and the entire amount as <.063mm to reach its conclusions. It's wrong.

From the Bedrock Contact Layer the DSEIR focuses on in attempting to prove the harmful potential of dredging we see yet again that the total mercury produced from this layer is 45mg with 107kg of material moved and a .42 mg/kg rate compared to the threshold of 20 mg/kg set by the State. These are remarkable numbers considering this study was done in a known mercury hotspot (Malakoff Diggin's mercury concentration).

Summary of Analysis of Mobilized Mercury

The above analysis was based on the data provided in the Fleck study and repeated in the DSEIR. The flawed data analysis provides the foundation for the argument in the DSEIR that dredges are remobilizing mercury at high rates and that a relatively limited number of dredgers could mobilize more mercury than the entire watershed natural rate. Based on the above breakout of layers in Pit #2 and the time required to move that material a more accurate estimate of mercury released can be provided.

The total mercury mobilized from all layers during our two days of dredging Pit #2 is less than one gram as shown below.

Total Mercury Mobilized in Pit #2		
Layer	>.063mm THg in mg	<.063mm THg in mg
Overburden	3.7711	1.8209
First Contact	2.777	4.65
Compacted Sediment	66.749	162.75
Bedrock Contact	11.69	33.3
Totals	**84.9871**	**202.5209**

Table 11. Total Mercury Recovered from Pit #2

Of the total mercury produced how much of this mercury would be released into the tailings versus being captured by the dredge. Using the 98% efficiency rate provided by Humphreys the following calculations estimate the mercury into the tailings –The release of mercury in the tailings and does not mean the mercury was suspended.

Estimates for Natural Loading Rate for the South Yuba River in Dry Year										
Layer	Input Gravels THg in mg	Dredge recovery rate = 98% in mg	THg in mg in tailings	Hours spent dredging	Natural Load S. Yuba in mg	Hg Production in mg/hr	Cumulative time required to reach level	Cumulative THg by level in mg	Adjusted mg/hr cumulative rate	Dredging hours required to reach natural load
OBL	5.592	5.480	0.112	11.33	800,000	0.0099	11.33	0.11	0.0099	81,046,903.74
FCL	7.427	7.278	0.149	1.84	800,000	0.0806	13.17	0.26	0.0198	40,476,556.24
CSL	229.499	224.909	4.590	2.86	800,000	1.6023	16.04	4.59	0.2862	2,795,440.29
BRC	44.99	44.090	0.900	0.37	800,000	2.4387	16.41	5.75	0.3505	2,282,751.69
Totals	**287.508**	**281.75784**	**5.75016**	**16.41**		**0.3505**	**16.41**	**5.75**	**0.3505**	**2,282,751.69**

Table 12. Time Required to Reach Natural Load of S. Yuba River

Table 12 provides the hours by layer, and the total hours for equal type pits to reach the natural load of the S. Yuba River. Taking into account the amount of Hg captured by the dredge and the variance in layers the number of dredging hours required to reach the natural load is 2.3 million hours. This is in sharp contrast to the chart provided in the DSEIR which is a direct extract from the Fleck report. It is clear that the authors of the DSEIR did not understand the source data. The source data is only referring to the amount of Hg in the silt and clay layers which constitutes only 2% of the total material in the pit. Secondly, the authors of the DSEIR ignored the findings from Humphreys which proved a dredge captures 98% of the mercury – including floured mercury.

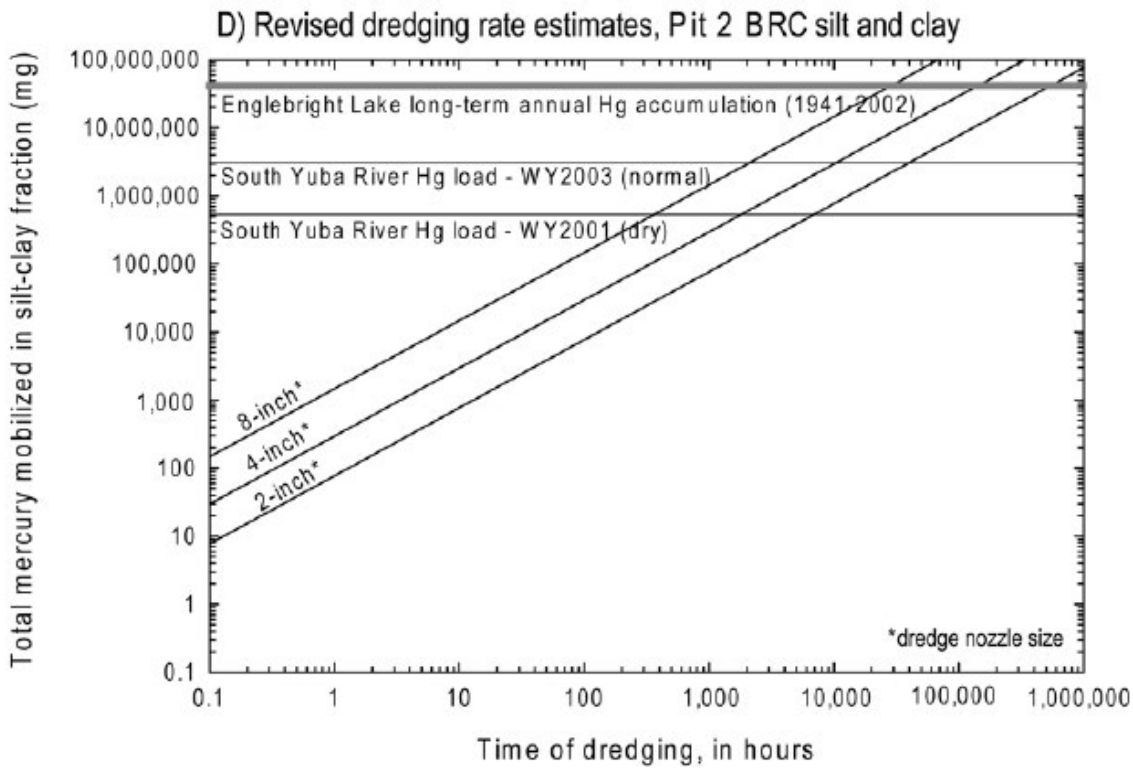


Figure 14. DSEIR Analysis of Dredge Hours Required

1,100 Hours or 2,800,000 hours – Who is Right?

To determine the accuracy of the DSEIR conclusions I used the same source data but accurately computed the amount of THg produced by a dredge as shown in the earlier section on mercury remobilization. Using the results and rates for the 4" dredge and the actual capture rates you get substantially different results.

The graph above shows approximately 1,100 hours of dredging would be required to produce the entire annual natural loading (in mg) of the S. Yuba Rivershed. This is ridiculous. A more accurate calculation, accounting for the fact that 95% of time is spent in accessing the compacted layers yields a total number of dredge hours of 2.8 million hours. The DSEIR does not account for the cumulative nature of hours spent dredging to reach the concentrated layers, it simply assumes that all output is less than .063mm. It appears the authors of the DSEIR did no independent quantitative analysis of the numbers but merely transcribed them from Fleck – and selectively transcribed the numbers that bolstered the position that dredging was harmful while ignoring the actual results.

A comparison of the two calculations is provided in Figure 15 below.

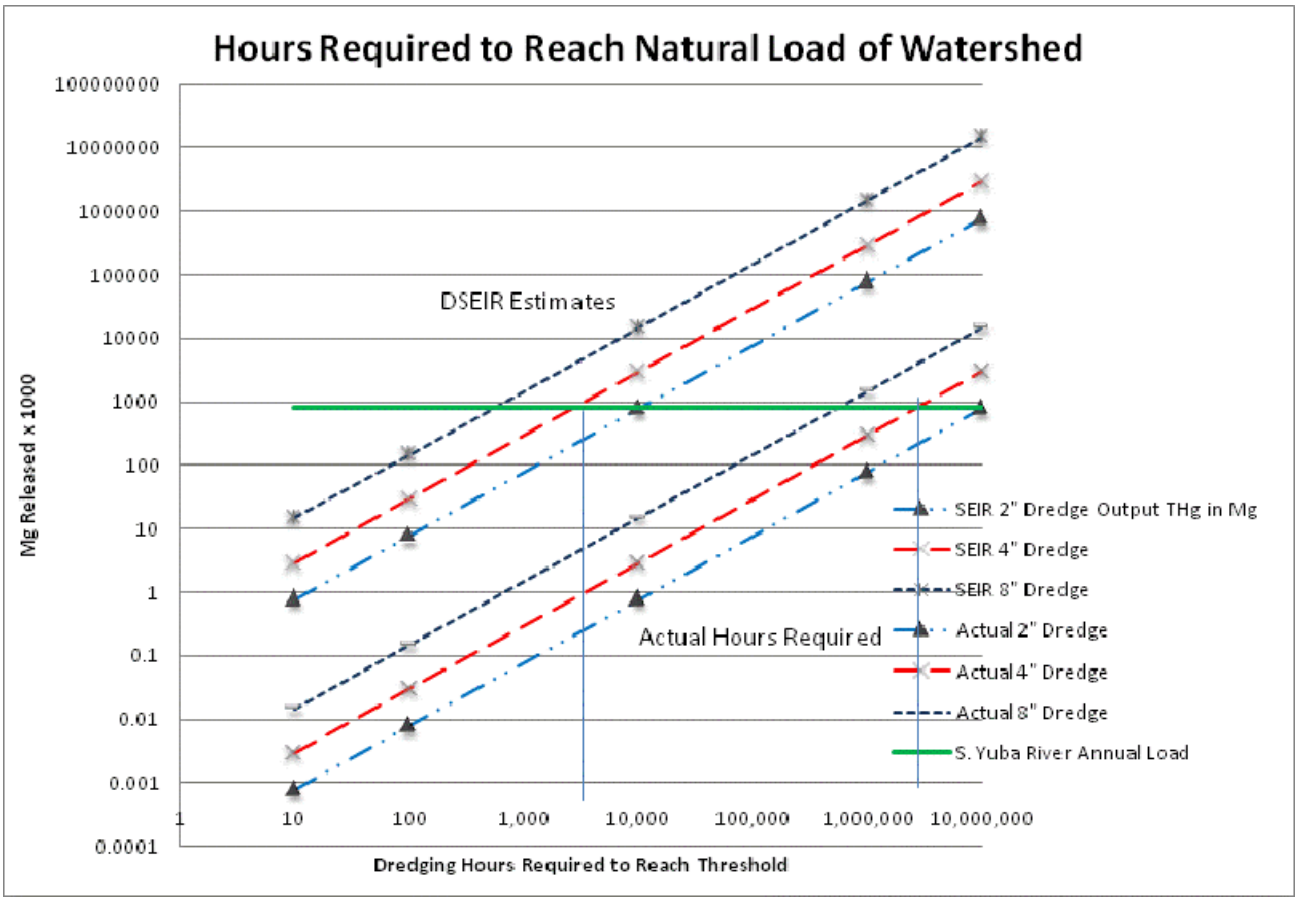


Figure 15. DSEIR Conclusions versus Actual Dredge Rates

Dredge Discharges as Reported By the DSEIR

The complete lack of analysis based on the variables of dredging is notably absent in the studies and the DSEIR. Again it appears the analysis was set up to deliberately show the harm from a dredge. To prove this point I will use the exact same numbers with the analysis shown above relative to dredge rates and material moved to demonstrate how far off the DSEIR numbers really are.

DSEIR, Figure 4.2-7 is shown below. This figure is important as it begins the discussion of how many dredgers would be required to produce the natural load for the watershed. Only using the figures for the 4" dredge we will use the same numbers to reach an alternate, but fact based conclusion.

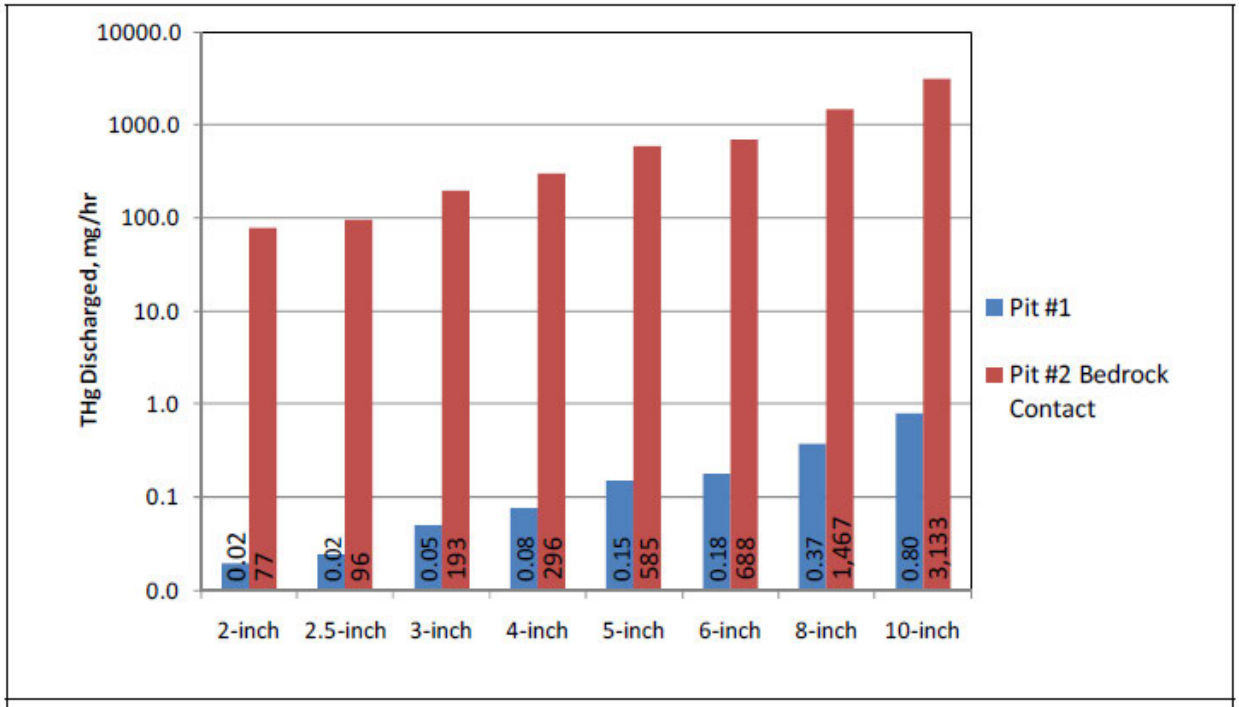


FIGURE 4.2-7. MERCURY DISCHARGE RATE FROM SUCTION DREDGING FOR DIFFERENT SUCTION DREDGE NOZZLE SIZES AND LOCATIONS WITHIN THE SOUTH YUBA RIVER

Figure 16. Chart from DSEIR estimating THg Discharge by Dredgers

To analyze the validity of this chart you must determine how it was built. Table 10c from the Fleck report was used to extract the cubic meters per hour and the sediment in kg/hr that a 4" dredge could move, then the DSEIR graphed the THg in mg/hr based on Table 10c based on a TSS Hg level provided by the flawed re-circulating tank experiment. The authors of the DSEIR did no independent analysis of the either the source or validity of the data, they merely transcribed it, and then performed calculations that supported their desired end state.

The DSEIR chart uses the concentrated sample mercury level as the output from the dredge and assumes that the entire time spent dredging is in this concentrated level. Both assumptions are wildly off the mark and distort the true output by orders of magnitude.

Table 10c gives the theoretical maximum amount of mercury that could have been moved assuming that a dredge is operating in only material less than .063mm. This is impossible as proved earlier. It took 19 hours of dredging time to reach the bedrock layer. To refute the chart in Figure 16 as provided in the DSEIR you simply need to look at the breakdown of the Bedrock Layer component of Pit #2 and derive time requirements based on the type of material moved. We can easily estimate the total time required to move the component of the layer in the .063mm range:

Bedrock Contact Layer	762 total kg			
Particle Distribution	Layer Distribution in kg	Dredge Rate in kg/hr	Time Rqd to dredge mtl in hours	Time Rqd to dredge mtl in minutes
>6.3mm	52	112	0.46429	27.86
1.0-6.3mm	33	128	0.25781	15.47
.25-1.0mm	16	266	0.06015	3.61
.063-25mm	3	290	0.01034	0.62
<.063mm	3	290	0.01034	0.62
Totals	107		0.80294	48.18

Table 13. Detailed Breakdown of Time Required to Move Material in the Bedrock Contact Layer

While the chart in ***the DSEIR estimates that a single dredger would produce 296 mg/hr*** of mercury you can see from the above that ***only 1.2 minutes were spent*** (after 16 hours of dredging) to move this material. It's an impossible and meaningless calculation provided by the DSEIR the equivalent of theoretically asking how long it would take for a dredge to travel to the moon. It can't happen. Under physical constraints of time required to move material to reach the bedrock layer and the amount of material moved it is impossible to ever achieve the rates provided in the DSEIR. Using Table 4.2-4 of the DSEIR we will examine the human health aspects of this event.

Comparison of SEIR Hg Released and Actual Hg Released Accounting for Material Moved						
11106 mg/L TSS mg/L		ug/kg ug/L Pit #2 BC	Time Spent in particles <.063	Released in ug/L	Dredge Efficiency 98%	Particles in tailings <.063mm
1		0.0111	0.01	0.00011	0.00011	0.00000
3		0.0333	0.01	0.00033	0.00033	0.00001
5		0.0555	0.01	0.00056	0.00054	0.00001
10		0.1111	0.01	0.00111	0.00109	0.00002
50		0.5553	0.01	0.00555	0.00544	0.00011
100		1.1106	0.01	0.01111	0.01088	0.00022
200		2.2212	0.01	0.02221	0.02177	0.00044
340		**3.7760**	**0.01**	**0.04098**	**0.04016**	**0.00082**
Human Health Criterion is .05 ug/L						

Table 14. Evaluation of Table 4.2-4 from DSEIR

The first 2 columns of Table 14 exactly match the table used in the DSEIR to show the ug/L rate of release from a suction dredge in Pit #2 (I used their assumption of 296mg/hr). However, as noted above the DSEIR assumes that all the time was moving particles less than .063mm AND assumes that all particles moved become suspended at the TSS suspension rate (false and poor assumption). As exhaustively shown in the previous section the time required to move the material that is less than .063mm is proven to be .01 hours. To derive a realistic number we have to account for only the fraction of time spent moving that material. To assume the entire dredging time is spent in particles less than

.063mm is complete fantasy – a dredgers fantasy for certain. Multiplying the numbers provided in the DSEIR by the fraction of time spent moving them provides an entirely different picture of THg mobilized per hour – several orders of magnitude lower and well below the human health criterion.

The DSEIR is deceptive in relating Table 4.2-4 to the California Human Health Criterion. The actual criterion is provided below in Figure 17. The DSEIR fails to mention that the measurement is a 30 day average. Even if you accept the DSEIR data you are still below the health criterion – even if you were dredging solid for 8 hours straight in material less than .063mm you would still average out well below the criterion. This is completely misleading and the selective use of the information does not meet the requirements under CEQA to provide all the facts.

California Toxics Rule (U.S. EPA)	Inland Surface Waters	Human Health (30-day average)	Drinking Water Sources (consumption of water and organisms)	0.05	
			Other Waters (aquatic organism consumption only)	0.051	

Figure 17. California Criteria for Mercury in Waters – Human Health Criterion

The DSEIR is wrong by several orders of magnitude and the presentation of the data shows a bias in the outcome as well as a lack of understanding of the cumulative nature of time required to reach the layer under study. It is impossible to achieve the numbers presented in the DSEIR. The actual numbers show no realistic number of dredgers could possible equal the load. Table 15 provides the calculations for the graph in Figure 15.

Hours Dredging to Mg of Hg Produced to Reach Natural Load						
				Time in hours		
Hours Spent Dredging	**0**	**10**	**100**	**10,000**	**1,000,000**	**10,000,000**
SEIR 2" Dredge Output THg in Mg	0	770	7,700	**770,000**	77,000,000	770,000,000
SEIR 4" Dredge Output THg in Mg	0	2,960	29,600	2,960,000	296,000,000	2,960,000,000
SEIR 8" Dredge Output THg in Mg	0	14,670	146,700	14,670,000	1,467,000,000	14,670,000,000
Actual 2"Dredge Output THg in Mg	0	0.77	7.70	770.00	77,000.00	**770,000.00**
Actual 4" Dredge Output THg in Mg	0	2.96	29.60	2,960.00	296,000.00	2,960,000.00
Actual 8" Dredge Output THg in Mg	0	14.67	146.70	14,670.00	1,467,000.00	14,670,000.00
S. Yuba River Natural Load THg in Mg	800,000	800,000	800,000	800,000	800,000	800,000

Table 15. Hours Required to Reach Natural Hg Load, S. Yuba River

SUMMARY

The preceding sections dispute the conclusions in the DSEIR and specifically dispute the finding of "Significant and Unavoidable." As shown from an accurate look at the data there are no feasible number of dredgers that could possible contribute sufficient mercury to exceed the natural load. Secondly, there is no situation in which a suction dredge will exceed the hazardous waste criteria set by

the state. It is impossible to achieve the rates the conclusions are based on in the DSEIR and the selective use and exclusion of data discredits both the source experiments and the resulting analysis.

Finally, the effectiveness of a dredge in capturing mercury- both floured and not floured is not discussed. A 98% capture rate must be applied to all discussions relative to the mercury mobilized by a suction dredge.

FLAWS IN THE ANALYSIS

- To reach the compacted layer requires a cumulative consideration of dredging time, you can't reach that layer without the effort to move the overburden – you must account for the time to reach the layer

- The analysis does not account for any type of dredge efficiency rate which according to Humphreys [a government scientist] the dredge Hg capture rate is 98%.

- You can't assume the particles less than .063mm from Pit #2 would have been equal to that collected through a dredge – the sifting process shown in Figure 18 [Fleck] would have resulted in the flouring of mercury that would probably have exceeded any flouring during dredging. The manual sorting and sifting itself would have floured the mercury to a greater extent than a dredge would have.

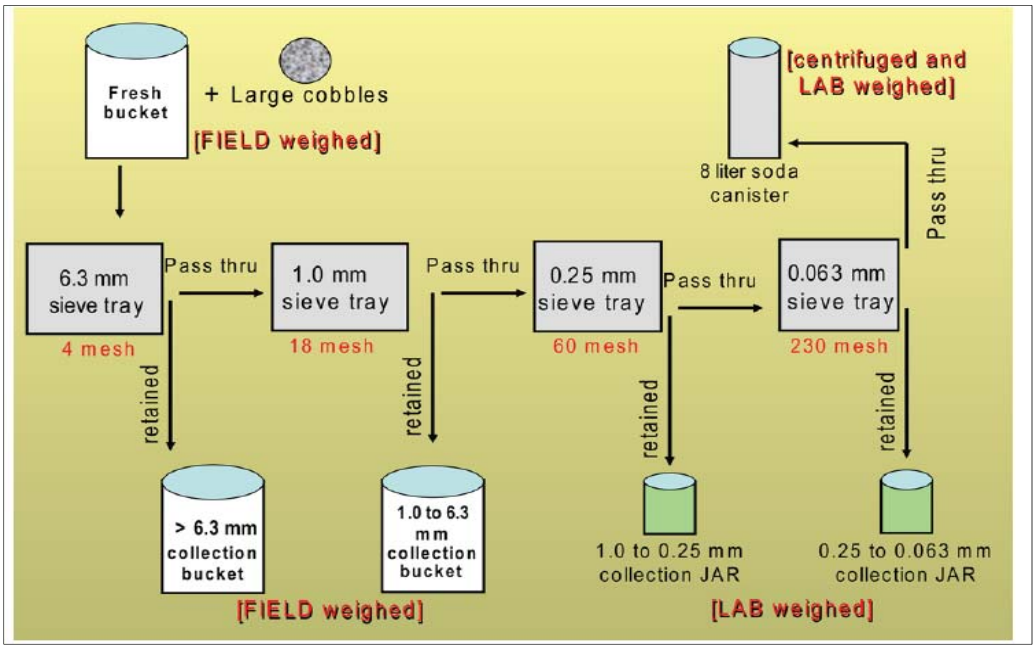


Figure 18. Sifting Process of Material Used to Classify Particles

CONCLUSIONS

The DSEIR conclusion states **1,100** dredging hours (4" dredge) would produce the entire natural load in the S. Yuba River. The actual hours (4" dredge) required would be **2,280,752** using the source data for the DSEIR.

Both of the above hours assume every dredger in the state is mining at the confluence of Humbug Creek and the Yuba River, an impossible dredge density, the comparison of current dredgers to effort required would be:

Dredgers Required to Reach Natural Load of the S. Yuba River					
	# Permits	Avg Days	Avg Hours/Day	Hrs per dredger	Total Hrs dredged in State
Statewide	3650	30	5.25	157.5	574,875
Hours Required to Reach Natural Load of S. Yuba River Watershed					**2,282,751.69**
Dredgers Required (permits) to reach natural load of S. Yuba River Watershed					**14,493.66**

Table 16. Dredgers Required to Reach Natural Load of the S. Yuba River Watershed

If we had 14,490 dredgers all dredging at the confluence of Humbug Creek and the S. Yuba River and all in material equal to test pit #2 we could produce the natural load of the Yuba River.

The Humphreys test shows that even the floured mercury is discharged with the sediment – it is not re-suspended as the DSEIR states and confirmed by Fleck in the dredge test. In the Humphreys test, and confirmed by the Fleck test - 98% of mercury was captured by the dredge and 2% was found in the sediment in the tailings of the dredge. It is extraordinarily unlikely and probably an immeasurable amount that is being converted to MeHg.

Methylized Mercury (MeHg) Analysis

The DSEIR attempts to provide a linkage between MeHg and suction dredging activities. The data and results do not support the DSEIR's conclusions.

The Fleck study [Fleck 2010] page 36 states ***"Dredging appeared to have no major effect on pMeHg concentrations in the South Yuba River during the dredge operations...Concentraions of fMeHg were all below the method detection limit (MDL) of .040 ng/L except for one sample..."***

Page 4.2-46 discussion of MeHg. Lines 28-30 "...*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..."*. This finding would be consistent with my calculations but it is not consistent with their assumptions of increased MeHg loading into both biota and the delta load. This is in light of the results from the 3" dredge test which showed a reduction in Hg(II)r from source material to tailings.

The above example indicates MeHg effects are non-existent from dredging. Additionally, the DSEIR allows for no evaporation of the mercury enroute to the Delta, while the California Water Quality Board found that up to 50% of MeHg is lost in transport due to evaporation:

*"Preliminary photodegradation study results for the Sacramento River near Rio Vista (Byington et al., 2005) **suggest that methylmercury loss from photodegradation may account for more than 50% of the unknown loss rate** illustrated in Figure 1." [California Environmental Protection Agency, Sacramento – San Joaquin Delta Estuary TMDL for Methylmercury Staff Report Draft , February 2008].*

Even if a suction dredge somehow contributed to MeHg in the river the analysis must include the photdegradation of the MeHg. The analysis does not account for this.

Effects of Dredging on Biota and Natural Rates of Hg

Finally we reach the crucial question in regards to the DSEIR and the proposed program – is dredging deleterious to fish? We have shown that the mercury mobilization rates from dredges, as measured in the output from the dredge sluice box are orders of magnitude less than the DSEIR claims. Actual field measurements of an operating dredge [Fleck and Humphreys] confirm that the release of Hg, Hg(II)r and MeHg are insignificant. We have additionally shown that the releases from a suction dredge are always below the established rates for Hazardous wastes. So the question becomes the cumulative effect of dredgers on wildlife.

An accurate measure of this impact is the sampling of biota as conducted during the Fleck study, unfortunately such a study in the field has so many variables it becomes impossible to determine the proximate cause, but it is fairly easy to demonstrate that the river itself contributes far more mercury than all of the dredgers could possibly contribute.

The MeHg study and analysis in the DSEIR, while likely accurately measuring the MeHg in tissue of various insects are incorrect in a number of ways.

We'll start with fish.

Page 4.2-47 reports that Rainbow Trout measured Hg levels were .17ppm versus the national average of .11ppm, however the DSEIR report is misleading as the averages provided by the US EPA provide wide bands of averages. To select only the lowest amount is deceptive and tends to skew the readers opinion of the issue. After 40 years of dredging it appears the real impacts on fish species are quite low. If the effects on re-suspension were as drastic as the report claims we would expect to see much higher levels.

Table 2-1
Range of Average Mercury Concentrations (ppm) for Major Fish Species in the U.S. in 36 States and DC, 1990-1995

Carp	0.061 -0.250	White sucker	0.042 - 0.456
Channel catfish	0.010 - 0.890	Largemouth bass	0.101 - 1.369
Smallmouth bass	0.094 - 0.766	Walleye	0.040 - 1.383
Brown trout	0.037 - 0.418	Northern pike	0.084 - 0.531

Figure 19. US EPA Ranges of Average Mercury Concentration

For perspective we need to understand that in rivers where gold dredging is taking place the measured MeHg levels are almost without exception within the ranges of measured levels across the United States as provided by the US EPA table in Figure 19. It's important to note that the single biggest contributor of MeHg to the environment is power plants (approximately 70%). The prevailing winds and rain patterns deposit the MeHg in the Sierras. There is no verifiable link to dredging in the DSEIR table.

The above table is compared to the DSEIR provided table:

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

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

Figure 20. Table 4.2-3 from the DSEIR for Mercury Concentrations

As mg/kg is the same as ppm no conversion is necessary. Comparing only largemouth bass you can see that they are within the ranges for the U.S. including areas where gold mining is not taking place. Table 4.2-3 may be interesting, but it is deceptive to use this table as a premise that gold mining is causing these levels of MeHg. The table also provides only the "highest mean concentration."

The DSEIR references the Fleck analysis of larval MeHg levels during 2007 and 2008. The statement on differences in MeHg levels is based on no differences between the water years except for dredging being banned in 2008. Let's take a closer look at this conclusion and test the validity of a two variable hypothesis where the two variables are suction dredges and flood events – can we only look at these two variables and determine a conclusion? Let's see.

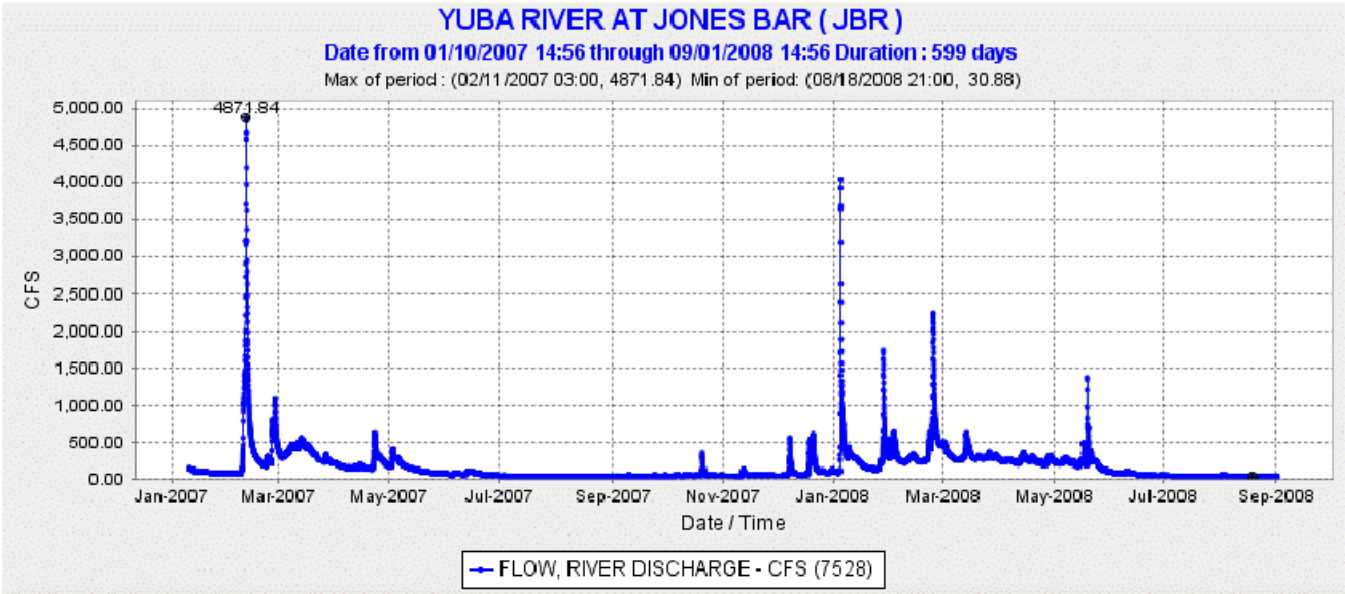


Figure 21. Water Years 2007 and 2008 at Jones Bar Measuring Station

When conducting a study it seems somewhat unscientific to simply say qualitatively that the two water years were the same. The above chart shows the water years were not the same. Water year 2007 had a spring flood event that was 20% higher than the spring flood event in 2008, surprisingly almost the same difference as measured in MeHg.

Differences are summarized in Table 17.

Measurements from 2007 to 2008 of MeHg in Biota					
	Average 2007	DEVSQ	Average 2008	DEVSQ	% Difference in MeHg yr to yr
Water Strider	148.6	18017.0	85.7	3919.0	0.42
Dragonfly	61.5	4219.0	30.3	886.0	0.51
Cadissfly	27.6	435.0	20.0	294.0	0.28
Stonefly	68.2	2179.0	48.9	2486.0	0.28
River Flood (cms)	4871		4000		0.18

Table 17. Decreases in MeHg from 2007 to 2008

The source data for Table 17 is provided in the Fleck Report. Fleck does not provide the detailed source data – only the average MeHg for a certain number of collected species. It is difficult to determine, lacking precise data if the differences are meaningful or if they are attributable to sampling locations or time of the year. The square of the deviations presents yet another problem – there is a high variability about the mean of the samples collected but there seems to be consistently higher variability in the 2007 data than the 2008 data. It's truly hard to make sense of this data and I would need to examine

the source data to make some type of conclusion. The only meaningful conclusion one can make of this data is there was a much higher variance in measured MeHg in 2007 than was found in 2008 and the differences, statistically, can't discount the effect of the spring flood.

The spring flood events as shown in Figure 21 provide yet another variable: the timing of the floods. While above we looked at differences in MeHg compared to the samples from year to year we can see the timing of the floods – which would discharge mercury are different. In 2007 the flood event occurred on 11 February while in 2008 the event occurred on 4 January. This is significant when you compare it to the timing of hatches in the Sierra Nevada. Overlaying the spring flood events with the hatches presents yet another variable not considered.

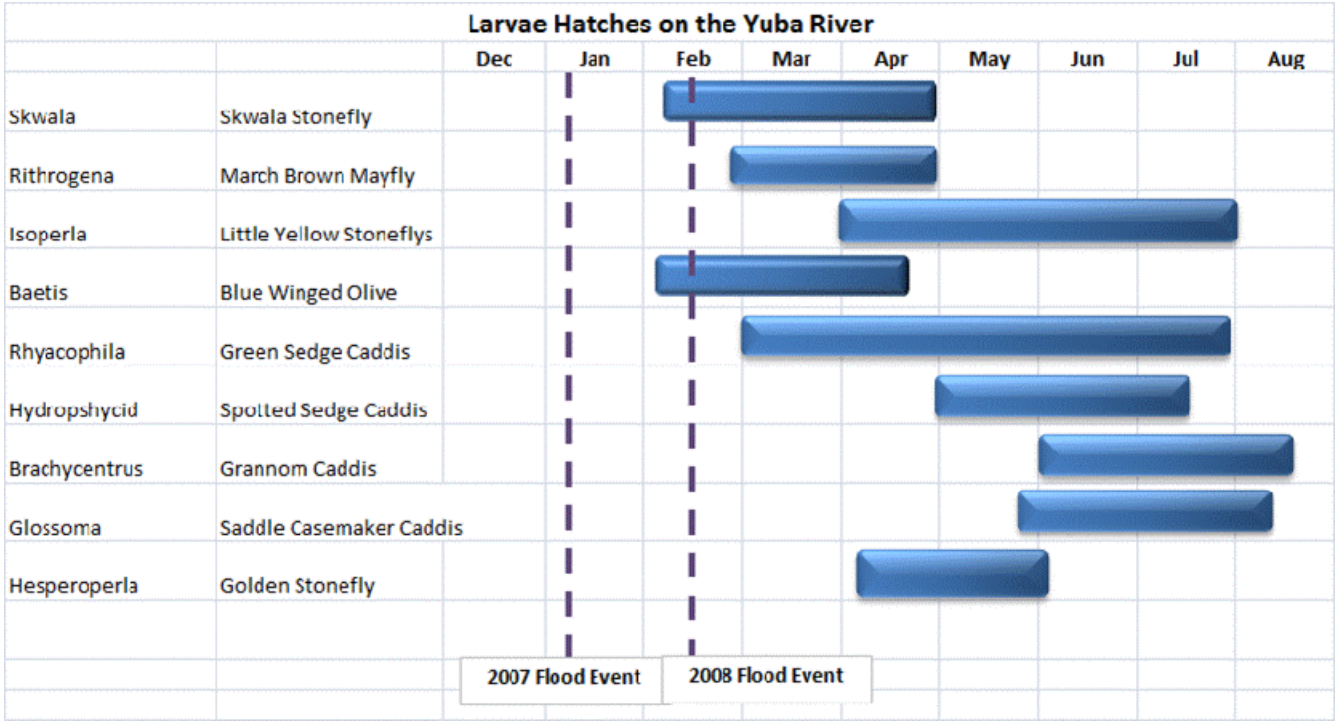


Figure 22. Spring Hatch Events

The timing of floods and the impact of MeHg on larvae needs to consider the timing of the hatches to make sense of the MeHg results. In this case the February flood occurred during a major hatch and just prior to the start of most hatches. The January flood would have had no impact on any hatches. Hatches are a difficult subject as they will be relative to elevation, but the point is the timing of the hatch is important in respect to flood events. Different sub-species will hatch at different times and the age difference of the larvae can show considerable variance. It's just too simple to compare year to year and conclude the only variable that changed was the presence of suction dredges.

Flood Event Contribution to Hg Loading

The impact of flood events is discounted in the DSEIR. During the Fleck study they measured the THg release from Humbug Creek and the South Yuba River so we can do analysis using that data. While the Fleck report labels the event a "storm event" from the chart below I think we can agree it was a flood event, especially in relation to the water data presented for 2007 and 2008.

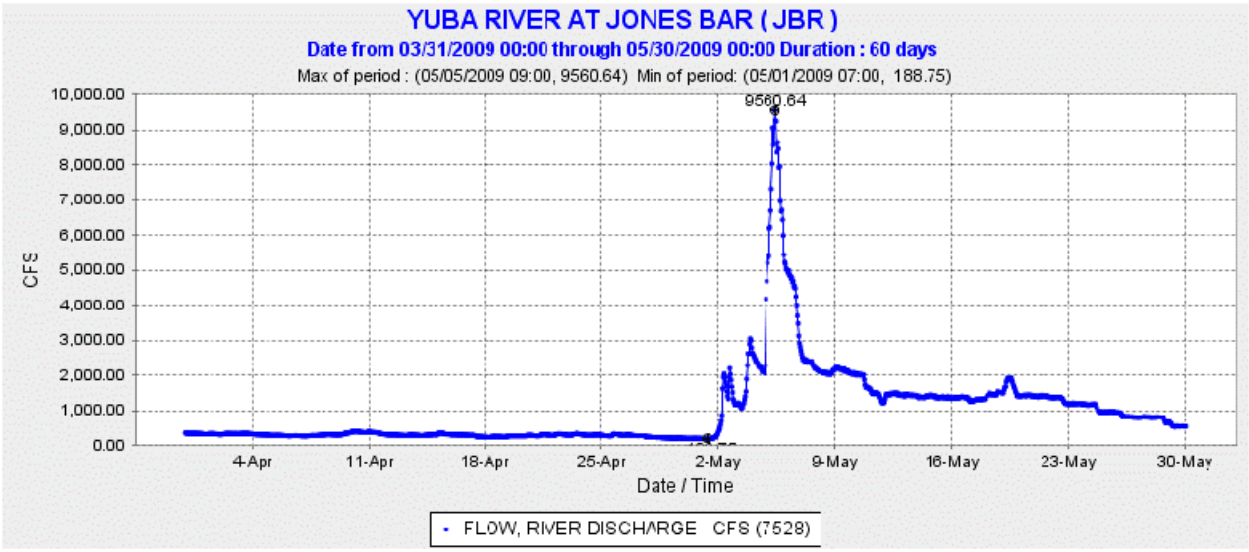


Figure 23. Graph of Flood Event for 5 May 2009

Interestingly 2009 was an active water year, in addition to the chart above the other flood events for that year are shown below.

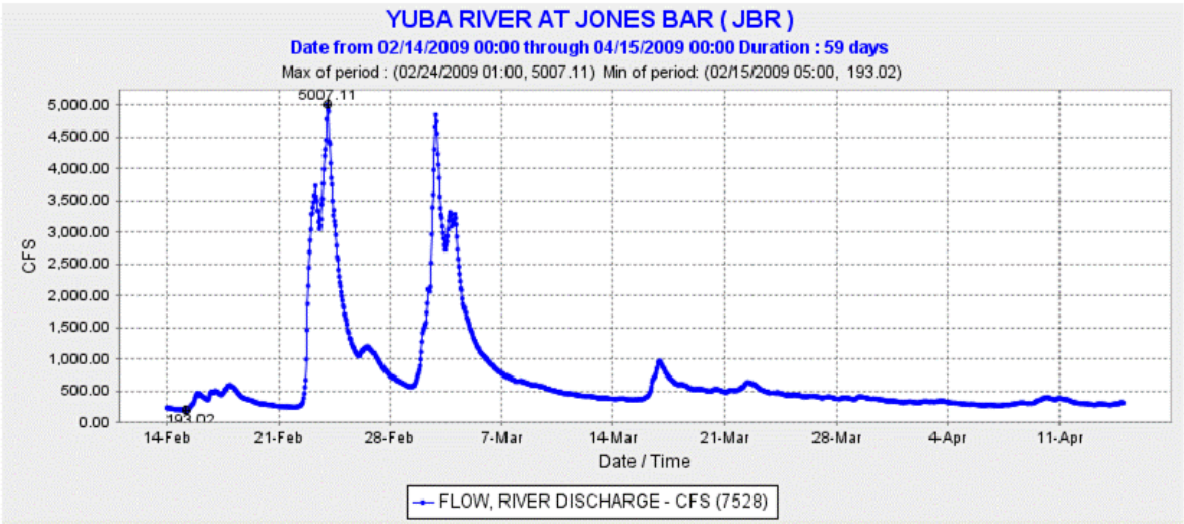


Figure 24. Flood Events for 2009

The size and timing of the floods in 2009 appear to coincide with the hatches. I would speculate that 2009 measured MeHg levels will be higher than 2007 and the variance amongst collected specimens will be tighter.

There are no water measurements for volume of flow for Humbug Creek but the Fleck study collected point samples (unknown how many, time of day, flow rate at the specific point or flow rate of Humbug Creek). However, given all these variables that weren't collected it's still of value that they collected Hg samples from the river at flood stage. To estimate Humbug Creek I used 500cfs – about 5% of the flow of the S. Yuba River during the flood event – likely this is low.

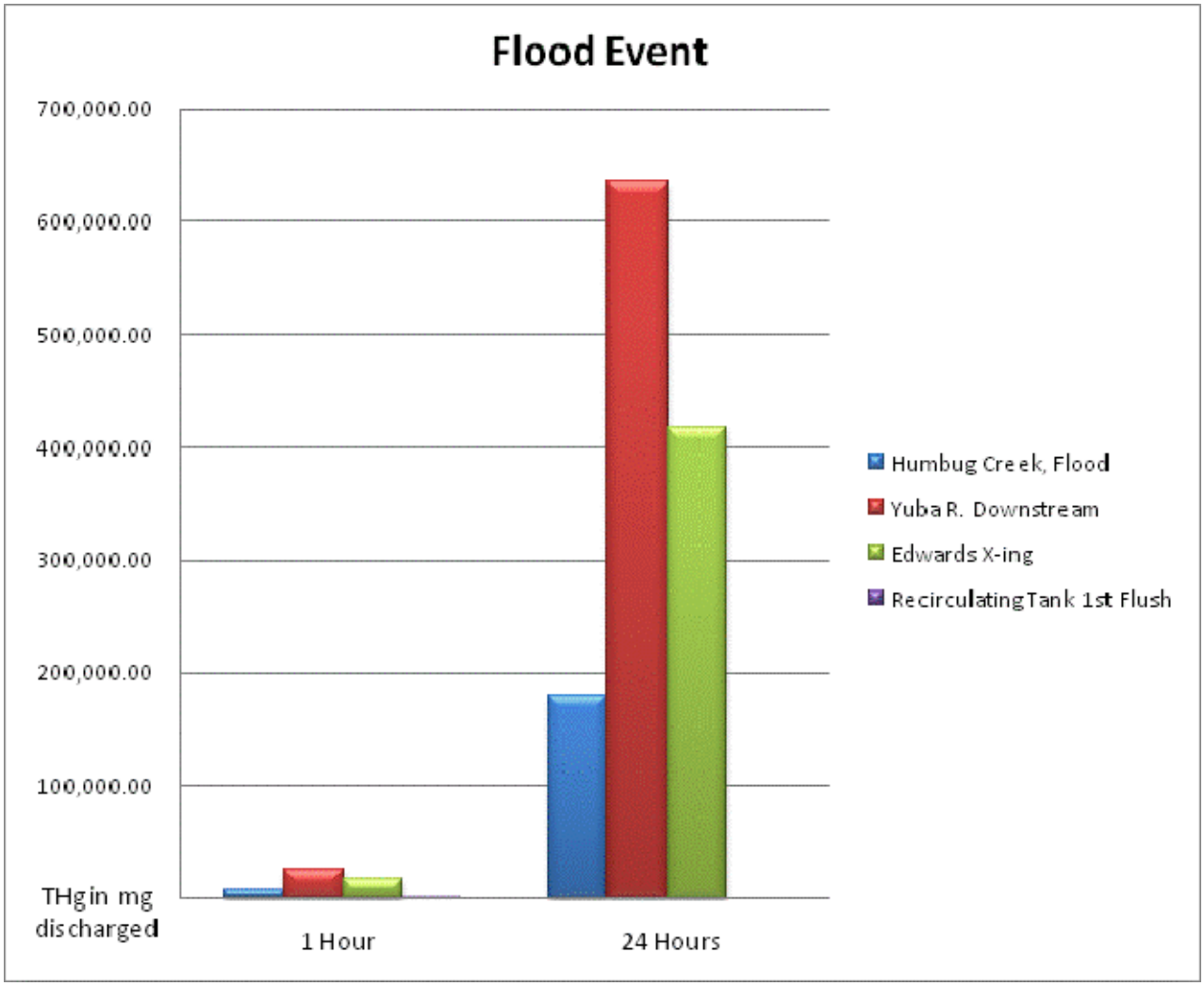


Figure 25. May 5th Flood Event

Conspicuously absent from the DSEIR is any analysis of the flood event reported by Fleck. Samples were collected of the 5 May 2009 event and analyzed for mercury content. The peak of the flood was near 0800 on 5 May. Given travel time to the site it is likely that samples were taken after 1200,

approximately 1,000 cfs below the peak. It is commendable that they took these samples. The resulting analysis in comparison to the dredge output, and the output from the recirculating tank experiment is shown in Figure 25 above.

The estimation of the recirculating tank experiment is provided above assuming the flow output of the dredge over one hour with the contamination levels measured in the tank. The output from the tank is a mere fraction of what is output naturally. As mentioned earlier to output that amount of material from the <.063 material would require an exponential increase in time required. It's impossible to do but is provided as a comparison to the natural event. The summary calculations used in the graph are provided in Table 18.

	1 Hour Event in mg/hr	24 Hour Event in mg/hr
Humbug Creek Storm Event	7566	181585
Yuba River, downstream, Flood	26488	635701
Edwards Crossing	17373	416964
Recirculating Tank first Flush	85	NA

Table 18. Hg Produced through Natural Storm Event on 5 May 2009

The full calculations are provided in Table 19.

STORM EVENT CALCULATIONS								
	TSS mg/l	TSS g/l	liters to make 1 gram	THg ng/g	THg ng/l	Peak Flow m3/s	Peak Flow liters/second	THg ng/l second
Humbug Creek Storm Event	135	0.13500	7.41	556	75.06	28.0	28,000	2,101,680.00
Yuba River, downstream, Flood	75	0.07500	13.33	362	27.15	271	271,000	7,357,650.00
Edwards Crossing	42	0.04200	23.81	424	17.81	271	271,000	4,825,968.00
Recirculating Tank first Flush	95	0.09500	10.53	407	38.67	0.608	608	23,508.32
Note 1: TSS and THg measurements are provided by Fleck								
Note 2: Added the values collected for less than .063 and .0003 to .063mm from source data for total								
Note 3: Maximum material possible to move by dredge is 8 cubic yards (6.08 cubic meters) which represents 10% of volume								
Note 4: To achieve water volume of dredge multiplied 6.08 cubic meters /								
Note 5: Peak flow measured at JBR for 5 May was 9580 cfs which equals 271.27 cubic meters								

Table 19. Storm Event Calculations

As opposed to the conclusions reached in the DSEIR – a single storm event indicates that one flood can produce the entire natural watershed load for the year. Again, this isn't mentioned, I would think it would be relevant. The only conclusion you can reach from this data is our time would be better spent limiting the number of storm events to one every 1.5 years than we would limiting the number of dredgers to 4,000.

Finally, the DSEIR makes the unsubstantiated claim that on page 4.2-52, lines 8-10, ***"Suction dredging operators may target deep sediments [i.e. those too deep to be available to scour under winter flows], and thus mobilize sediment that may not be mobilized by typical winter high flow events."***

This statement is not substantiated anywhere in the literature and disregards the "storm" event of May 5th that showed the single natural load of the watershed is produced in 24 hours. Secondly, the DSEIR disregards the Humphrey finding that mercury actually moves during low flow events***. "Post dredge test inspections show that during low flow periods (200cfs) sediment does not travel over the bedrock hump. But post dredge test inspections also showed that mercury had re-deposited on the bedrock that had been dredged clean." [Humphreys 2005].***

Anyone who has ever played with mercury as a kid knows that mercury, as a liquid metal and being nearly as dense as gold, will travel by gravity and will fragment and recollect. It is completely false to believe that mercury is not constantly reacting to the forces of gravity in a stream, regardless of flow events. Mercury moves during all stages of the river. Dredges remove this mercury prior to its remobilization.

RECOMMMENDATIONS:

Eliminate the mercury studies and analysis from the final DSEIR based on limited data and analysis of an exceptionally complex topic requiring considerable additional study that incorporates a much higher variable consideration.

Evaluate the ability of a "flare jet" dredge to recover mercury – it is likely higher than the 98% reported by Humphrey's as a flare jet reduces the flow of water into the header box which should result in less flouring.

The proposed program limitation of permits to 4,000 is not based on evidence, scientific studies or facts. All data and analysis shows no reasonable number of dredgers could approach natural loading of the rivers – continue with the current (1994) program with no limits on permits or nozzle sizes.

There is no basis to limit either the nozzle size or the number of permits based on mercury analysis.

Future studies should structure their experiments more carefully and the analysis of the data should be accomplished without bias.

LIST OF REFERENCES

1. Humphreys et al, 2005 "Mercury Losses and Recovery during a suction dredge test in the South Fork of the American River."

2. Fleck, et al, 2010, USGS Report 2010-1325A, "The effects of sediment and mercury mobilization in the South Yuba River and Humbug Creek Confluence Area, Nevada County California."

3. Mercury Report, August 2002, California Department of Toxic Substance Control

4. Silva, Michael, Placer Gold Recovery Methods, Special Publication 87, California Department of Conservation, Division of Mines and Geology, 1986

5. California Environmental Protection Agency, Sacramento – San Joaquin Delta Estuary TMDL for Methylmercury, Staff Report Draft, February 2008

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Response to Comments 1
The Department disagrees with the assertion that the significance conclusions in the DSEIR are incorrect. Please see the responses to the individual comments provided below.

Response to Comment 2
This comment does not provide reasoning or evidence to substantiate its conclusions. As such, the Department continues to stand behind the conclusions presented in the DSEIR relative to this topic.

Response to Comment 3
See MR-WQ-1 and MR-WQ-10.

Response to Comment 4
See MR-WQ-15.

Response to Comment 5
Regardless of the methods that Humphreys used to calculate sediment mercury concentration, the assessment of total recoverable mercury was based on more than just results from Humphreys (2005), and thus this comment does not substantially alter the assessment or its conclusions.

Response to Comment 6
It is not clear to which measurements from Fleck et al. 2011 the comment is referring. See also MR-WQ-12.

Response to Comment 7
See MR-WQ-1 and MR-WQ-10.

Response to Comment 8
The DSEIR concluded that the Program would not cause substantial, or likely even measurable, increased risk to human health through consumption of mercury in drinking water supplies. Therefore, regardless of averaging period, this comment does not substantially alter the assessment or its conclusions.

Response to Comment 9
See MR-WQ-1 and MR-WQ-10.

Response to Comment 10
See MR-WQ-15.

Response to Comment 11
See MR-WQ-13.

Response to Comment 12
See MR-WQ-12.

Response to Comment 13
See MR-WQ-7.

Response to Comment 14
See MR-WQ-17.

Response to Comment 15
The Department disagrees with the assertions in this comment. The best available science was used to evaluate the potential impacts related to mercury from suction dredging. For more detail, please see the responses provided above. Also, note that at the request of SWRCB, the water quality analysis in the DSEIR was peer reviewed by five individuals knowledgeable in the subject matter, including several university professors. These peer reviews, and related responses, are provided in Section 3.5 below.

Response to Comment 16
See MR-WQ-12, -13, and -17.

Response to Comment 17
See MR-WQ-5 and MR-WQ-11. Also, the degree to which sediment high in mercury is overlain by overburden will vary from site to site. At other sites, overburden may only be a fraction of what was found at Pit #2. Finally, the assessment does not assume that all material being moved is ≤ 63 µm particles. The percentage of the bulk sediment samples in Fleck et al. 2011 that were ≤ 63 µm was applied to the bulk sediment movement rates used in the analysis. The assessment does assume that only ≤ 63 µm are transported to areas downstream favorable to methylation (i.e., Lake Englebright and the Delta), based on data from Curtis 2005.

Response to Comment 18
See MR-WQ-1 and MR-WQ-10.

Response to Comment 19
See Response to Comments 17 and 18, above.

Response to Comment 20
See Responses to Comments 17, and 18, above. See also MR-WQ-13. No values of TSS were utilized in the loading analysis.

Response to Comment 21
The comment makes several misinterpretations of the DSEIR analysis and calculates alternative values based on different assumptions. See also Response to Comment 16, above. This comment does not substantially alter the assessment or its conclusions.

Response to Comment 22
The DSEIR concluded that the Program would not cause substantial, or likely even measurable, increased risk to human health through consumption of mercury in drinking water supplies. Therefore, regardless of averaging period, this comment does not substantially alter the assessment or its conclusions.

Response to Comment 23
See Responses to Comments 17 through 21, above, and MR-WQ-15.

Response to Comment 24
See MR-WQ-17. Additionally, the comment misinterprets the citation; it is not the case that 50% of methylmercury is lost as a result of evaporation. The citation refers to "50% of the unknown loss rate" of the methylmercury balance of the Delta. Regardless, effects of suction dredging on eventual body burdens of methylmercury in fish downstream are not strictly dependent on the quantity or mechanisms of methylmercury loss pathways; thus, this comment does not substantially alter the assessment or its conclusions.

Response to Comment 25
See MR-WQ-6.

Response to Comment 26
See MR-WQ-2.

Response to Comment 27
See Response to Comment 6 under 030611_(b) (6)

Response to Comment 28
The author has performed independent calculations on the amount of mercury mobilized in a storm event in which Fleck et al. 2011 took measurements in the South Yuba River and Humbug Creek. Based on the methodology of those independent calculations, the comment makes numerous assumptions, including that single values of TSS can be extrapolated to the entire event and that the peak flow extends throughout the course of the entire event. Finally, it is impossible for a single storm to mobilize the entire watershed load of mercury in 1 year, since the watershed load of mercury includes said storm in its calculation. Thus, this comment does not provide evidence that would alter the DSEIR assessment or its conclusions.

Response to Comment 29
This comment does not provide any evidence to show that the DSEIR is erroneous in this assertion.

Response to Comment 30
See Response to Comment 28, above.

Response to Comment 31
See MR-WQ-1 and MR-WQ-7.

Response to Comment 32
The Department does not believe that the suggestions in this comment warrant any changes to the analysis in the DSEIR. The DSEIR's analysis of the potential effects of suction dredging related to mercury was based on the best available science and uses a scientifically valid approach. Evaluation of a flare jet, as suggested, would be unlikely to alter the DSEIR conclusions, since it would not capture the smallest size fraction passing through the

dredge, and it cannot be assumed that flare jets would always be used. Please see Section 3.4, "Section 228(g): Permit Cap and Section 228(k)(1): Nozzle Size," for a discussion of why the Department believes the permit and nozzle size limits are appropriate.

We disagree with the Less Than Significant conclusion and would recommend that it be changed from Less than Significant to ***Beneficial.***

Dredge holes 3 feet or deeper are considered adequate refugia for fish. Excavating pools could substantially increase their depth and increase cool groundwater inflow. This could reduce pool temperature (Harvey and Lisle 1998). If pools were excavated to a depth greater than three feet, salmonid pool habitat could be improved. In addition, if excavated pools reduce pool temperatures, they could provide important coldwater habitats for salmonids living in streams with elevated temperatures (SNF, 2001).

- *Impact BIO-FISH-9:* ***Destabilization/Removal of Instream Habitat Elements (e.g., Coarse Woody Debris, Boulders, Riffles) (Less than Significant);***
- *Impact BIO-FISH-10:* ***Destabilization of the Stream bank (Less than Significant);***
- *Impact BIO-FISH-11:* ***Effects on Habitat and Flow Rates Through Dewatering, Damming or Diversions (Less than Signigicant)***.

We understand that the SEIR is using a 4-inch intake nozzle size limit to establish these "Less than Significant" conclusions. However, the published science does not support their projected nozzle size limitation. The small-scale suction dredge study in Fortymile River, Alaska was performed using 8- and 10-inch dredges. Prussian, et. al. (1999) concluded that, "suction dredge mining clearly reduces macroinvertebrate densities, diversity, BOM, and periphyton immediately below dredge activity regardless of the background conditions, though these effects are local and short lived."

The test results for the Chatanika River and Resurrection Creek, Alaska studies reflected the seasonal impacts from the use of small-scale suction dredges that had nozzle sizes ranging from 2- to 6-inches. The Chatanika River and Resurrection Creek sites, "represent the best examples of concentrated mining activity we could find and should be considered "*worst-case*" scenarios because both streams receive considerable mining activity and have relatively well-defined downstream boundaries. Together with the results of other studies, we suggest that the impacts by small-scale dredging activity are primarily contained within mined areas and persist for about one month after the mining season." This is clearly the definition of "Less than Significant".

Since harm to fish is no longer the issue, according to the findings in the SEIR, we will address the issues that were identified as "significant and unavoidable". They are:

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

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

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

If these subject areas were important enough to investigate, and expend public funds, they should be analyzed in the proper light that peer-reviewed scientific analytical standards demands. It is stated in the notice of availability that "The analysis found that significant environmental effects **could** occur as a result of the proposed program (and several of the program alternatives), specifically in the areas of water quality, and toxicology, noise, and cultural resources. *Although CDFG does not have the jurisdictional authority to mitigate impacts to these resources*, they were, nevertheless, identified as significant and unavoidable."

In Chapter 4.2, WATER QUALITY AND TOXICOLOGY of the DSEIR the first issue of significant and unavoidable impact is "Impact WQ-4. **Effects of Mercury Resuspension and Discharge from Suction Dredging** (Significant and Unavoidable)".

You have provided no direct dredging evidence to support this! You state, "Few dredge studies are available regarding how small scale suction dredging specifically affects mercury. However two important, high quality studies present results indicating less than significant effects.

A cumulative study using an 8 and 10-inch dredge (actually operating in a flowing river) commissioned by the USEPA (1999) produced values of dissolved mercury that were actually 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. This is the most relevant piece of published scientific evidence, addressing dredging at intensity beyond that typically experienced in California, with real world interceptions of occasional mercury deposits. The draft fails entirely to explain how any other information undermines the conclusions of this study.

Humphrey (2005) demonstrated that at least 98% of the mercury was retained in the sluice box of the dredge. The fact remains that most suction dredgers do not find mercury hotspot's. Most dredgers report seeing only occasional drops of mercury or amalgamated gold…if any. The highly infrequent nature of mercury interceptions confirms the lack of significance.

Humphreys (2005) and Marvin-DiPasquale (2009) made an attempt to quantify effects of small scale suction dredging on mercury. Their work has added bits of information to the database of known mercury hotspots. However, their work added very little information to the known effects that suction dredges may have on mercury in the "normal" environment. Later attempts to quantify the effects of dredging on mercury (Fleck 2011) were unsuccessful even when:

- They skewed the results by intentionally establishing a study directed at the worst case, most contaminated, location in the State of California; and,
- Attempted, using data from a non-dredge study, to draw statewide conclusions "calculating" the movement of greater quantities of mercury from one 8-inch dredge than is moved in an entire year by natural flood conditions.

According to Fleck (2011), "*It is important to note that the results presented in this publication were not developed using a full-scale dredge operation*." As a matter of fact, other than for the 3 inch dredge portion of the study, no dredge was used!!! The procedure is categorically not a scientifically acceptable or environmentally realistic calculation of results to be scaled-up

quantitatively to reflect what would occur from the outflow of a "real" dredging operation. Fleck further hedged, "*The results of the test should be evaluated as valuable information regarding the proof of concept [of site remediation] rather than a quantitative evaluation of the effects of suction dredging on water and sediment in the South Yuba River*." (Fleck 2011).

The first significant failure of this project was not returning the funding to the California State agencies when it was determined USGS would not be allow the use of small-scale suction dredges in the river to perform the suction dredge study. Following that decision the main scope of the project was manipulated to provide pre-conceived answers to the questions the State agencies were seeking. These actions have the appearance that the only goal of forcing these data was to provide grounds for the State agencies to control the waters of California by closing areas or placing strict requirements in areas used by suction gold dredgers. All of this would be based on non-peer reviewed grey literature science like the Humphrey (2005) and Fleck (2011) studies. A legitimate scientifically designed study would have a hypothesis that would have been formulated to find the best information based on data, from actual small-scale suction dredge operations. Fleck (2011), makes it clear when he states, "*the scope of the study was modified to accommodate concerns by the State Water Resources Control Board and California Regional Water Quality Control Board, Central Valley Region*". These concerns could have been laid to rest simply by moving the test site to a more natural segment of the river system rather than staying in the chosen location of a site known to contain the greatest concentration of mercury in California

Fleck (2011, page 5) stated, "*The revised project scope replaced the planned full-scale suction-dredge test with study elements 2 and 3, which focused on a more complete assessment of sediment composition and Hg contamination and speciation as a function of grain size, as well as current and historical sources of contamination at the SYR-HC confluence site. The information generated in this study could have been valuable in determining the potential for Hg transport due to dredge activities through* ***simulation*** *(emphases added) calculations*."

Fleck (2011) further described his concern for human health stating that, "*Ultimately, the importance of the results of this study relate to whether the Hg in the sediment has a negative effect. Potential for a negative effect is closely related to the transport of sediment into the water column where it may become a threat to local users or be transported downstream*." Presenting these concerns does not make them true especially without adding a study element regarding the bioavailability of released mercury, in the presence of naturally occurring selenium, to cause harm. Therefore, we remain without an answer to the question of what negative effects may be generated from any of the sources of mercury contamination on exposed organisms. Once one has the knowledge that mercury and selenium interact antagonistically it is scientifically unacceptable to comment only on the mercury data without consideration of the selenium data that can demonstrate the total elimination of mercury toxicity

The Fleck (2011) study does further disservice to legitimate science by presenting information calculated on data not collected during the study. He stated, "*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*." Flow rates from a dredge are site specific and ***cannot*** be substituted for industry flow rates that are used to sell dredges. Knowing this

Fleck (2011} concludes "***These estimates are, like the previous analysis, dependent on numerous assumptions and estimates and thus possess a high degree of uncertainty***."

On the very same project, when a three inch dredge was used, the researchers found no significant level of mercury flowing out of the sluice box. Results of the three inch dredge study are listed below:

- Concentrations of particulate total mercury increased in a similar manner as total suspended solids, 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.
- Concentrations of filtered total mercury in the South Yuba River during the dredge test were similar to those in the field blanks (i.e., field control samples).
- Dredging appeared to have ***no major effect*** on particulate methylmercury concentrations in the South Yuba River during the dredge operations.

Results from this three inch dredge study are the closest data presented in this report that reflect the effects of an honest dredge study. However, these results are of insufficient quality or sample quantity to allow for a conclusion that particulate total mercury will float indefinitely down a waterway as Fleck's (2011) conclusion suggests. In fact, there are peer-reviewed journal articles that provide the necessary data to show this is not the case.

USEPA commissioned a study on the impact of suction dredging on water quality, benthic habitat, and biota in the Fortymile River, Resurrection Creek, and Chatanika River, Alaska (Royer, 1999). The results showed that although 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, both metals concentrations declined to near upstream values by 80 m downstream of the dredge.

It was suggested the pattern observed for total copper and zinc concentration is similar to that for turbidity and total filterable solids. The metals were in particulate form, or associated with other sediment particles. The results yielded a similar effect to what Fleck (2011) found regarding particulate total mercury in the South Yuba Humbug creek confluence. However, the Alaskan data provided a totally different outcome than Fleck leads us to believe resulted from his study that did not use a suction dredge to develop the data.

The Fortymile River suction dredge study, using 8 inch and 10 inch suction dredges, measured the distance the metals associated with the sediment particles moved in the water column before settling back to the bottom of the river. The sediment particles did not float indefinitely as Fleck leads us to believe. Zinc at 7.10 g/cm^3 and copper at 8.92 g/cm^3 have significantly lower densities than mercury at 13.55 g/cm^3. Zinc and copper average slightly more than half the weight of mercury. Yet those elements only floated 80 meters. The only reasonable inference, absent real data to the contrary, is that Hg, which has almost twice the weight of copper or zinc, would, as gravity dictates; sink to the river bottom in a shorter or, at least, no greater distance downstream.

What value is there to the public interest when a federal agency, such as USGS, forms the hypothesis of a worst case scenario regarding small-scale suction dredging based on a study performed without using a suction dredge? A project where no suction dredge measurements were taken will never be a substitute for honest factual data. No one should be allowed to force results from an ill conceived project on the citizens of California as scientific truth.

In the California Department of Fish and Game, February 28, 2011 proposed suction dredge regulations the definition of a suction dredge is as follows:

Suction dredging. For purposes of Section 228 and 228.5, the use of vacuum or suction dredge equipment (i.e. suction dredging) is defined as the use of a motorized suction system to vacuum material from the bottom of a river, stream or lake and to return all or some portion of that material to the same river, stream or lake for the extraction of minerals. A person is suction dredging as defined when all of the following components are operating together:

A) A vacuum hose operating through the venturi effect which vacuums sediment in the river, stream or lake; and,
B) A motorized pump; and,
C) A sluice box.

Below are photographs of the Fleck (2011) mercury hotspot "suction dredge" and the one hole from which the sample was collected. This single tub of water is what is being used in the SEIR to define mercury contamination from all suction dredges working the waters of California.

And for those unfamiliar with suction dredging the following photograph will reveal that the dredge floats on the water and is intended to vacuum the overburden from the river or creek bottom. The vacuumed material, (i.e., clay, sand, rocks,) pass through a sluice box that captures the heavy materials (i.e., gold, lead, platinum, mercury) while returning the other materials back to the receiving water.

It states in the SEIR that "The effects of Hg contamination from historic mining 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.*" The statement is followed by the following diagram.

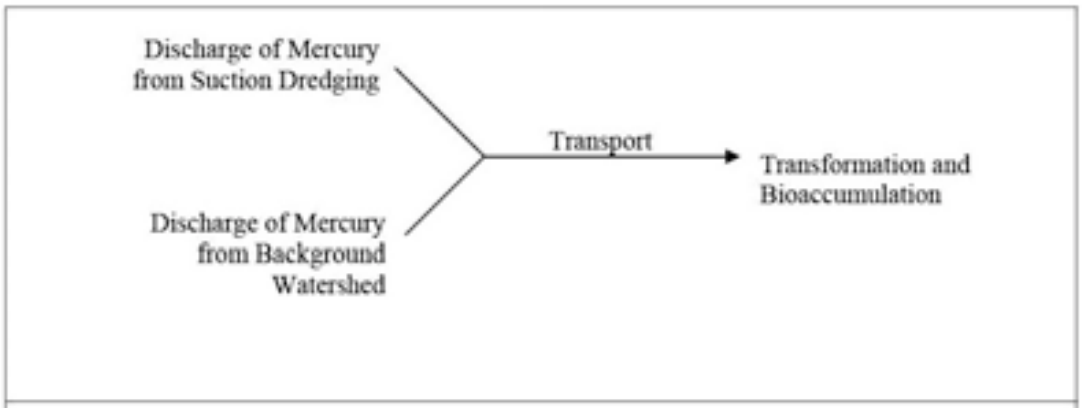


FIGURE 4.2-3. CONCEPTUAL MODEL FOR THE MERCURY IMPACT ASSESSMENT

The statement highlighted in red is factually false and is grounds for dismissing any results from this model. We have no criticism of the modeling approach itself as that is outside of our area of expertise. However, anyone that has worked in science and with modelers understands that the quality of the results is predicated upon the quality and accuracy of the input. There is a term for a model that has used bad or questionable data. It is "garbage in, garbage out". This comment does not reflect on the individual providing the model but, only on the quality of information he is provided. If you were to look at the diagram of the conceptual model it is very clear the element "Discharge of mercury from suction dredging", as defined by the above description from the USGS, is entirely dishonest. Furthermore, we must point out that there is not a control sample from the test site itself. Our understanding is that just one hole was flooded and sucked out using a closed circuit device repeatedly recirculating the water (not a dredge) and historical chemistry for the Yuba River was used as the control data. Not scientifically acceptable!

To prove our point we have only to go back to the statement, "*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 statement is false. The California State Water Board denied the researchers the right to use an eight-inch suction dredge in the river as the study had planned to do. Therefore, Dave McCracken, the mining consultant, was asked to determine where he believed might be the most contaminated sites for sampling. He did so. A hole was hand dug out on a gravel bar down to the water table. A closed circuit system was then used to suck the fluid and streambed material from the hole into a large container. The

same water was circulated from the hole, into the container and back into the hole, over and over again for about an hour. (A second hole was also hand dug from bedrock outside of the active river (having been exposed to oxygen for potentially many years) just downstream from the most contaminated site.

It was these holes and test procedures that resulted in the measured concentration of the mercury being called dredge discharge. From this description it is clear a real suction dredge was not used to provide the results in the study and the materials did not represent the typical river overburden that had been undergoing natural cleaning from years of flushing winter floods. In fact it is stated that, "discharge of Hg from suction dredging was based primarily on field characterization of Hg contaminated sediments (Fleck et al., 2011). Background watershed mercury loading estimates were utilized to compare to suction dredge discharge estimates (Alpers, et al., in prep). There you have it in their words. Study results were based on contaminated sediments outside the river, or from highly-re-circulated water not representative of ordinary dredging in the river and "background watershed mercury loading estimates were utilized" for the control, rather than precise comparative measures in this area known to have atypically high mercury contamination..

Furthermore, the entire discussion in the draft is written as mercury were a highly toxic, irreversible toxin that everyone should be deathly afraid of. This view is totally biased and slanted. It was bad enough to create a model based only on possibility of worst case factors influencing bioaccumulation, but worse still to not incorporate bioavailability considerations of Hg toxicity into the models assessment management evaluation. We do not see any discussion to the vast collection of published peer reviewed articles that support selenium's antagonism to mercury and the resultant detoxification. This data should also be included in any discussion or model which is attempting to fairly represent any toxic effects to fish, wildlife, aquatic organisms and the environment in general

*Examiner Columnist Ron Arnold wrote "*Where does a regulatory agency run by political appointees find scientists willing to claim their subjective opinion is science? The FWS gets most of its science from U.S. Geological Survey biologists working in a closed loop: FWS gets science from **USGS**, USGS gets funded by FWS - which assures predetermined outcomes and no dissent. Interesting money trail, so where's Congress and the media?" We believe the information reflected in the Fleck, et al (2011) report should be viewed with this same skepticism. The dredge output conclusions calculated by re-circulating water through a hand dug hole, in the most highly mercury contaminated area known to the State of California, is the poorest excuse for science we have observed in our combined 60+ years of scientific research.

Intentionally seeking out and targeting site samples from areas containing known extreme levels of mercury contamination, rather than applying a scientific approach of random sampling, and using these data to draw conclusions that affect a whole State's suction dredge industry is unacceptable. Even worse, the study observations were extrapolated to represent a real stream environment where, it is claimed, mercury would float indefinitely. While panning gold concentrates miners frequently see gold floating on the water until the surface tension is broken. But, overburden and oxygenated water flowing off the end of a sluice box submerges and mixes

below the water surface. This turbulent action breaks the surface tension and the dense materials settle out in a short distance.

January 2010, EPA reported that "since suction dredge mining creates turbidity in the stream it is likely this action increases oxygenation of the waters and therefore, methylation of inorganic mercury would be less likely to occur in these habitats." No quantitative evidence is presented concerning the degree of oxygenation, or whether it has any appreciable effect on general, downstream levels relevant to methylation processes. Determinations of significance require more than theorizing as to possible effects.

As one would expect the results of the USGS study (Fleck 2011) using the 3-inch dredge showed only a slight increase in particulate total mercury present in the water column immediately downstream of the suction dredge. Data indicating that an increase of particulate total mercury does not equate to an increased concentration or change in speciation to the more toxic form methylmercury.

It is important in dealing with science to occasionally step back and ask yourself 'So what?' It's necessary as a scientist to not try to push the data and your resulting conclusion into a pre-conceived notion of what your initial theory was. The push to smear suction dredging with the presented information raises the question of whether we are dealing with scientists or activists working for the USGS. Let me quickly show you what a dredge study should look like.

In the following illustration, from the Fortymile River study in Alaska, you can see the dredge location in the river. There are two control sampling sites upstream of the dredge and several transects with multiple sites crossing the entire river. That is a true example of scientists performing high quality, subject specific research.

Figure 2. Results of turbidity survey behind an operating 10-inch suction dredge (site #1 on fig. 1). All numbers shown are in NTU, or nephelometric turbidity units; the standard unit of turbidity. The right bank of the river is off the edge of the figure. The approximate shape of the plume is shown in gray. Note that the figure is exaggerated 5x horizontally, so the plume is actually much narrower than it appears in the figure. To comply with State regulations, dredges may not increase the turbidity of the river by more than 5 NTU, 500 feet behind the dredge.

In the presentation to the CDFG PAC Claudia shared numerous peer-reviewed journal articles that prove selenium's chemical antagonism to mercury, and other mercury species such as methylmercury, cause no significant harm to fish or human health. These published peer reviewed articles leave no doubt that toxicity from mercury contamination in historic mining basins is ***(Less than Significant)***.

There is no doubt that methylmercury may cause harm under the right circumstances. An example of this occurred in Minimata, Japan where inhabitants were exposed to 27 tons of mercury waste dumped in the bay but, with no corresponding shift in selenium levels. However, there has been a large body of (peer reviewed) evidence published that demonstrates that supplemental dietary selenium moderates or counteracts mercury toxicity. Mercury exposures that might otherwise produce toxic effects are counteracted by selenium, particularly when the Se:Hg molar ratios approach or exceed 1." Selenium has a high affinity to bind with mercury thereby blocking it from binding to other substances, such as brain tissue. The bond formed is irreversible. "All higher animal life forms require selenium-dependent enzymes to protect their brains against oxidative damage (Peterson 2009)". As early as 1967 Parizeik found that high exposures Se and Hg can each be individually toxic, but evidence supports the observations that co-occurring Se and Hg antagonistically reduce each other's toxic effects.

In 1978, scientists from Sweden were reporting that "mercury is accompanied by selenium in all investigated species of mammals, birds, and fish," adding that it "seems likely that selenium will exert its protective action against mercury toxicity in the marine environment" (Beijer 1978). Building onto the list of species known to be protected by selenium's bond with mercury and the toxic effects of methylmercury, a group of Greenland scientists in 2000, published the results of mercury and selenium tests performed on the muscles and organs of healthy fish, shellfish, birds, seals, whales, and polar bears. They found that, "selenium was present in a substantial surplus compared to mercury in all animal groups and tissues" (Dietz 2000)

Not only ocean species but freshwater species are found to also be protected. Researchers at Laurentian University in Ontario, Canada reported that selenium deposits, from metal smelters into lake water, greatly decreased the absorption of mercury by microorganisms, insects, and small fish. Suggesting a strong antagonistic effect of selenium on mercury assimilation (Yu-Wei 2001). Peterson's group (2009) collected 468 fish representing 40 species from 130 sites across 12 western states. Samples were analyzed for whole body selenium and mercury concentrations. The fish samples were evaluated relative to a wildlife protective mercury threshold of 0.1 ug Hg/g wet weight, and the current tissue based methylmercury water quality criteria for the protection of humans of 0.3 ug Hg/g wet weight and presumed protective against mercury toxicity where the Se:Hg molar ratios are greater than 1. The study included data from samples collected in California which, in all cases, contained proportions of mercury to selenium that were adequate to protect fish, wildlife and human health. Results showed 97.5% of the freshwater fish in the survey had sufficient selenium to protect them and their consumers against mercury toxicity. The California results were 100% protective.

Peterson's (2009) research supports Ralston's (2005) findings stating that "Mercury toxicity only occurs in populations exposed to foods containing disproportionate quantities of mercury relative to selenium." Also supporting this finding inadvertently, the California Office of Environmental Health Hazard Assessment website has no evidence of any one in California that has died from mercury poisoning from eating sports fish… despite mercury warnings they have issued.

"Methylmercury exposure to wildlife, and to humans through fish consumption, has driven the concern for aquatic mercury toxicity. However, the methylmercury present in fish tissue might not be as toxic as has been feared. Recent structural analysis determined that fish tissue methylmercury most closely resembles methylmercury cysteine (MeHg[Cys]) (*or chemically related species*) which contains linear two-coordinate mercury with methyl and cysteine sulfur donors. MeHg[Cys] is far less toxic to organisms than the methylmercury chloride (MeHgCl) that is commonly used in mercury toxicity studies." (Harris 2003).

The best science suggests that the tiny amounts of mercury in fish aren't harmful at all. A recent twelve-year study conducted in the Seychelles Islands (in the Indian Ocean) found *no negative health effects* from dietary exposure to mercury through heavy fish consumption. On average, people in the Seychelles Islands eat between 12 and 14 fish meals every week, and the mercury levels measured from the island natives are approximately ten times higher than those measured in the United States. Yet none of the studied Seychelles natives suffered any ill effects from mercury in fish, and they received the significant health benefits of fish consumption

Forty years of research illustrates the conclusion, from hundreds of journal articles, that demonstrate mercury is not a threat to the environment or human health if the molar ratio of selenium:mercury meets the defined criteria. In California there are adequate supplies of selenium to support the criteria. Results of these studies support the fact that methylmercury is not deleterious to fish and wildlife or aquatic organisms.

We disagree with the Significant and unavoidable conclusion, because of the lack of factual scientific basis that would support this conclusion. We would recommend that it be changed from Significant and unavoidable to ***(Less than Significant)*** until the full body of science is evaluated.

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

Cumulative Impacts are no different in this regard as Impact WQ-4. The many factors associated with bioavailability such as total hardness, dissolved organic carbon, pH, alkalinity, sulfate reducing bacteria, anaerobic conditions, etc. need to be present for methylation and bioaccumulation in the food chain. Even if the conditions for methylation are met, if selenium to

mercury has, at least, a 1:1 molar ratio all the mercury will bind with selenium creating an irreversible bond cancelling any potential toxic effects of mercury. Furthermore, since this opinion appears to rely heavily on the purported "scientific" results provided by the USGS dredge study they are totally worthless and should not be used for the aforementioned reasons.

We disagree with the Significant and unavoidable conclusion, because of the lack of factual scientific basis that would support this conclusion. We would recommend that it be changed from Significant and unavoidable to ***(Less than Significant)*** until the full body of science is studied.

Sincerely,

(b) (6)

Physical Scientist, U.S. Environmental Protection Agency [RETIRED]

and

(b) (6)

Research Biologist, U.S. Environmental Protection Agency [RETIRED]

050311(b) (6)

Response to Comment 1
See MR-GEN-3 and MR-GEN-6.

Response to Comment 2
See MR-WQ-7. The study to which the comment refers did report that dissolved mercury was higher upstream of the dredge than downstream. However, values for total mercury (which would include mercury bound to particles) were not reported. Furthermore, sediment concentrations of mercury were not measured; thus, it is unclear how this site would compare with sediments that may be dredged in California.

Response to Comment 3
See MR-WQ-1, -7, and -10.

Response to Comment 4
See MR-WQ-5. The assessment makes use of valuable information provided in Fleck et al. 2011, including sediment mercury concentrations and particle size distributions. This data did not require a dredge to be in operation to collect.

Response to Comment 5
See MR-WQ-9.

Response to Comment 6
See MR-WQ-11. Although there is uncertainty with regard to sediment mobilization rates during suction dredging operations, multiple sources suggest that estimates used in the analysis are reasonable (For further discussion of the issue, refer to Section 3.3.3 of the DSEIR).

Response to Comment 7
See MR-WQ-12, -7, and -14.

Response to Comment 8
See Response to Comment 2, above. Mercury bound to particles does not make those particles have the same density/specific gravity of element mercury. See also MR-WQ-14.

Response to Comment 9
The highlighted statement is true. USGS efforts were specifically focused on assessing the *potential* discharge of mercury from suction dredging activities. The study did so by characterizing the particle size distribution of mercury in sediments available to suction dredgers. It is not necessary to *measure* mercury coming off of a suction dredge in order to assess/model the potential discharge.

Response to Comment 10
See MR-WQ-13.

Response to Comment 11
See MR-WQ-9.

Response to Comment 12
See MR-WQ-5 and MR-WQ-7.

Response to Comment 13
See MR-WQ-17.

Response to Comment 14
See MR-WQ-12. Results of the 3-inch test were not used to determine reactivity or transformation of particulate-bound mercury.

Response to Comment 15
See MR-WQ-9.

Response to Comment 16
See MR-WQ-9 and MR-WQ-17. This comment does not substantially alter the assessment or its conclusions.

Trace metals

"Wanty et al. (1997) examined dissolved metal concentrations 60.8 m (200 ft) downstream of a 10-inch and an 8-inch dredge and found no difference between the sides and center of the dredge plume. ……... As the metal-laden sediments were transported downstream and deposited on the riverbed, total copper and zinc concentrations declined. By 80 m downstream of the dredge, copper and zinc concentrations were similar to those measured upstream of the dredge."

Turbidity, Total Suspended Solids and Trace Metals

"Of the factors we measured, the primary effects of suction dredging on water chemistry of the Fortymile River were increased turbidity, total filterable solids, and copper and zinc concentrations downstream of the dredge. These variables returned to upstream levels within 80-160 m downstream of the dredge. The results from this sampling revealed a relatively intense, but localized, decline in water clarity during the time the dredge was operating."

(USGS 1997)

Next we will analyze the impacts of suction dredging on the riverine environment, again in the pristine waters of Alaska, from a joint Federal/State ongoing study.

(Below excerpts from the October 1997 USGS AK Study Fact Sheet, An ongoing joint study by the Alaska Department of Natural Resources (AKDNR) and the USGS. Applicable parts underlined.)

Here is what the USGS study findings were for another pair of **8**" and **10**" dredges:

Trace Metals

CHEMICAL SURVEYS

"Water-quality samples were collected at three points 200 feet behind each of the two operating suction dredges. One sample was collected on either side of the plume, and one in the center of the plume. The samples were passed through a filter with a nominal pore size of 0.45 micrometers and acidified to a pH less than about 2. Results are shown in the

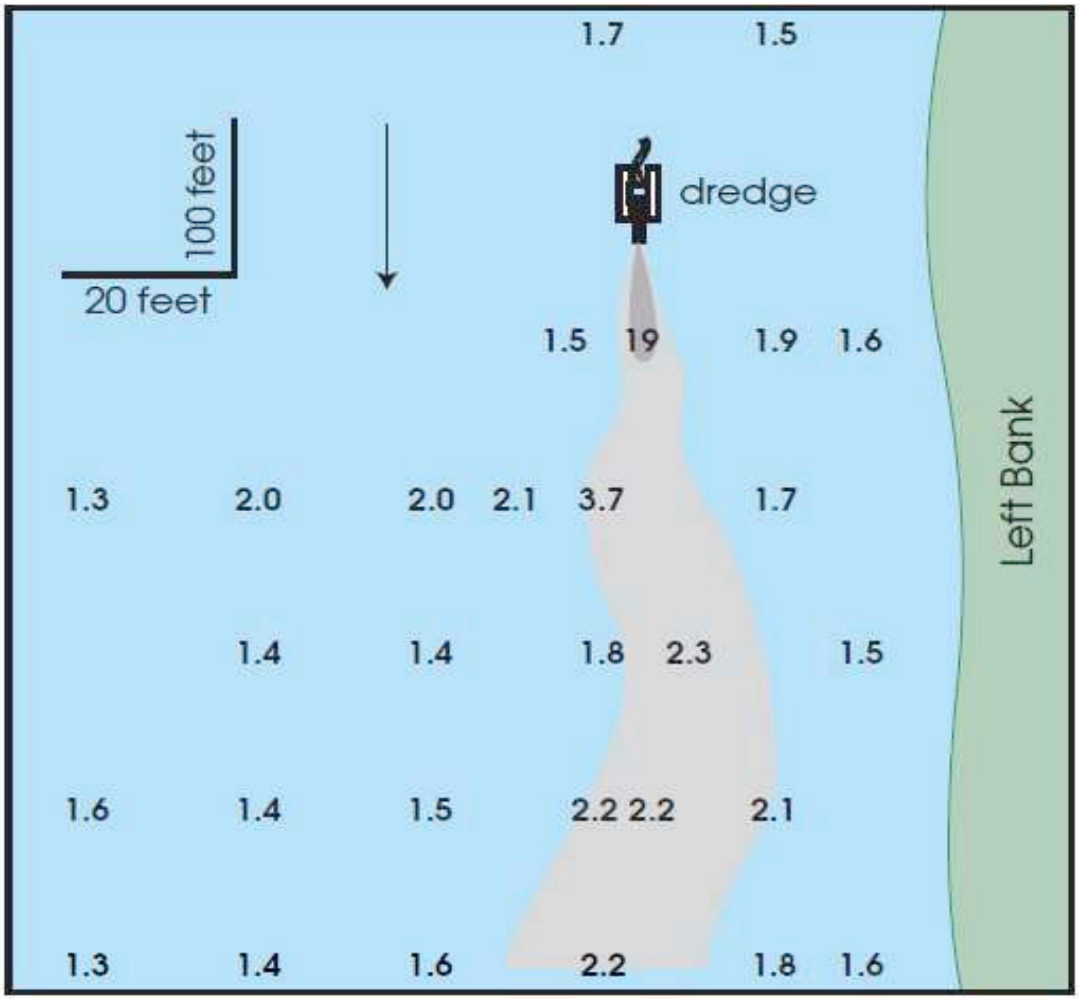
table below. Samples 1A, 1C, 2A, and 2C are from either side of the plume behind dredges 1 and 2, respectively. Samples 1B and 2B are from the center of each plume. All concentrations given are in micrograms per liter, except pH, which is expressed in standard units."

	Dredge 1			Dredge 2		
	1A	1B	1C	2A	2B	2C
pH	7.7	7.6	7.8	7.0	7.5	7.5
Arsenic	0.3	0.3	0.3	0.3	0.3	0.3
Iron	110.	110.	110.	100	97	100
Chromium	2	2	3	3	3	3
Cadmium	all less than 0.02 micrograms per liter					
Cobalt	0.07	0.07	0.06	0.06	0.05	0.05
Zinc	0.8	0.6	0.8	1.0	1.0	1.0
Lead	all less than 0.05 micrograms per liter					

"The data show similar water quality values for samples collected within and on either side of the dredge plumes. Further, the values shown in the table are roughly equal to or lower than the regional average concentrations for each dissolved metal, based on the analyses of 25 samples collected throughout the area. Therefore, suction dredging appears to have no measurable effect on the chemistry of the Fortymile River within this study area. We have observed greater variations in the natural stream chemistry in the region than in the dredge areas."

Turbidity and Total Suspended Solids –

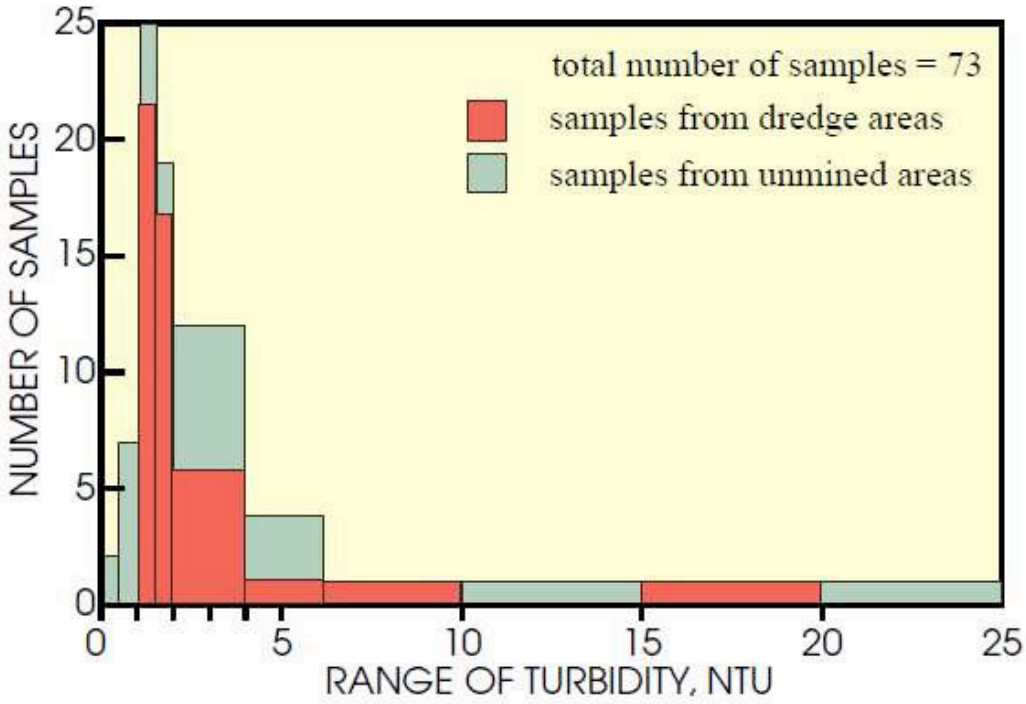
"State [AK] regulations require that suction dredges may not increase the turbidity of the river by more than 5 nephelometric turbidity units (NTU), 500 feet (»150 m) downstream. In both cases, the dredges were well within compliance with this regulation. The results of the turbidity survey for the 10-inch dredge are shown on figure 2. Turbidity values behind the 8-inch dredge were lower, because the smaller intake was moving less sediment material, and because the coarser sediments being worked by the 8-inch dredge settled more rapidly."



**"Figure 2. Results of turbidity survey behind an operating 10-inch suction dredge (site #1 on fig. 1).
All numbers shown are in NTU, or nephelometric turbidity units; the standard unit of turbidity.
The right bank of the river is off the edge of the figure. The approximate shape of the plume is shown in gray. Note that the figure is exaggerated 5x horizontally, so the plume is actually much narrower than it appears in the figure. To comply with State regulations, dredges may not increase the turbidity of the river by more than 5 NTU, 500 feet behind the dredge."**

Comparison of Dredge Turbidity to Regional Values

"The turbidity values found in the dredge studies fall within the range of turbidity values found for currently mined areas of the Fortymile River and many of its unmined tributaries. Figure 3 shows the ranges of turbidity values observed along the horizontal axis, and the number of samples which fall within each of those ranges. For example, 25 samples had turbidity between 1.0 and 1.5 NTU, 22 of which were in a dredged area. The highest turbidity value was from an unmined tributary to Uhler Creek; the lowest from a number of different tributaries to the North Fork. As seen on the figure, there is no appreciable difference in the distribution of turbidity values between mined and unmined areas."



"Figure 3. A comparison of turbidity values between mined and unmined areas shows that the suction dredge mining does not affect the turbidity of the Fortymile River system under the conditions studied. The highest turbidity values from the dredge areas are within 200 feet (60 m) of the back of the two operating dredges which were studied."

(NOTE – The only place the 10" dredge had turbidity levels higher than the AK limits, of not greater than 5 ntu above background levels past 500ft, was the narrow silt plume going less than 200 feet downstream. The 10" dredge was also working finer sediments than the 8" dredge, which had even lower turbidity numbers. These dredges were even working in a 'Wild and Scenic Corridor' designated by the Alaska National Interest Lands Conservation Act)
Mark Stopher

USGS Summary

"As seen in the chemical and turbidity data any variations in water quality due to the suction dredging activity fall within the natural variations in water quality. This conclusion is further supported by the other water-quality data collected throughout the region…."

CONCLUSIONS

It would appear that the DSEIR missed a couple studies, or found the information in these two Federal Studies would be of no use in determining the significance of dredging impacts.

That apparently being the case, I would like to quote CEQA Section 15384(a), which requires DFG to consider the "whole record" before it, including this letter and the cited studies.

> "*Whether a fair argument can be made that the project may have a significant effect on the environment is to be determined by examining the whole record before the lead agency".*

Due to all the above USGS and EPA study findings, it should be obvious that the impacts of dredging (with even a **10** inch or **8** inch dredge) does not rise to any Significant level that needs to be regulated further, especially for smaller dredge sizes.

RECOMMENDATIONS

Drop the following Proposed Regulations:

Sec 228(g) Maximum of 4000 dredge permits.

Sec 228(j)(1) Maximum nozzle size 4".

Sec 228(k)(3) No dredging 3 feet from a bank.

And…….

Mark Stopher

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050611(b) (6)

Response to Comment 1

See MR-WQ-3. Also, the DSEIR based its finding of "Significant and Unavoidable" relative to the potential impacts of suction dredging related to trace metals in areas with known acid mine drainage and associated low pH conditions. The cited study was not conducted at such a site, and consequently the specific results of this study do not affect the assessment or its conclusions.

Response to Comment 2

See Response to Comment 1.

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the relatively mild winter of 1980/81, high flows still filled the hole created by dredging on NFAR with a sand and gravel mixture and eliminated all sand from the main streamed. After the high flows in winter and spring of 1981/82, no substrate changes caused by dredging in the previous summer were evident on Butte Creek. Saunders and Smith (1965) observed a quick recovery in the trout population after scouring of a heavily silted stream, which, along with the quick temporal recovery of stream insects seen in this study, implies that suction dredging effects could be short-lived on streams where high seasonal flows occur." (Harvey 1986) "…dredge mining had little, if any, impact on water temperature." (Hassler, Somer & Stern 1986.)

"Although distinct to even the most casual observer, dredge plumes in Canyon Creek were probably of little direct consequence to fish and invertebrates. Suspended sediment concentrations of 20,000 to 100,000 mg/l which impact fish feeding and respiration (Cordone and Kelly 1961) greatly exceed the highest level of 274 mg/l measured in Canyon Creek. In general, dredge turbidity plumes were highly localized and occurred during midday which is not a peak feeding period for steelhead (Moyle 1976). Laboratory studies by Sigler et al. (1984) found that steelhead and coho salmon preferred to stay in channels with clear water, and turbidities as little as 25 NTU's caused a reduction in fish growth. In contrast to Sigler's results, young steelhead in Canyon Creek appeared to seek out dredge turbidity plumes to feed upon dislodged invertebrates even though clear flowing water was available nearby." (Stern 1988)

"In the 1997 permit, EPA defined a small suction dredge as those with nozzles less than or equal to four inches. EPA is proposing to redefine the small suction dredge range as less than or equal to six inches. Information provided in EPA's suction dredge study and the United States Geological Survey (USGS) study support the conclusion that there are local but short term effects on both water quality and macroinvertebrate communities in the mining areas. On the Fortymile River, dredges larger than those proposed under this GP showed that turbidity was reduced to background levels within 250 feet. It is expected that small dredges would have even less impact on the downstream receiving water quality." (U.S.EnvironmentalProtectionAgency2001.)

It is PLP's position the DFG DSEIR has been twisted and skewed to a point that it is all but prohibitive on the suction dredging community and is in some cases totally prohibitive. For this reason the following comments will attempt to address those assumptive DFG errors and prohibitions. It would be near impossible for a suction dredge miner to comply with the proposed regulations and still maintain a commercial venture or to make a living or even supplement his income.

§ 21166. SUBSEQUENT OR SUPPLEMENTAL IMPACT REPORT; CONDITIONS

When an environmental impact report has been prepared for a project pursuant to this division, no subsequent or supplemental environmental impact report shall be required by the lead agency or by any responsible agency, unless one or more of the following events occurs:

(a) Substantial changes are proposed in the project which will require major revisions of the environmental impact report.

(b) Substantial changes occur with respect to the circumstances under which the project is being undertaken which will require major revisions in the environmental impact report.

Right to file a complaint

The California Occupational Safety and Health Act of 1973 gives workers the right to file a complaint about workplace safety and health hazards.

Names of complainants must be kept confidential

The name of any person who submits a complaint to Cal/OSHA must be kept confidential by law if the person so requests.

If you would like to report hazards at your workplace to Cal/OSHA, call the Cal/OSHA Enforcement Unit district office nearest the place where the hazards exist.

You can also mail or fax a completed Web complaint form to the Cal/OSHA Enforcement Unit district office nearest where the hazards exist.

You can also file a safety and health complaint electronically using the Federal OSHA on-line complaint form located at:
www.osha.gov/pls/osha7/ecomplaintform.html.

On this whole subject of Hydrology and Geomorphology the DFG information is based on studies, most of which are prior to 1994. Yet they conclude that the same same law violations are going on after the 1994 regulations were in place. PLP finds that to be an accusation by the DFG that a large percent of the suction dredgers are criminals and have continued old practices by ignoring the 1994 regulations.

Contrary to popular belief of the DFG and others, the miners are not criminally inclined. The miners had to face these same accusations in 1993 and 1994 because of DFG accusations that the miners were a bunch of criminals and agency personal feared for their safety. The miners in defense searched through all of the DFG citations on file from 1988 to 1993. There were 96,000 citations, out of this there were 76 suction dredging citations and only 17 convictions. That calculates to .00017 percent of those criminal citations with convictions being suction dredgers. This tells us that for the most part suction dredgers are law abiding citizens. Quit making it sound as though the DFG has to mitigate for precaution against lawbreakers. You don't take everyones drivers license because a few drivers drive a 100 miles an hour, you enforce the law on those who violate it.

Mercury

Mercury appears to be a sore spot with the DFG and the Environmental community. Since suction dredging appears to be the only economically and environmentally sound method of recovering 98% of the mercury from the rivers and streams, it boggles the mind to think that their would be opposition to that amount of recovery and scream about the 2% loss.

Mercury Effects, Sources and Control Measures, Sept. 1996, Exhibit 3

Prepared by
Alan B. Jones, Brooks Rand, Ltd., Seattle, WA
Darell G. Slotton, University of California, Davis
Review contributions by

Chris Foe, Central Valley Regional Water Quality Control Board
Joe Domagalski, United States Geological Survey
A Special Study of the
San Francisco Estuary Regional Monitoring Program
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2nd Floor
7770 Pardee Lane
Oakland, CA 94621

This above study needs to be taken under consideration in the DFG FSEIR as Attached, Exhibit-3

The effectiveness of a suction dredge recovering mercury is verified in the peer reviewed suction dredge study conducted by the Environmental Protection Agencies (EPA) 1998.

EPA, Suction Dredge Study (1998)

"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.)"

Here PLP will adopt the comment on the mercury portion of another party who participated in the Alpers mercury study. Mr. Dave McCracken, who has some 30 years of dredging and teaching experience. Mr McCracken helped set up the test equipment on the project and has explained his reasoning in his comments on the DSEIR and Mr McCracken's comments as to the conclusions of the Charles Alpers study are as follows:

Improper Conclusion: "In fact, the water from my closed system appeared to be so contaminated, USGS staff ordered special stainless steel containers flown in so they could send the water out by helicopter and dispose of it properly! It was mainly from these water samples which Charles Alpers formed his conclusion that suction dredges may discharge mercury into the active waterway. But the water from my tank had been continuously used over and over again to excavate and capture 100% of the mercury from highly-contaminated material. It is unreasonable to take water from a closed circuit system like that and attempt to relate to what might come off the back of a dredge system which only uses water one time (in a completely different way) to excavate material. **This is <u>bad</u> science!"**

Improper Conclusion: "Then Charles Alpers concluded that the levels of mercury captured from our second excavation could be used as a baseline of how much mercury might exist throughout all of California's waterways. He makes some estimations of how much mercury suction dredgers could potentially re-suspend, based upon the amount of mercury that we excavated off bedrock, just below the source of mercury, in one of California's worst mercury hot spots? **How scientific is that?"**

Improper Conclusion: "Furthermore, Alpers related the potential statewide impacts to the estimated production yardage figures which Keene Industries (dredge manufacturer) publishes in their promotional material. Even though the USGS team stood by and watched my team excavate using a 3-inch dredge, they did <u>not</u> take the opportunity during the study to measure the volume so they could come up with a real production estimate for suction dredges. **Therefore, Charles Alpers reached out to projected estimates in a promotional brochure?** There are so many variables in play while dredging (make up of the streambed, speed of the river water, depth of the excavation, type of power jet, experience of the operator, etc), that there is <u>no way</u> Charles Alpers could use unproven

information from a promotional brochure to make reasonable statewide projections in a scientific conclusion!"

Improper Conclusion: "Alpers suggests that most mercury contamination at the bottom of California's waterways is locked in place by armored streambed and should be left in place until some better method of recovery is developed. However, any experienced suction dredger will tell you that annual flood events, especially the larger ones, naturally tear up armored streambeds and move the material further downstream. The fact that we find man-made objects underneath the armoring is testimony that streambed are highly mobile. Besides, your own SEIR's entire section on river ---- defeats this Alpers Study."

The DFG should totally ignore the non PEER reviewed recent study of Charles Alpers, etal. Mr. Alpers has shown in the Public Action Committee (PAC) meetings, his speaking engagements, his organizational affiliations and his past studies that his science is not true science but a politically slanted bias. He should be ashamed to refer to himself as a scientist. Those who except this type of work as science are not better.

No one could even consider a recirculation tank that was used in the mercury study as being comparable to a suction dredge study for mercury. I think the DFG knows this and is planning on turning this hot potato over to another agency, mainly California Water Quality Control Board.

Here, PLP will adopt the comments given on the DSEIR submitted on (May 1, 2011) to the Ca. DFG by (b) (6) **(RE: Comments regarding SEIR and Proposed Regulations for suction dredge mining in California in Favor of Maintaining Current 1994). "Attached" as Exhibit-2**

It has been suggested by many that even the mercury test done by Rick Humphries is a far better document than that of Charles Alpers and PLP would have to agree. However even Mr. Humphries Mercury test (not a study) has considerable flaws in it. For example Mr. Humphries states that the 2% of the Mercury that was lost by the suction dredge (old header box style) not the new flair jet, was floured and was more suseptible to mercury methylation. However, Mr. Humphries did not bother to check the soil overburden prior to it entering the intake nozzle to see if in fact the mercury may have been floured prior to being sucked up into the dredge box.

Mr. Humphries also explains that the 2% of floured mercury that was discharged from the dredge sluice box would eventually end up somewhere in an area that was conducive to the bacterial required to methylate the floured mercury. The bacteria required to methylate mercury is not commonly found in rivers and stream where suction dredging normally prevails because of the high dissolved oxygen (DO) content. The bacteria required is associated with low oxygen areas such as swamps and lakes. Along with the fact that most suction dredging is done in streams and rivers and the action of the suction dredge also creates its own dissolved oxygen.

Along with this assertion Mr. Humphries in his test mentions that while the suction dredging was being done that they noticed that there was mercury falling to the bedrock in front of the suction nozzle and re-conglomerating. So my question to the DFG and Mr. Humphries is, what is going to prevent the floured mercury that comes off the the end of the dredge sluice box from re-conglomerating as it did in front of the suction nozzle when it fell to bedrock? Because of mercury's ability to re-conglomerate, it shoots holes in Mr. Humphries assumption that the mercury would be more suseptible to methylation because it was floured by the suction dredge.

During the Public Action Committee Meetings, (b) (6) a retired Environmental Protection Agency (EPA) spent the best part of one hour and a 30 minute power point presentation explaining the actions of Selenium vs Mercury and how they cancel each others toxicity. In the DFG DSEIR we are very luck to see any reference to her presentation, one short paragraph that could have been missed even with a diligent reading. The selenium issue needs to addressed in full because there are several good PEER reviewed documents on the subject. For Horizon and the DFG to ignore this issue is a violation CEQA best science procedures.

It appears that DFG is ignoring anything that has been presented to them in a positive manner in favor of balancing the negatives in the DSEIR on suction dredging. This would include the lack of DFG addressing .(b) (6) power point presentation on turbidity as well as (b) (6) mercury presentation.PLP suggest that the DFG spend some time on these issues in their FSEIR, with diligent research instead of just blowing it off as not worth addressing. ((b) (6) and (b) (6) comments attached)

This whole attack on suction dredging losing 2% of the recoverable mercury being made as a big deal is a Chicken Little fear tactic to discredit an honest endeavor. Even a fish is probably smart enough to see the advantage of removing 98% of a poison from the waterways, that which will never have an opportunity to methylate. If the DFG or some other California Agency had a lick of sense they would take advantage of this opportunity by rewarding the recycle of mercury instead of attacking it, other states do.

Lead is another toxic material the the DFG attempts to ignore and in the past has stated that they are not concerned. Let me say that there was a real danger from lead getting into the water system, so much as a matter of fact that over the years since I was a child the government has banned many of its uses. Stopped the use of lead solders for water pipes especially to a residence, laws have been passed as to the types of fishing weights fisherman use or the use of lead bullets and the list goes on.

Lead left in the river and stream systems from hunters and fisherman eventually chrystalize's and becomes part of the water system through ionization. People have become very ill from lead sources in drinking water. Lead has affected human brains, nervous systems and even caused death. Suction dredging removes the mercury, lead and other heavy metals and should be rewarded, if not by money, then credit for mitigation. If the DFG and Horizon feel there is no concern, why is it that other agencies have banned the use of lead?

affected the population".[3] One study suggests that the "data from a comparably-sized undammed river fork in the same system…demonstrated that both the number of potential sites and the total number of egg masses were…higher on this fork than in our main stem," and so the unseasonal flooding required by the dam was negatively affecting the mating behavior of the frog.[9] The temperature of the water in Trinity County is also lower than it was before the dam was put into place. To keep up with demands of fisheries, the water's temperature is kept artificially lower than normal, which consequently slows the development of R. boylii.[9] Therefore, the colder temperatures are making it more difficult for the frogs to grow quickly, which sometimes leaves the species prey to many other animals that dine on their young. The problems occurring between the Foothill Yellow-Legged Frog and the dam are being handled by several herpetological organizations, along with the Forest Service, to find ways to alter the effects in a beneficial way for the frog".

During the PAC meetings there were a lot of heavy discussions on the definition of the word deleterious. There were all types of interpretations, especially from the opposition to suction dredging and the DFG went right along with the opposition as though they didn't know the definition. It appeared that the more broader the definition the DFG could use the more ability they had to declare as a significant effect so they could over regulate the suction dredge miner. As you can see from the DFG's own regulations (Above) that in order to be deleterious there has to be long term harm. "S*ection 5653, is one which manifests* ***at the community or population level*** *and persists for longer than one reproductive or migration cycle"*

2.2.2 Definition of "Deleterious to Fish: 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.

PLP maintains that none of the studies referred to and used by DFG and Horizon will reach the threshold of the lawful definition of the above code. By all of the studies used by DFG and Horizon, none have described this type possible Harm or any where near this type of harm. By interpretation, if this is what it takes to be deletarious, then suction dredging should not even require a permit of regulation.

Total Maxim Dailey Load (TMDL)
For example, Total Maxim Dailey Load (TMDL) or turbidity for short term caused by suction dredging could not possibly qualify for being deleterious by DFG's own 5650 or 5653 regulations.

In the PLP and my comments on the DFG Proposed Supplemental Draft Environmental Impact Report (PSDEIR) a turbidity study done in a 2 year period from 1936 and 1937 by one of the top fish biologist of that time (Dr. Henry Baldwin). No where in the SDEIR do we find any mention of this study. It was a very thorough study on turbidity and should be considered a plus for suction dredging in the DFG SFEIR. I have re-addressed it below for the DFG convenience. We have also reiterated for the convenience of the DFG information from the Siskiyou National Forest Draft Environmental Impact Statement (DEIS) on the total TMDL's from suction dredging compared to natural erosion and this should be carefully scrutinized as to what the minimal effects of a suction dredge really does by comparison.

Turbidity is not Deleterious to Fish but is beneficial to their survival and even if it was it is temporary, short term and definitely does not exist for one complete reproductive cycle. PLP suggest theat the DFG again take a close requisite look at their definition of damage from TMDL's and turbidity.

Siskiyou National Forest Draft EIS on Suction Dredging

With the following information it would be very hypocritical for the (DFG) or any other agency or persons to show the massive concern, over a few thousand suction dredge operators spread out over tens of thousands of miles of rivers. Suction dredges only recirculate back into the river, gravels that have already been deposited by man or nature. Even though the suction dredging materials that are considered TMDL's are only .7 of one percent of total gravel and soils added from the riparian area erosion in any given year, the suction dredging process does not add anything to the water such as additional soils from the riparian areas. (Siskiyou National Forest DEIR on suction dredging).

Political bias and not sound science. DFG and Horizon acting as though they are attempting to fix or protect a problem without precise knowledge of what the cause of that problem is, is a problem. And, to speculate what that problem is and speculate how to fix that problem is an effort in futility and the result of an uninformed decision that will most likely be in error. If it ain't broke, don't fix it most likely applies here.

This study was done on the Rogue River in Oregon by Dr. Henry Baldwin to resolve issues on high turbidity caused by silt and turbidity created by hydraulic and other forms of placer mining The following are quotes from a 2 year study by Dr. Henry Baldwin on these types of placer mining operations and the effect it would have on the rivers and the fish in those rivers. Dr. Baldwin's credentials were and still are beyond reproach.

Placer Mining on the Rogue River, Oregon, in its Relation Ship to Fish and the Fishing in the Stream (Dr Henry Baldwin Ward. 1937 and 1938)

Sediment
Appendix - A

The Rogue River has always carried loads of silt.

"All the evidence that has been obtained justifies the conclusion that no present-day contributions of materials produced by bank erosion differ in character or exceed in amount those added periodically by purely natural processes in past times. Splendid runs of salmon and Steelhead were established and maintained under truly natural conditions which were certainly on occasion more extreme and violent before man ever came into the picture than they are today."

"The coming of man has wrought many changes in the environment which have been clearly unfavorable to fish." These changes have been (1) The Construction of Dams; (2) The building of diversion ditches; (3) The development of agriculture interests, such as farms, orchards, forests nurseries: (4) the organization of towns and cities: (5) the establishment of factories and industrial enterprises."

(1) "Dams interfere with upstream migration of adult fish." " Dams also modify the natural temperature of river water" "It looks as if the migrating young
would be drawn into the turbines and destroyed"
Fish ladders on dams are not very successful in as much as the water that is utilized is not the same temperatures that attract the fish and many fish go to cooler breeches in the dams and never reach the ladders. Dams prevent natural storm flushing flows required for keeping the river gravels loose and not cemented and available for ideal spawning of fish.

(2) " Diversion ditches have also modified the rogue River." The entrance to such ditches has created severe problems for fish, including fry, fingerlings and even adult fish, attempting to ascend rivers." "That such as the case abundant testimony can be furnished."

This causing fish to be stranded and dying in evaporating holes after the water is cut off.
Man attempting to protect this from happening by putting screens of the ditch entries is
not always successful.

" One feature is less widely recognized and deserves mention because of its intimate relation to the welfare of Salmonoid fishes, The diversion of river water through ditches, its dispersion over fields, and slow return to the river by seepage channels results in raising the average daily temperature of the river during the dry summer season."

This making the temperatures of the river unsuitable for fish because warm waters do not hold the dissolved oxygen required for fish and healthy rivers. Suction dredges create cooler waters and help re-oxygenate these rivers. Addressed in another comment.

(3) Towns, cities, canneries, factories packing plants, and animals all creating organic and inorganic wastes and all ending up in the river to help degenerate the conditions that fish rely on.

"These wastes contain organic materials in the process of disintegration or chemical substances which are by products of industrial plants. The latter are often toxic in character and the former take up oxygen with such avidity that the water of the stream is deprived of this essential element"

"Further in Oregon, Finley and his associates have tested the results of placing young Salmon in municipal wastes and found the fatal effects of such an environment to be almost immediate."

Here on; "All of these tests show that the amount of colloidal material in the water of the Rogue River and its tributaries below the point at which the run-off of placer mine workings has been added to the stream is to small to produce and the bottom a "blanket" which might affect adversely young fish, eggs in nests if present. Of the fish food in the water." The placer mines were operating actively and the run off was a conspicuous feature in smaller tributaries and at points on the main river also."
"The supplementary report of Mr. A. M. Swartley, who aided me in the part of the survey made in September, 1937, is of value in giving the views of a careful and experienced geologist. He confirmed fully statements I had reached in my preliminary report as to the physical conditions found in the Rogue River drainage, and especially the small amount of clay and other material on shores and stream bottoms, in backwaters and otherwise in our examination of the river and its tributaries. He discussed fully the methods of rock disintegration and the transportation and ultimate character of the materials produced. He emphasized the fact that mining debris "is chemically inert, makes no oxygen

demand on the stream and therefore takes away from the flowing water nothing which the fish require. This is equally true of this material whether placed in transit by nature or by man since (the products) are alike in nature, come from the same sources and are only being accelerated by man in their journey to the sea." Further he stated:" All these materials entering the streams, whether by natural or human activity, whether coarse or fine, whether traveling on the bottom, in suspension or solution ,are almost altogether inert, suffer little change on their way to the sea, and having reached the end point of chemical change do not rob the water of oxygen which the fish demand, or add to the water toxic agents injurious to fish (fish food or other forms of life)."

"The placer mine run-off is waste in the sense that it is superfluous. And unserviceable material, but it is not material that has been modified by process of manufacturing or chemical treatment. The placer mine run-off is composed of good water and normal unaltered soil; it carries no materials that can rightly be called deleterious substance. This distinction is fundamental and should be emphasized."
"To designate placer mine as run-off pollution is a confusion of terms. Neither the dictionary definition nor in scientific analysis can the use of this term be justified. To pollute is to defile: to contaminate with waste of man or animals: this is don by introducing domestic and community wastes, or such as produced in manufacturing and industrial processes. Chemically these include toxic materials or unstable compounds which have a high affinity for oxygen and withdraw promptly so much oxygen from the water that they threaten the life of organisms in it."

(Bulletin U.S. Bureau of Fisheries, No. 22, 1937) by Dr. M. M. Ellis, in charge Interior Fisheries investigations. On page 432 Dr. Ellis points out that erosion silt has no effect on streams (a) in decreasing dissolved oxygen, (b) in increasing acidity, (c) in increasing alkalinity, (d) in increasing specific conductance, (e) in increasing ammonia, (f) in specific toxic action on fishes."
A suction dredge miner cannot introduce anything into the river that is not already there and will not stir up anything that the flushing flows will not stir up. Like stirring a pot of soup that has settled, the dredge stirs up only to allow the soup to resettle in a relative short period of time.
"Fish live and thrive in rivers carrying large loads of silt." "Engineers and other experienced men have in personal discussion borne positive testimony to this view, both as to the relative amount of silt and to the presence of vigorous and healthy fish."

"More recently the problem has been studied by Cole (1935) has demonstrated experimentally that fish move uninjured through very muddy waters." "Swartly in his supplementary report gives a table of the amount of suspensoids recorded in a group of streams, some which are good salmon rivers, these carry from 137 to 395 ppm of solid materials. And have turbidities varying from 27 to 245. In his experiments Griffin maintained for some weeks young salmon in good condition in water containing more that 1000 ppm of mud from placer mine areas in the Rogue River Valley, whereas the maximum amount actually found in water taken form the river at Agness was 440 ppm.

"I have seen among these Alaska rivers in which salmon run and spawn some so heavily loaded with mud that one could not trace the body of an adult Solomon ascending the river even when the dorsal fin cut the surface of the water. Yet the fish examined on the spawning grounds just before and just after death showed that gills had suffered no injuries" "The examination was made in connection with the study on the cause of death after spawning and all organs were closely inspected. The gills were reported as apparently in perfect condition."

"In further comment I desire to call attention first to the fact that these experiments were performed

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050711(b) (6)

Response to Comment 1
See MR-WQ-3 and MR-WQ-14.

Response to Comment 2
See MR-WQ-1, -10, and -7, as well as the response to Comment 2 in 050311_(b) (6)

Response to Comment 3
See MR-WQ-12.

Response to Comment 4
See MR-WQ-15 and MR-WQ-17.

Response to Comment 5
See MR-WQ-9.

Response to Comment 6
See MR-WQ-1, -10, and -16.

Response to Comment 7
See MR-WQ-3.

Response to Comment 8
See MR-WQ-3.

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Since some regional water boards have taken it upon themselves to already pass bans on dredging in thermal refugia areas without any proper scientific studies being done, it is duplicity of regulation for CDF&G to also create such a ban. At a minimum, CDF&G should allow the legality of these politically motivated thermal refugia bans imposed by these water boards to be upheld in court as valid and ruled not a taking of property before CDF&G imposes them also.

The comment in the DSEIR that many of the new regulations are to bring California inline with regulations in other states is another misleading and false statement. The new regulations in Oregon that ODEQ has imposed on suction dredging in that state are being legally challenged and because they are new should not be considered as an industry standard. There was a politically motivated attempt to try and impose the very same regulations in Idaho that completely failed. It is unbelievably wrong for CDF&G to say those regulations are an industry standard when the true industry standard is the regulations adopted in 1994 in California, and the current regulations in Alaska and Idaho. The new regulations in Oregon and Washington are not the industry standard and are very obviously politically motivated by a large voter block that is overly environmentally cautious.

The extreme reduction in dredging seasons, the complete banning of dredging in numerous waterways, and the reduction from eight inch and six inch nozzles to four inch nozzles will make most affected claims valueless and has a very high chance of being determined in a federal court to be a taking of mineral property.

How can CDF&G say that an eight inch suction dredge operating on the main stem of the Klamath river in November has a detrimental impact on salmon when CDF&G has publicly stated that no salmon spawn in this stretch of the Klamath? There is no way that CDF&G has performed any properly conducted scientific study since the ordering of this SEIR because there has been no running dredges to study.

That is the main flaw of this DSEIR compared to the 1994 EIS. The 1994 EIS studied running dredges; this DSEIR has not studied one single operating dredge.

In Chapter 4.2, WATER QUALITY AND TOXICOLOGY of the DSEIR, the determination has been made that the effects of mercury resuspension and discharge are significant and unavoidable. How has such a determination been made in a DSEIR that performed no studies on any running suction dredge? This determination is not based on sound science but rather has to be based on opinions that contradict the few known scientific facts on this subject that have been gathered using proper scientific methodology actually studying an operating suction dredge. The DSEIR states that there have been few studies done on this subject.

I would like to offer the following facts and some common sense as to why this is.

First, the EPA had a study performed in 1999 on the impact of suction dredging on water quality, benthic habitat, and biota**.** This study followed proper scientific methodology and has stood up to ten plus years of peer review. The section on mercury studied large dredges running in mercury contaminated material and found that the readings of elemental mercury downstream from the dredge were actually lower than upstream of the dredge and that the discharge from the dredge was well within the natural variation of that stream. Prussian, Royer, Minshall, 1999

It is hard to refute properly conducted scientific evidence. That is why there have not been many studies on this subject, and the few that have been performed since have not used proper scientific methodology to reach the very biased conclusions that they have reached.

Humphries did not use proper methodology in his study, and he allowed to many variables to go uncontrolled that should have been controlled which has resulted in his study not standing up to peer review, and yet no matter how flawed the study, he found a dredge catches over 98% of the mercury that passes through it. He used a crash box header in that study, which is old suction dredge technology. The current dredges use flare tubes and are far more efficient in fine gold recovery, and therefore common sense would say they are far more efficient in fine mercury recovery also. This is because a flare tube does not cause the violent mixing of bottom sediment that the old crash box style headers do. So the question to be asked about this study is, if it had been performed using proper scientific methodology and had this study used current equipment instead of old outdated recovery technology, just how much improved would the recovery of that dredge had been? 1% possibly, which would have raised the recovery rate of that dredge to over 99% of the mercury that passed through it. As I said, there is no substitute for sound science.

A far more recent study was performed that I was personally involved in. **The Effects of Sediment and Mercury Mobilization in the South Yuba River and Humbug Creek Confluence Area, Nevada County, California:**
Open-File Report 2010–1325A
http://pubs.usgs.gov/of/2010/1325A/

The conclusions reached in this study are way off base, and in no way are based on sound science using proper scientific methodology. The press release from this study attacking recreational dredging is based only on personal opinion and ignores the very few scientific facts this study actually did produce. The conclusions of this study are based on a scientific concept that will not and does not stand up to peer review. That concept is that there is a layer of mercury laden clay slikens that is immune from the natural effects of erosion and flooding and is only being disturbed by suction dredges. This concept ignores the simple common sense fact that erosion and flooding are what have placed that mercury where it is today and erosion and flooding will continue to move that mercury. The study only took three year flood events into consideration to prove and justify the validity of this "concept". This study failed to mention or consider flood events that

occur every twenty to one hundred years that will obviously move any "theorized safe layer of mercury contaminated slikens as conceptualized in this study", all the way to the SF Bay Delta area in one single flood event. Worst yet, this study failed to mention the 100 to 200 year flood events that will without a doubt scour this river valley from one side to the other. These major flood events are a very real fact. It is only a matter of time before the next one occurs and once again scours this river bed in a way that this study never even considers. The flood of the winter of 1861 and 1862 is a scientific fact and matter of record, and will repeat itself. For this study to try and use the concept of a mercury contaminated slikens layer that is safe from the natural forces of erosion and flooding is a huge mistake in the scientific integrity of this report on dredging and mercury effects, especially in light of the study this very same government agency, USGS, has put together on this exact flood scenario called ARkStorm. Not only did this study fail to consider very real flood events that have and will occur, it also failed to even locate the layer of mercury laden slikens anywhere within the flowing riverber of the South Fork of thezYuba River. There are many other issues with how the conclusions of this study do not do not meet the intent of the standards of the USGS Fundamental Science Practices.

In the only actual testing of turbid discharge water below an actual operating suction dredge in highly mercury contaminated river material, the above study stated quote;

"Dredging appeared to have no major effect on pMeHg concentrations in the South Yuba River during the dredge Operations."

"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)."

Do not miss this point. The amount of methyl mercury and reactive mercury in the turbid discharge plume of a 3" suction dredge operating in the highly mercury contaminated SF Yuba river below the confluence of Humbug creek was so small it could not even be measured with the extremely sophisticated laboratory equipment used by one of the leading, if not the leading USGS mercury testing laboratory.

This fact 100% reinforces all the past studies that show the effects of suction dredging are *de-minimus.* It also shows that the turbidity that everyone is concerned about having a potential of moving measurable amounts of mercury that become methyl mercury are unfounded and uncalled for. The fact that a running 3" suction dredge in one of the most highly mercury contaminated rivers in this state created a turbidity plume that the amount of reactive and methyl mercury could not even be detected cannot be ignored or refuted.

Let me repeat this fact, in the only scientific test of a three inch dredge operating in the most highly mercury contaminated stream in California, using proper scientific methodology, the amounts of reactive mercury and methyl mercury in the turbidity plume of that suction dredge were to small to be measured using the extremely sophisticated equipment in one of the, if not the most, advanced USGS mercury testing laboratories in this country. Therefore, for CDF&G to state in this DSEIR anything that contradicts this

fact or contradicts the scientific facts from the 1999 EPA Alaska study on water quality proves that CDF&G has chosen to believe OPINIONS instead of scientific facts and these regulations are politically motivated instead of being based on sound science as is required by law.

I do not agree with the need for suction dredging permits to become limited entry. Suction dredging is not an operation that CDF&G grants mine owners the right perform, like commercial fishing. At a minimum, CDF&G should make permits available to all past permit holders from the creation of the 1994 regulations first before offering any new permits to the general public that opponents of dredging may try to obtain. The Federal mining law of 1872 as amended is what grants claim owners the legal right to remove mineral deposits located on those claims, and CDF&G only has the legal right to regulate any proposed mining project to minimize the negative impacts of the proposed mining activity. CDF&G does not have the legal right to prohibit this proposed mining activity through regulation as these new regulations proposed by this DSEIR will do, and restricting the number of suction dredging permits will do.

The new permit should be issued to a person, who only has to be present onsite for anyone to be able to operate any part of that person's suction dredge, not a nozzle operator's permit like in the past. California is the only state that issues a nozzle operator's permit and this is one area that California has never been in line with the industry standards from other states.

Also, the listing of actual dredges to be used is something that there is no legal need or requirement for. A suction dredge miner should be able to use any suction dredge he/she wishes that is of a legal allowed nozzle size. Dredges break and are replaced or other miners may loan one until another could be obtained. Sometimes one person may operate on another persons dredge. The requirement to list the actual dredge used on the permit is obviously unneeded over regulation that there is no harm impact associated to fish or game species and is therefore outside of CDF&G authority to regulate. Once again, mining mineral deposits is a Federal Granted Right, not a special privilege allowed by CDF&G at it's discretion like sport fishing and hunting or commercial fishing.

It is imperative that CDF&G realizes that the attack the Karuk Indians have made against suction dredging is based only on opinions that contradict all scientific studies done about the effects of suction dredging as it was being regulated under the regulations CDF&G adopted in 1994 from an environmental impact study that actually studied operating suction dredges. This DSEIR has not studied one single operating suction dredge yet the recommended regulation changes are extreme and will make suction dredging for mineral deposits on many Federal mining claims illegal.

050811(b) (6)

Response to Comment 1
See Response to Comment 2 in 050311_(b) (6)

Response to Comment 2
See MR-WQ-1 and MR-WQ-10.

Response to Comment 3
This comment does not substantially alter the assessment or its conclusions. Note also that it cannot be assumed that all dredgers would use the most current technology.

Response to Comment 4
See MR-WQ-6.

Response to Comment 5
See MR-WQ-12 and MR-WQ-13.

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(b) (6)

Subject: Suction Dredge Permitting Program
Date: Monday, May 9, 2011 10:26:40 AM PT
From: (b) (6)
To: dfgsuctiondredge@dfg.ca.gov

FROM: (b) (6) Oregon Wild | PO Box 11648, Eugene, OR 97440 | (b) (6) |
(b) (6)
TO: dfgsuctiondredge@dfg.ca.gov
ATTN: Mark Stopher, California Department of Fish and Game
DATE: 9 May 2011
RE: Suction Dredge Permitting Program

Please accept the following comments from Oregon Wild regarding the proposed Suction Dredge Permitting Program.

I want suction dredging prohibited in the upper East Fork Illinois River, upper Applegate River and their tributaries in Siskiyou County, California for the following reasons:

1. Remoteness from California staffing resources causes high expense with enforcement/monitoring. These areas can only be accessed via roads through Oregon.

2. Lack of enforcement/remoteness emboldens dredgers to not follow California regulations.

3. Viable populations of federally listed coho that spawn and rear in upper East Fork Illinois would be harmed. Habitat would be damaged due to disdain for regulations in this remote area.

4. Contamination of upper Applegate River, tributaries , and Applegate Lake due to mercury from historic mining and severe toxic metal contamination from the Blue Ledge mine. Suction dredging would likely re-suspend these toxic materials. http://www.fs.fed.us/r6/rogue-siskiyou/projects/mines/index.shtml

5. Pollution from dredgers would cross the Oregon/California state line and contaminate Oregon streams.

Sincerely,

(b) (6)

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050911(b) (6)

Response to Comment 1
Comment acknowledged.

Response to Comment 2
The assessment of potential water-quality effects of Program implementation presented in Chapter 4.2 of the DSEIR is applicable to describing effects that could occur in those water bodies that may cross the California/Oregon border.

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SISKIYOU PROJECT

Protecting the Siskiyou Wild Rivers region for future generations

May 9, 2011

Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001
dfgsuctiondredge@dfg.ca.gov

Re: Suction Dredge Permitting Program and Draft Subsequent Environmental Impact Report

Dear Mr. Stopher:

The Siskiyou Project is a non-government group that advocates for the protection of forests and streams on public lands within the Rogue River Siskiyou National Forest. I am staff ecologist and have considerable experience with documenting physical impacts from suction dredging (Nawa 2002), mining impacts in SW Oregon (Nawa 2010), and research about the susceptibility of Chinook salmon redds to scour (Nawa and Frissell 1993). The Siskiyou Project recommends that suction dredging be prohibited in the upper East Fork Illinois River, upper Applegate River, and their tributaries in Siskiyou County for the following reasons:

1. Remoteness from California causes high expense and coordination difficulties with enforcement/monitoring.
2. Lack of enforcement/remoteness emboldens dredgers to not follow California regulations.
3. Viable populations of SONC coho spawning and rearing in upper East Fork Illinois would be harmed. Habitat would be damaged due to disdain for regulations in this remote area.
4. Contamination of upper Applegate River, tributaries , and Applegate Lake due to resuspension of mercury from historic mining areas and resuspension of severe toxic metal contamination from the Blue Ledge mine.
5. Pollution from dredgers would cross California state line and contaminate Oregon streams.

The SEIR seems to have overlooked SONC coho salmon that are found in the upper East Fork Illinois River and its tributaries (Dunn Creek, Bybee Creek) located on the Rogue River Siskiyou National Forest in Siskiyou County. About 7 miles of high quality coho habitat is vulnerable to suction dredging. Figure 2-1 fails to illustrate the East Fork Illinois River in Siskiyou County at the extreme northern edge of

California. Vehicle access to this remote area is from Oregon. No vehicle access exists directly from California. An analysis of these streams in conjunction with the General Rationale for Proposed Regulations for SONC coho (Table 4.3-1 p. 3) would likely identify these cold water refugia streams for Class A in Proposed Amendments to Regulations (2-54). Currently the Proposed Program would leave the upper East Fork Illinois streams open to dredging with Class F season July 1-September 30 (SEIR 2-6) which is unacceptable because of adverse impacts to federally listed coho salmon. Besides thermal impacts and despoliation of spawning substrate prior to spawning (Harvey and Lisle 1999), enforcement of California laws in this disjunct remote area is extremely problematic. Apparently suction dredgers ignored the California moratorium and continued dredging in Dunn Creek through summer 2010. The problems associated with law enforcement alone would logically be reason for season long closure (Class A). The expense of CDFG to travel to the Upper East Fork Illinois River to administer the Proposed Program would be cost prohibitive. Dunn Creek has high quality habitat which is being annually degraded, regardless of California regulations.

The proposed regulations would designate the Applegate River and all tributaries as Class C (SEIR 2-54) to allow dredging from June 1-September 30 (SEIR 2-6). The SEIR has found a significant and unavoidable impact from the effects of mercury resuspension and discharge from suction dredging (SEIR 4.2 p.33-54). The upper Applegate River and tributaries in California have had gold mining operations that have likely contaminated the area with mercury. The upper Applegate River in California flows into Applegate Lake in Oregon. Fish in Applegate Lake would be expected to experience elevated mercury similar to Englebright Lake (SEIR 4.2-48). Thus, the significant and unavoidable impacts from mercury resuspension identified in the SEIR would be expected to occur with proposed dredging in the Upper Applegate River and its tributaries.

The U.S. Environmental Protection Agency is proposing to add two abandoned mines that discharge toxic pollutants to California waterways to the Superfund National Priorities List. The Blue Ledge Mine is located on privately owned land surrounded by the Rogue River-Siskiyou National Forest, approximately three miles south of the Oregon-California border along Joe Creek in the upper Applegate River watershed. Copper, cadmium, other metals, and acid mine drainage from past copper and zinc mining operations have contaminated sediments and surface water at levels that are toxic to aquatic organisms. Impacts include the absence of fish for more than three miles downstream and potential negative impacts to fisheries all the way to the Applegate Reservoir, nearly eight miles downstream. http://yosemite.epa.gov/opa/admpress.nsf/0/55332E90033DDA768525784D005DD2CB

The USFS collected surface water samples from the mine drainage, Joe Creek, and Elliott Creek in April 1992. Samples were analyzed for pH, conductivity, metals, sulfates, fluoride, hardness, and alkalinity. The results confirmed that the mine drainage contained cadmium, copper, and zinc at levels exceeding EPA freshwater criteria. The sample of the mine drainage exhibited an acidic pH of 3.10. In summary, the previous investigations have demonstrated that the waste rock present within the abandoned workings and on the slopes of the Site are a significant historic and ongoing source of cadmium, copper, iron, lead, and zinc, and sulfuric acid to Joe Creek. Data from previous investigations demonstrate that cadmium, copper, iron, and zinc concentrations in surface water detected below the Site are significantly higher than background detections, further confirming that the Site is a significant source of these metals and is releasing these metals to the environment at

significant concentration. Based on the work completed to date, releases have been confirmed to have severely impacted the aquatic life of Joe Creek, and Joe Creek would otherwise be a productive native fishery. Numerous reports about blue ledge mine contamination and remediation are available at http://www.fs.fed.us/r6/rogue-siskiyou/projects/mines/index.shtml

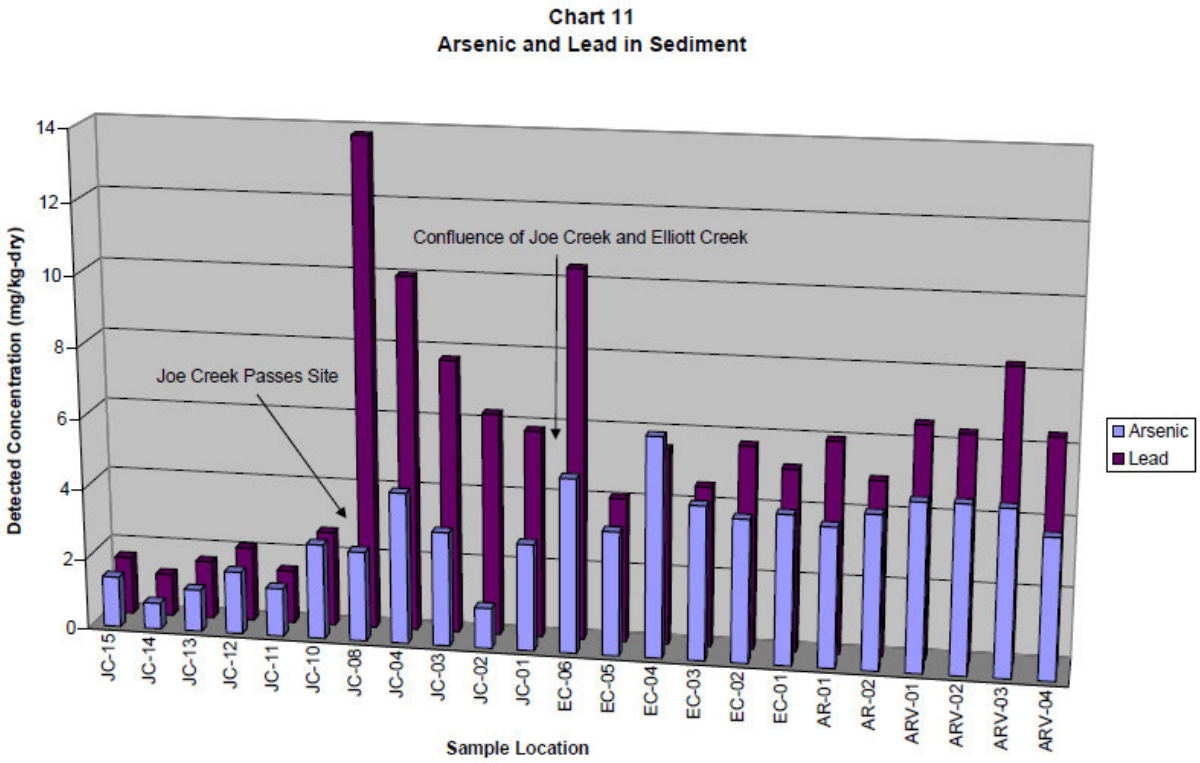

Chart 11. The Blue Ledge mine has caused elevated arsenic and lead in streambed sediments of Joe Creek(JC), Elliot Creek (EC) and Applegate Reservoir (Lake).

Historic copper and zinc mining from the Blue Ledge mine and resulting acid drainage has caused some upper Applegate River tributaries to have low pH and are susceptible to the significant and unavoidable effects of resuspension and discharge of other trace metals form suction dredging (SEIR 4.2 p. 54-59; p. 58 lines 34-44). Closing these trace metal hot-spots associated with past mining operations (e.g. problematic sites with acid mine drainage) would be advisable. Thus it would be prudent to close the Applegate River and its tributaries to suction dredge mining.

Both the upper Applegate River and upper East Fork River flow from California into Oregon creating a need for pollution restrictions, analysis, and coordination due to pollution created by the California Proposed Program causing contamination to Oregon waters. The situation for the Applegate Watershed is particularly acute because of the potential for mercury, lead, arsenic, and other toxic elements to accumulate in Applegate Lake which lies immediately north of the California/Oregon state line. The

complexities of oversight involving two states and regional EPA would seem to warrant prohibition of suction dredging in these remote areas separated from direct California access. Monitoring and administration would be extremely costly for California state officials to make site visits. Simply ignoring the pollution issues caused by suction dredging will create extreme difficulties for federal and state agencies located in Oregon. In summary, it seems best to prohibit suction dredging in disjunct remote river systems that drain into Oregon.

References

Nawa, R.K., 2002. Observations of mining activities in Siskiyou National Forest Riparian Reserves and Probable Impacts to Aquatic Organisms. Siskiyou Project, Grants Pass, OR.

Nawa, R.K., 2010, Mining impacts in the Siskiyou Wild Rivers Area Southwest Oregon. Siskiyou Project, Grants Pass, OR

Nawa, R.K. and C.A. Frissell, 1993. Measuring scour and fill of gravel streambeds with scour chains and sliding-bead monitors. North American Journal of Fisheries Management 13:6234-639.

Sincerely,

Richard K. Nawa
Staff Ecologist
Siskiyou Project
950 SW 6th
Grants Pass, Or 97526

541-476-6648
rich@siskiyou.org

Cc: Oregon Department Environmental Quality

Enc: Nawa 2002, Nawa 2010, Nawa and Frissell 1993

050911 Nawa

Response to Comment 1
Comment acknowledged.

Response to Comment 2
The assessment of potential water quality effects of Program implementation presented in Chapter 4.2 of the DSEIR is applicable to describing effects that could occur in those water bodies that may cross the California–Oregon border.

Response to Comment 3
In Chapter 4.2 of the DSEIR, Impact WQ-6 addressed the potential disturbance and discharge of trace metals that may be present in unknown hot-spot deposits, which was considered a potentially significant impact. See also MR-GEN-6.

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Allowing the activity to occur, with the vague possibility that harms may be address in the future is simply not acceptable. While this is true of any program, it is particularly true here. The tribal governments and organizations who submit these comments began addressing the harms that suction dredging cause to fish – and particularly to endangered fish species – in 1997 (and in some instances much earlier). It has taken two lawsuits and a Legislative enactment to force the Department to stop issuing suction dredging permits, even after the Department fully acknowledged the harm being caused to endangered fish in a court of law. Considering how hard-fought any change has been to date, the public cannot accept an environmental assessment that is vague and dismissive on key issues.

Recommendation

The Department must acknowledge its authority to address adverse impacts from suction dredge mining that are identified in the dSEIR, including adverse impacts to water quality that impact fish. The Department cannot study the impacts of water quality from suction dredge mining and then pass the buck to another agency, which cannot be held accountable for findings and statements made during this administrative process.

In addition, the Water Board's intended use of the water quality assessment in the dSEIR must be clearly stated. The Water Board must come forth and state if it intends to issue a permit for suction dredge mining, particularly the type of permit (individual or blanket permits; NPDES permit under section 402 of the Clean Water Act; a Waste Discharge Permit under Porter-Cologne; or a Waste Discharge Permit and 401 State Water Quality Certification, subsequent to the issuance of a 404 dredge permit issued by the Army Corps). The Water Board should also confirm its intention to conduct an antidegradation analysis and an anticipated timeline for the public comment period and adoption of the permit.

Lastly, if the Water Board anticipates reliance on the Department for any aspect of its own permitting program, particularly enforcement, that information must be clearly stated in detail during the public comment period on the Department's draft dSEIR and draft regulations. This information *cannot* be made public after the fact.

COMMENT # 6: THE HYDROLOGY AND WATER QUALITY SECTION FAILS TO ADEQUATELY EVALUATE DELETERIOUS EFFECTS OF RESUSPENDED MERCURY ON FISH

Reasoning

There are two potential pathways in which fish could be exposed to mercury in the aquatic environment. One pathway is direct uptake, methlymercury passing through membranes, from the water column and the second is through feeding on organisms contaminated with mercury; such as macro invertebrates, amphibians, crayfish, mussels and algae. Cumulatively these pathways result in exposure of fish to an extremely

harmful metal, mercury is a known mutagen, teratogen and carcinogen with effects in fish ranging from acute to lethal.

The following except from ***Mercury Hazards To Fish, Wildlife, and Invertebrates: A Synoptic Review***[9] describes the effects detected in mercury poisoned fish:

> *"Signs of acute mercury poisoning in fish included flaring of gill covers, increased frequency of respiratory movements, loss of equilibrium, and sluggishness (Armstrong 1979). Signs of chronic mercury poisoning included emaciation (due to appetite loss), brain lesions, cataracts, diminished response to change in light intensity, inability to capture food, abnormal motor coordination, and various erratic behaviors (Armstrong 1979; Hawryshyn et al. 1982). Mercury residues in severely poisoned fish that died soon thereafter ranged (in mg/kg fresh weight) from 26 to 68 in liver, 16 to 20 in brain, and 5 to 7 in whole body (Armstrong 1979). And at high sublethal concentrations of methylmercury, rainbow trout were listless and darkly pigmented; appetite was reduced, and digestion was poor (Rodgers and Beamish 1982)."*

LC-50 laboratory studies exposing juvenile and embryo-larva rainbow and brook trout to various levels of organic mercury, identified concentrations causing death at the various life stages, see Table 1.

Table 1: LC-50 Studies on Rainbow and Brook Trout

	Effect	*Concentration ug Hg/L medium*	*Reference*
Rainbow trout			
Larva	LC-50 (96 h)	24.0	EPA 1980
Juvenile	LC-50 (96 h)	5.0–42.0	EPA 1980
Brook trout			
Yearling	LC-50 (96 h)	65.0	EPA 1980

Mercury at low concentrations adversely affects freshwater organisms' cycles of reproduction, growth, behavior, metabolism, blood chemistry, osmoregulation and oxygen exchange. Aquatic biota accumulation of mercury is generally rapid while depuration is slow, leading to bioaccumulation. Organomercury (especially methlymercury) compounds are significantly more effective in producing adverse effects and accumulations than inorganic mercury.[7] Generally, mercury accumulation is enhanced with increasing age of the organism and when water quality conditions are

[9] Eisler, Ronald 1987. *Mercury Hazards To Fish, Wildlife, and Invertebrates: A Synoptic Review*. U. S. Fish and Wildlife Service Patuxent Wildlife Research.

such: elevated temperature, reduced salinity/hardness, reduced pH, and presence of zinc, cadmium or selenium.[7]

Water quality conditions in the Klamath River monitored during base flow by the Karuk Tribe Water Quality Program indicate annual elevated temperatures, low conductivity and pH dips characteristic of photorespiration from algal communities.[10] Water quality data collected specifically from Indian Creek detected mercury in the system along with reduced hardness, low levels of pH and increased water temperature.[11] Data collected during base flow overlaps with dredging activities in the Klamath main stem and tributaries.

The SEIR 4.2-52 indicates a single dredger could increase mercury contamination by 10%: "For example, within areas of highly elevated sediment Hg concentrations, a single suction dredge operator using an average size (4 inch) dredge could discharge approximately 10% of the entire watershed Hg loading during a dry year during an average suction dredging time of 160 hours." Given the ideal water quality conditions in the Klamath and its tributaries and the potential for a **single** dredge to discharge 10% of a watershed's mercury load, uptake of mercury by aquatic organisms is likely.

A recent study on the Trinity River, tributary to the Klamath, demonstrated uptake of mercury in larval lamprey ammocoetes and western pearlshell.[12] These are both traditional food sources to the Karuk Tribe; and as with salmonids, the bio-magnification through the food chain presents a health risk to tribal people consuming these foods.

Recommendation

In summary, the water quality conditions documented in the Klamath River and historic use of mercury for gold mining extraction poses a significant impact to fish as well as people. Mining directly for mercury also occurred in the Klamath River basin on the west fork of Beaver Creek, Oak Bar and Empire Creek. Maps of historic gold mines are available and should be used to identify "hot spots". Dredging activities in known and unknown "hot spots" have the potential to re-suspend mercury which is then absorbed by many aquatic species as proven in both the 2010 USGS study *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* as well as the 2010 Trinity River report, *A comparison of mercury contamination in mussel and ammocoete filter feeders*. Mercury is not limited to the Yuba River. The Klamath River is another hot-spot as the data from the Trinity River study confirms. The current water quality alternative presented in the DEIS does not remedy suction dredgers mobilizing

[10] Karuk Department of Natural Resources, 2009. Water Quality Report for the Mid-Klamath, Scott and Shasta Rivers: May-Dec 2009.
[11] Karuk Department of Natural Resources, 2001. Karuk Aboriginal Territories Indian Creek and Elk Creek Water Quality Monitoring Report.
[12] Bettaso JB, Goodman DH. 2010. A comparison of mercury contamination in mussel and ammocoete filter feeders. Journal of Fish and Wildlife Management 1(2):142–145; e1944-687X. doi:10.3996/112009-JFWM-019

mercury from unknown hotspots. In order to mitigate for the potential deleterious impacts that can occur to aquatic organisms in known and unknown mercury "hot spots", it is our recommendation that DFG restrict dredging in watersheds with a well-documented history of gold mining.

COMMENT # 7: DSEIR FAILS TO EVALUATE HUMAN HEALTH IMPACTS AND FISH HEALTH IMPACTS RESULTING FROM THE MECHANICAL LYSING OF MICROCYSTIS AERUGINOSA AND RELEASE OF MICROCYSTIN

Reasoning

Dredging occurs at a time when the levels of *microcystis aerugenousa*, and its associated liver toxin microcystin, are elevated to levels requiring public health postings. The cells of the algae are suspended in the water column as it flows downstream to the estuary from its source, the Copco and Iron Gate Reservoirs. When the cells of *microcystis* are lysed or broken, the toxin microcystin is then released into the water column. Dredging operations involve the sucking of the river water through a hose which then pressure pushes the water over a series of angular metal trays to extract the gold. Activities such as these have the potential to lyse the algal cells thereby releasing the toxin.[13] Unlike other water quality impacts associated with dredging activities, release of the toxin is a cumulative addition to the current elevated toxin concentration and does not diminish as it travels further away from the dredge; the toxin thus travels to the ocean.

Elevated toxin levels annually present a threat to public health as well as presenting a stress to salmonids. During the fall of 2010, the Karuk Tribe water quality department collected adult salmonid tissue for analysis of microcystin. The toxin was detected in the livers of one steelhead and four adult Chinook during the sample period.[14] Figure 1 depicts *microcystis* and microcystin sampling results from 2010, as well as highlights the time at which fish were collected with detectable levels of microcystin; sampling locations span the Klamath River below Iron Gate (site code: KRBI) to Orleans (site code: OR).

[13] Kann, Jacob, Personal communication, April 2011.
[14] Kann, Jacob., L.Bowater, G.Johnson and C.Bowman. Technical Memorandum: Preliminary 2010 Microcystin Bioaccumulation Results for Klamath River Salmonids (Updated 4-7-2011).

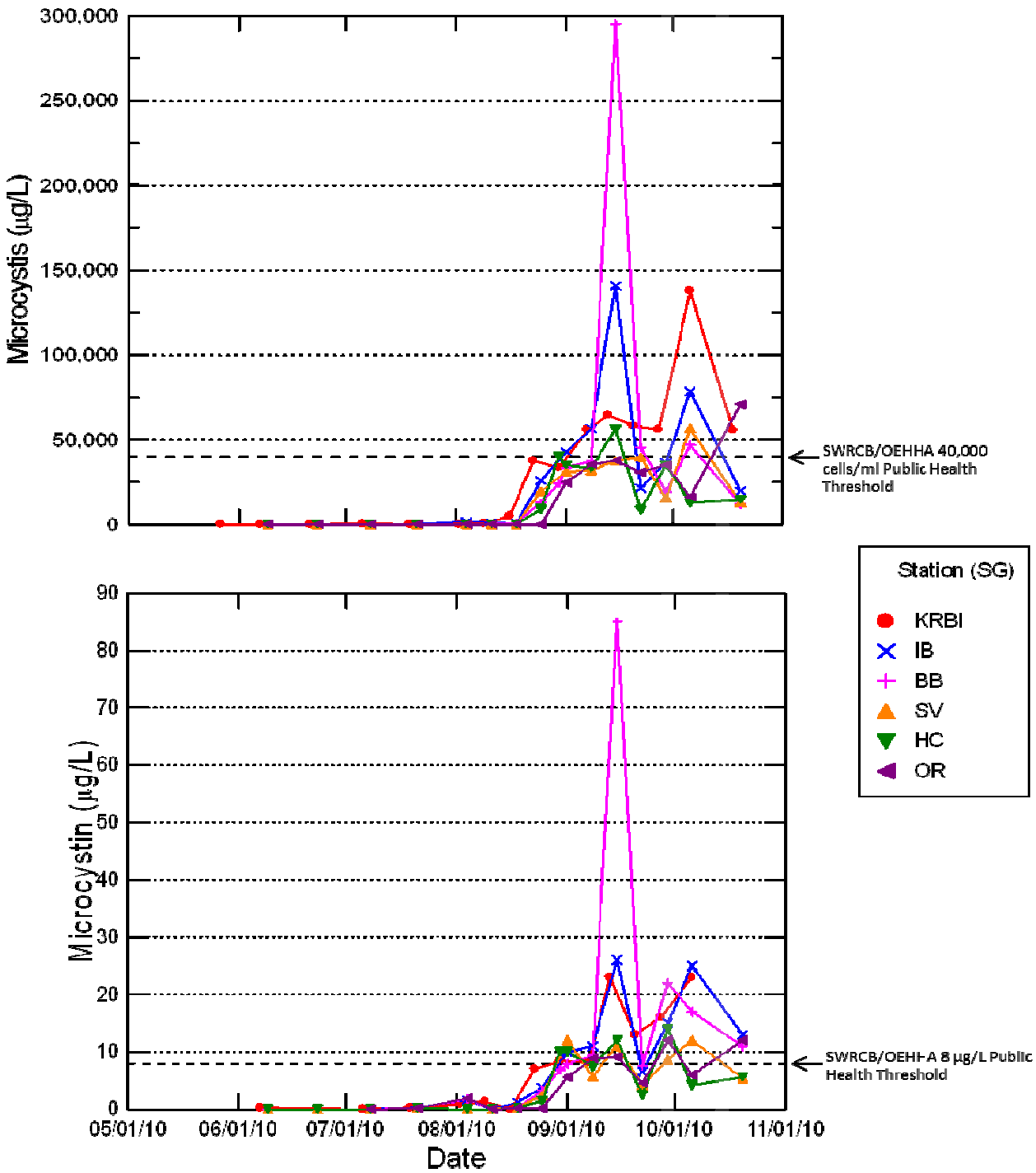

Figure 1: Public Health Sampling 2010 Microcystis and Microcystis Results; shoreline grabs. Shaded vertical lines depict time periods when fish with positive microcystin were collected.

In 2009, the Karuk Tribal Water Quality Department conducted a study to examine the levels of microcystin in fresh water mussel tissue, a traditional food of the Karuk people. Results indicated that ingestion of fresh water mussels in the Klamath River system would result in microcystin doses exceeding various public health thresholds for safe

consumption throughout the summer and fall.[15] Children are most at risk in the months of July, September, and October, when the Acute Tolerable Intake (TI) dose was exceeded by up to ~4 times. This coincides with the time of year that traditional and subsistence use of fresh water mussels occurs; even one meal could exceed safe consumption levels.

Recommendation

In order to avoid the lysing of *microcystis* which thereby increases the concentration of microcystin in the river posing a health threat to people through direct exposure to river water as well as through consumption of mussels, and posing an additional stressor to salmonids; dredging should not occur when microcystis is present in the water column. In 2010, this generally occurred between the months of August and mid-October (Figure 1). In drier years, the bloom may begin as early as July and extend into October[16,17,18]

COMMENT # 8: THE SEIR SHOULD INCLUDE A SECTION ON ENVIRONMENTAL JUSTICE

The Karuk Tribe has described the cultural beneficial uses of the Klamath River. These uses are described and documented in some detail in Chapter 2 of the North-coast Regional Water Quality Control Board's *Staff Report for the Klamath River Total Maximum Daily Loads (TMDLs) and Action Plan Addressing Temperature, Dissolved Oxygen, Nutrient, and Microcystin Impairments in California.*[19] The affect the Program would have on these uses were not evaluated.

Reasoning

Several California laws require that state agencies, and California EPA in particular, consider how rules and regulations affect minority communities. These laws include SB 828, AB 1360, SB 89, and more.

Environmental justice (EJ) is defined in California law as *"the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws and policies."*[20]

The Karuk Tribe has described the cultural beneficial uses of the Klamath River. These uses are described and documented in some detail in Chapter 2 of the North-coast

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[15] Kann, J., S. Corum. 2009. Toxigenic Microcystis aeruginosa bloom dynamics and cell density/chlorophyll a relationships with microcystin toxin in the Klamath River, 2005-2008. Technical Memorandum Prepared for the Karuk Tribe of California, May, 2009.
[16] Jacoby, J.M. and J. Kann. 2007. The Occurrence and Response to Toxic Cyanobacteria in the Pacific Northwest, North America. Lake and Reserv. Manage. 23:123-143.
[17] Kann, J., S. Corum. 2010. Middle Klamath River Toxic Cyanobacteria Trends, 2009. Technical Memorandum Prepared for the Karuk Tribe of California, June, 2010.
[18] Kann, J., S. Corum, K.Fetcho 2009. Technical Memorandum: Microcystin Bioaccumulation in Klamath River Freshwater Mussel Tissue: 2009 Results.
[19] http://www.swrcb.ca.gov/northcoast/water_issues/programs/tmdls/klamath_river/090619/Ch_2_PS_090619.pdf
[20] Government Code section 65040.12

take a hard look at dredging impacts to filter feeding communities except for how mercury bioaccumulates.

Recommendation

Undertake a more thorough evaluation of the impacts to lamprey ammocoetes, mussels, and other filter feeders.

COMMENT # 14: PROPOSED REGULATIONS VIOLATE KLAMATH BASIN PLAN AND EXISTING STATE LAW

Reasoning

In many salmonid bearing streams, migrating fish, both out-migrating juveniles and returning adults, rely heavily on thermal refugia to survive. Thermal refugia are river zones characterized by water temperatures measurably lower than the main channel or surrounding area. The lower temperature of the refugial area results from inflow from a colder tributary or an underwater spring.

Although the Department did propose significant dredging restrictions in Klamath River cold water refugia, it failed to propose restrictions wholly consistent with the restrictions mandated by the Klamath TMDLs. The Porter-Cologne Act requires State Agencies to comply with State Water Quality standards:

> ***§ 13146. State agency compliance***
> *State offices, departments and boards, in carrying out activities which affect water quality, shall comply with state policy for water quality control unless otherwise directed or authorized by statute, in which case they shall indicate to the state board in writing their authority for not complying with such policy.*

Specifically, the refugial areas identified in the TMDL not identified in the Department's proposed regulations are:

- Canyon Creek (Siskiyou county)
- Cottonwood (Siskiyou county)
- Little Horse Creek (Siskiyou county)
- West Grider Creek (Siskiyou county)

The following creeks have a 1500 foot thermal protection zone in TMDLs but only 500 foot protection zone in proposed Regulations:

- Aubry Creek (Siskiyou County)
- Clear Creek (Siskiyou County)
- Dillon Creek (Siskiyou County)
- Elk Creek (Siskiyou County)
- Grider Creek (Siskiyou County)

- Horse Creek (Siskiyou County)
- Indian Creek (Siskiyou County)
- Rock Creek (Siskiyou County)
- Swillup Creek (Siskiyou County)
- Ukonom Creek (Siskiyou County)

Additional Creeks have additional in stream restrictions on dredging described in the TMDLs that are not reflected in proposed DFG regulations. A full comparison between proposed DFG regulations and restrictions on dredging included in the TMDLs can be seen in the following table:

Klamath River Tributaries	**Refugia Protection proposed by DFG**	**Refugia Protection Provided by TMDL**
Aubrey Creek	500 ft radius	1500 ft radius + 3000 feet up the Creek
Beaver Creek	500 ft radius	1500 + 3000 feet up the Creek
Canyon Creek	0	500 ft radius
Cottonwood Creek	0	500 ft radius
Clear Creek	500 ft radius	1500 ft radius + 3000 feet up the Creek
Dillon Creek	500 ft radius	1500 ft radius + 3000 feet up the Creek
Elk Creek	500 ft radius	1500 ft radius + 3000 feet up the Creek
Empire Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Fort Goff Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Grider Creek	500 ft radius	1500 ft radius + 3000 feet up the Creek
Horse Creek	500 ft radius	1500 ft radius + 3000 feet up the Creek
Indian Creek	500 ft radius	1500 ft radius + 3000 feet up the Creek
Jenny Creek	0	500 ft radius
King Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Little Horse Creek	0	500 ft radius + 3000 feet up the creek
Little Humbug Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Mill Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Nantucket Creek	500 ft radius	500 ft radius + 3000 feet up the creek
O'Neil Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Portuguese Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Reynolds Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Rock Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Sandy Bar Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Seiad Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Stanshaw Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Swillup Creek	500 ft radius	1500 ft radius + 3000 feet up the Creek
Ti Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Titus Creek	500 ft radius	500 ft radius + 3000 feet up the creek
Ukonom Creek	500 ft radius	1500 ft radius
West Grider Creek	0	500 ft radius
Scott River Tributaries		
Boulder Creek	none	500 ft radius
Canyon Creek	none	500 ft radius
Kelsey Creek	none	500 ft radius

Recommendation

Dredge mining regulations should not be inconsistent with California water quality laws such as the Klamath Basin Plan, or any other state or federal river management plans.

COMMENT # 15: PROPOSED REGULATIONS FAIL TO PROTECT HABITATS AGREED TO IN THE DFG/KARUK PROPOSED SETTLEMENT AGREEMENT

In 2005 the Karuk Tribe filed litigation against the Department alleging that suction dredge mining regulations were insufficient to protect fish. Shortly thereafter, the Department and the Tribe negotiated mining restrictions in the Klamath Basin that the Department agreed achieved the statutory standard of "not deleterious to fish."

This agreement was based on the consideration of data exchanged between the Tribe and the Department. The data established that the impact of suction dredge mining in these waters would cause deleterious impacts to endangered and special status fish species, including the Coho salmon. That reasoning and data were described in the concurrently filed declaration of Dr. Peter Moyle, fisheries biologist and professor in the Department of Wildlife, Fish, and Conservation Biology at the University of California at Davis, and Associate Director of its Center for Watershed Science. Some of Dr. Moyle's studies were reviewed by the Department in drafting the dSEIR and draft regulations (included in the Literature Review).

Dr. Moyle testified as follows:

"The general effects of suction dredging on fish are well described in Harvey (1986) and Harvey and Lisle (1998) and so will be described only briefly here. The effects vary according to a variety of factors including size of stream, fish species present, season of dredging, and frequency and intensity of dredging. The key is that suction dredging represents a chronic unnatural disturbance of natural habitats that are already likely to be stressed by other factors and can therefore have a negative impact on fishes that use the reach being dredged. Direct effects include entrainment of invertebrates and small fish in the dredges, altering of the habitat that supports the food supply of fishes, and changing channel structure in ways that make it less favorable for fish (usually by making it less stable and complex). An area of particular concern in the Klamath, Salmon and Scott Rivers and their tributaries is the creation of piles of dredge tailings that are attractive for the spawning of salmonids but that are so unstable they are likely to scour under high flows, greatly reducing survival of the embryos placed within the gravel.

"A more immediate effect is the impact of chronic disturbance of the fishes, which can change their behavior and cause them to move to less favorable conditions. I am particularly concerned in this regard with dredging in or near thermal refugia of juvenile salmonids. As discussed in the NRC (2003) report and references therein, the Klamath River and some of its tributaries can reach temperatures in excess of 65-70ºF during the

day in late summer. Such temperatures are very stressful or even lethal for many salmonids, so the fish seek out cooler areas, where small tributaries flow into the river or there is upwelling of ground water. Juvenile Coho salmon, Chinook salmon, and steelhead will often be packed into these areas during the day. This past August, I spent a day with Dr. Michael Deas, who was documenting the nature of a thermal refuge created by the inflow of single creek into the Klamath River. When I swam through the refuge area with a mask and snorkel I was impressed with the concentrations of fish in the area (and the lack of them in the main river) and how much even a minor disturbance of the habitat would reduce the ability of the area to support fish.

"Adult salmon and steelhead can also be disturbed by the intense dredging activities. I am particularly concerned with spring-run Chinook salmon, a species with which I have worked closely in the Sacramento River drainage. Adult spring-run Chinook spend the summer in pools in rivers, especially the Salmon River (and its forks) and Wooley Creek. They have to survive the summer without feeding, using reserves of fats and oils they bring up from the ocean. Chronic disturbance of the type created by dredging and dredgers can increase stress on these fish and has the potential to reduce their over-summer survival. An often overlooked impact of dredging is that the people involved often live on or close to the stream in remote areas for weeks at a time, where they not only dredge, but swim, bathe, and fish (sometimes illegally). Such activity can cause spring-run Chinook to use up precious energy reserves if they have to move to less favorable areas or swim about avoiding people.

"It is important to note that the Klamath River and its tributaries support the highest diversity of anadromous fishes of any river in California including: Coho salmon, chum salmon, multiple runs of Chinook salmon, coastal cutthroat trout, multiple runs of steelhead, eulachon, green sturgeon, white sturgeon, Pacific lamprey, and river lamprey. This is the reason, of course, why the river also supported a rich and diverse fishery by the native peoples who live along the river. Today virtually all the species are in decline or threatened with declines from multiple factors (see NRC 2003). Therefore, in my professional opinion, suction dredging should only be allowed in areas where it can be demonstrated there will no immediate or cumulative impact on the anadromous fishes. It should be assumed there is harm, unless it can be proven otherwise. One reason for my taking this conservative position is that we simply do not know the effects of dredging on many species, especially when the intensity of dredging is increasing. For example, the larvae (ammocoetes) of Pacific and river lamprey live in soft materials along the stream edge or in slow-moving sections of stream. Dredging of areas where ammocoetes are abundant will push them into the water column where they can be readily consumed by predators, contributing further to the likely declines of the species. Even for salmonids, information on the effects of dredging, with the exception of a few studies such as that of Harvey (1989), is largely anecdotal or in non-peer reviewed reports (see, for example, the bibliography of DFG 1994). Studies are also largely confined to looking at immediate effects of single dredges and they do not examine the cumulative or long-term effects of multiple dredges and activities associated with the dredges. Indeed little has changed since DFG (1994, p. 71) listed the need for additional studies on practically every

important aspect of the environmental impacts of dredging. Harvey and Lisle (1998) present a strategy for acquiring much of the needed information.

"The NRC (2003) report emphasized two important considerations for the recovery of Klamath basin fishes that are especially relevant here: (1) cold water refuges are key to the persistence of many species, especially Coho salmon and (2) the entire array of anadromous fishes (i.e., the Tribal Trust Species) need large scale and pro-active measures to assure recovery. Suction dredging is one more insult to these fishes that is likely to hurt their chances for recovery. In particular, Coho salmon, spring-run Chinook salmon, and summer (spring) steelhead are particularly vulnerable to the immediate effects of dredging and have been reduced to low numbers in the Klamath Basin so need special protection."

However, the newly proposed regulations allow suction dredge mining, contrary to the data and reasoning agreed upon in 2005 and as described above by Dr. Moyle. For most of the river segments, the proposed regulations extend the season deeper into the fall. For the Salmon and Scott, all tributaries where mining would have been banned in the proposed settlement are open to dredging in the proposed regulations.

The Department agreed that a ban on dredging in the following tributaries were necessary to avoid a deleterious impact on fish in the proposed Karuk Settlement:

Salmon River tributaries
Butler
East Fork of Knownothing
Indian
Kelly Gulch
Knownothing
Little N. Fork
Methodist
Negro
Nordheimer
North Fork
South Fork
Specimen
Wooley

Scott River Tributaries
E. F. Big Mill
SF Boulder
Canyon
Etna
French
Kangaroo
Kelsy
Kidder
McAdam
Mill (Scott Bar)
Mill (aka Shackleford/Mill)

Moffett
Patterson
Shackleford
SF Scott
Suger
Tompkins
Wildcat
Wooliver

In addition, the dredging season in the main-stem Salmon was banned from the mouth to Forks of Salmon and the season was 15 days shorter in the main-stem Klamath.

Recommendation

The Department should explain in detail why it no longer judges dredging in these tributaries to be deleterious to fish as it once did. In addition, the Department should explain in detail why the Department decided to change its policy position established in the proposed Karuk settlement such that dredging from September 15 to September 30 in the main-stem Klamath no longer causes deleterious impacts to fish.

COMMENT # 16: PROTECTING COHO FROM DELETERIOUS EFFECTS OF DREDGES MEANS PROTECTING BEAVER FROM DELETERIOUS EFFECTS OF DREDGES

Recent data suggest that a critical step in restoring Coho salmon is the restoration of beaver and beaver habitat (http://www.surcp.org/beavers/conference.html). Indeed, recent surveys of beaver bonds in the Klamath Basin reveal improved juvenile rearing populations of Coho in areas flooded by beaver ponds (Toz Soto, Will Harling, personal communication).

Recommendation

Ban dredges where established or suitable beaver habitat coincides with that of Coho salmon.

COMMENT # 17: EVALUATE RISK TO PUBLIC CREATED BY HIDDEN UNDERWATER PITS EXCAVATED BY DREDGERS

Reasoning

Dredging often leaves behind deep under water pits excavated by the dredge. Although the draft regulations require dredgers to fill in pits, this rule will not likely address this concern. The material excavated from the pit often washes downstream and is therefore not available to put back in the pit. Furthermore, commenters assert that it is highly unlikely that unsupervised miners would make the effort to fill in the pits and the Department lacks the manpower and resources to properly enforce this provision.

Recommendations

In the context of cultural resource management, Commenters are uncomfortable with these proposed actions, and the reinstatement of largely unmanaged ground disturbing activity along the Klamath River and its tributaries. Commenters support the following recommendations provided by the Karuk Tribal Historic Preservation Office:

- At a minimum, prior professional archaeological and tribal review and evaluation of all sites to be permitted for suction dredging. This assessment recognizes that many sites are unrecorded throughout California, and maintain both their significance and integrity.
- Funding for such site review to be provided by through Dredge Permit fees.
- Clear provision for enforcement and defined jurisdictional authority.
- All permit holders must be advised of Federal and State laws that govern cultural resources, and the associated penalties for any infractions of those laws.
- All cultural resource information must remain confidential, and not made public. Any associated records, site maps, and associated materials are to be kept in a secure facility – either the appropriate Information Center and/or THPO office.
- Annual review of the program with key stakeholders, including tribal government representatives. Development of a clear and comprehensive mechanism to provide findings and assess impacts, including cultural resource protection and management.

COMMENT # 29: THE SEIR FAILS TO PROVIDE ANY RECENTLY COLLECTED SUCTION DREDGE TURBIDITY DATA FROM 303(D) SEDIMENT LISTED STREAMS ON THE NORTH COAST TO SUBSTANTIATE THE "LESS THAN SIGNIFICANT" DETERMINATION FOR EFFECT OF TURBIDITY/TSS DISCHARGES FROM SUCTION DREDGING (IMPACT WQ-3 SEIR 4.2-28).

Reasoning

The SEIR (4.2-31 lines 39-44) states that "[w]hen the levels of suspended solids (and thus turbidity) become extremely high, they can adversely impact fish and macro invertebrates by making it difficult for sight feeders to locate prey, causing abrasive injuries, clogging gills and respiratory passages, and/or by blanketing the streambed, thereby killing incubating fish eggs/larvae and benthic macro invertebrates (McKee and Wolf, 1963; EIFAC, 1965; NAS, 1972; Alabaster and Lloyd, 1980)." The Proposed Program has a new provision that states "reasonable care shall be used to avoid dredging silt and clay material, the disturbance of which would significantly increase in turbidity." Dredging into silt/clay stream banks, which is known to occur regularly, is likely to create extremely high TSS and turbidity, but the SEIR conveniently assumes that this will

not happen because "the Program would provide enforceable conditions." (SEIR4.2-32).

In reality, neither dredgers nor law enforcement officials can reasonably be expected to recognize silt or clay material (less than 63 micrometers) or what "reasonable care" means. A significant effect is certain when stream banks are excavated in conjunction with dredging on small remote Coho streams (e.g., Smith River and Scott River tributaries). Extreme turbidity, exceeding that commonly reported in controlled studies (SEIR 4.2-29 lines 12-15) is likely to occur and have significant impacts of fish.

The SEIR fails to acknowledge that the reason many streams are listed for sediment is because the streambed has a relatively high content of silt/clay. "Reasonable care" could mean no dredging in silt/clay laden 303(d) listed streams. In small, low-gradient streams favored by Coho salmon, dredgers are likely to create extremely high turbidity which could extend very far down the stream. Coho could not avoid the plume in small streams because it would extend from bank to bank. For example, Nawa[55]reports having to discontinue snorkel counting of juvenile Coho salmon when turbid water from a single suction dredge muddied an estimated 1,000 feet of a small unnamed tributary to Middle Fork Sixes River in Oregon. The entire water column was muddied and the juvenile Coho salmon had no place to escape the turbidity. Assumptions made by the dSEIR about fish avoidance of turbidity would only be valid on larger streams such as the Klamath River.

The dSEIR provides no data about turbidity/TSS measurements in 303(d) sediment listed streams to demonstrate the validity of dSEIR speculation of how dredging would actually affect turbidity/TSS. In the absence of data collected from suction dredgers in 303(d) streams, the only valid assumption is that they would adversely affect fish, especially federally listed Coho salmon.

The SEIR (5-28) fails to explain or provide a scientifically valid reason why the CDFG "believes" that SEIR reported significant cumulative turbidity and significant cumulative discharges (<u>that would appear to warrant dredging closures</u>) are not "believed" to be necessary to avoid deleterious effects to fish. Opinions not supported by facts are not valid.

Recommendation

Ban suction dredge mining in all 303(d) impaired streams until such time that studies can be designed and conducted, data collected and impacts assessed such that the Department has sufficient data to determine that no suction dredging operation will cause deleterious impacts to fish. Once the latter has occurred, the Department should amend the regulations, if the data supports reclassification of the respective streams to allow suction dredge mining to occur.

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[55] Nawa, R.K. 2010. Mining Impacts in the Siskiyou Wild Rivers Area Southwest Oregon. Siskiyou Project. Grants Pass, Oregon.

050911 (b) (6)

Note that many of the comments provided in this letter have been addressed by Master Responses, as indicated in Appendix J. The responses below address issues that were not addressed by Master Responses.

Response to Comment 1

The DSEIR addressed potential impacts of mercury on fish on pages 4.2-50 to 4.2-51. The literature and data provided by the comment describe effects of mercury on fish at levels much higher than would be expected in the affected environment. For example, the quote from Eisler 1987 describes effects at 5–7 milligrams per kilogram wet weight. As can be seen from Table 4.2-3 of the DSEIR, these levels are above what is observed in fish in California. Values for 96-hour Lethal Concentration 50s (LC50s)[13] are likewise above expected environmental concentrations. Consequently, the evidence provided by the comment does not substantially change the types of biological effects or the thresholds for these effects that are described in the DSEIR and used as part of the analysis.

Response to Comment 2

There is no available data with which to assess whether effects of suction dredging activity cause substantial additional lysing (i.e., rupture) of algae cells containing toxins relative to the level of natural lysing, or, if lysing were to occur, whether said effects would result in substantially greater concentrations of toxin in the water. Algal cells lyse in the water column, even in reservoirs, and one could speculate that a lotic environment, such as the Klamath River, provides mechanical mechanisms that might produce even greater effects than diverting flow through a dredge. There is no information to suggest that dredging will produce an effect that is measurable against background conditions. As a result, the Department's conclusion regarding the purported effect is that it amounts to nothing more than speculation (Cal. Code Regs., tit. 14, § 15145). The SEIR has sufficiently considered the best available information and determined that substantial evidence does not exist to support a finding that the potential lysing of blue-green algal cells is a significant impact.

Response to Comment 3

See MR-WQ-18.

Response to Comment 4

The regulations presented in the FSEIR represent an independent effort using a different and detailed methodology applied throughout the state from that used for the proposed settlement agreement, and represent a comprehensive, thoughtful review. The regulations in the proposed settlement agreement were based on negotiations between various parties, and as such may not have been entirely based on the best available science. As such, it is predictable that some of the regulations in that agreement would be different from those developed via the thorough comprehensive review that was conducted for the SEIR. In addition, it is worth noting that the Karuk Tribe entered a consent judgment with the Department engaging in this CEQA review.

[13] In other words, the concentration at which half of the fish would die if exposed to it over a 96-hour period.

Response to Comment 5

See MR-GEN-6, MR-GEN-12, and MR-WQ-8.

(b) (6)

Staff Report, May 2005, MERCURY LOSSES AND RECOVERY
At the Redding scoping meeting November 18th 2009, I objected to the use of the above document. I stated that it had several substantial flaws and errors within the report. I was assured by Mr. Mark Stopher that the DFG was aware of those flaws. Those errors were apparently overlooked in the preparation of the draft EIR! I once again wish to point out those errors and, demand under the Federal Data Quality Act aka Information Quality Act that the false assumptions made in the DEIR be corrected.

Page 4) "Moreover, an important drawback was that the efficiency of a standard suction dredge at recovering mercury was unknown." The efficiency of a standard dredge is still unknown! The dredge used for the test was an outdated header box "crash box" design. This design has fallen out of favor due to its poor recovery habits! Moreover, those few that are still used would never be used without miners moss! The header box design would be highly prone to flour mercury. To use this as a "standard" is liable.
The fact that this dredge recovered 98 percent of the mercury is remarkable and, begs the question, what would a properly equipped flair box dredge recover? Would a dual log jet flour less? How much more mercury might be caught is a mercury trap were used?

Page 8 #2) Methlmercury is formed in an anaerobic environment not, an aerobic environment. Any mercury losses from dredging would move the mercury from an anaerobic environment to an aerobic environment.

This report is an interesting experiment but hardly an accurate nor definitive study. It should not be used as a system wide definitive tool! Additionally, the removal and proper disposal of 98% of the mercury should be viewed as more beneficial than leaving 100% in the environment!

Section C (3) list engine manufacturer and model number, and horsepower; if in the course of mining an engine needs to be replaced, do we need to notify the department and amend our permits? Why do you need to know manufacture, and model number?

Section C (e) what triggers the requirement of an On-site Inspection?

Section C (f) When would a 1602 permit be required?

Section C (g) Justify the limit of 4,000 permits. Is that 4,000 resident permits? How many permits were issued for 2012?

Section C (h) allows that the assistant chief of enforcement may, revoke or suspend a permit for past infractions; so an infraction in 2008 may cause a 2012 permit to be revoked at the assistant chief of enforcements discretion or whim! This is unconstitutional!!!

The revocation of a permit for the mere issuance of a citation is unconstitutional. Whether the citation is justified or not seem not to have any bearing on the subject. Whether a person is guilty of an infraction or not seems to be of no consequence either.

Section C (j) Nozzle size; the reduction from six to four needs to be justified. This rule makes my inventory of 5" & 6" nozzles and constrictor rings worthless as well as all the nozzles material over

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051011 (b) (6)

Response to Comment 1

Comment acknowledged. The referenced study (Humphreys 2005) had several limitations, and some of these are described on page 4.2-36 of the DSEIR. Nevertheless, the study makes some observations that are relevant to the assessment. This study was considered along with other source of information for the assessment. See also MR-WQ-1, -10, and -17.

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(b) (6)

Subject: Comment on Suction Dredge Mining DSEIR
Date: Tuesday, May 10, 2011 4:48:17 PM PT
From: (b) (6)
To: mstopher@dfg.ca.gov

Dear Mark,

SI have lived and worked in the Happy Camp area for the last 15 years. During this time I have been employed by the U.S. Forest Service as a temporary seasonal fisheries technition. I live on family property (b) miles up Elk Creek, the town of Happy Camp's primary municiple water supply.
Over the years I have observed many dredging operations both while out on fisheries related creek surveys and while living at my house.
Of the hundreds of dredging operations I have seen there have been many that were obviously dangerous to aquatic life and/or destructive to recreational enjoyment of the area's creeks.

The following are just a few of the negative impacts I have actually witnessed.

Gasoline spills.
Turbid water that runs for over 1 mile downstream of a dredge.
Riparian tree cutting and undermined banks.
Large scale disturbance of the creek bed and spawning gravel.
Highly unstable dredge holes with dangerous boulders precariously balanced on edges.
Garbage and broken dredge equiptment scattered around dredge sites.

Several years ago I was out on a fall chinook spawning survey for the U.S. Forest Service. The creek was covered in fallen leaves and we were looking for spawning salmon and redds.
While walking through the creek around a pool I fell into and twisted my knee in an old dredge hole that was hidden by the leaves. While my knee has since healed somewhat, I had to go to an orthopedic specialist and spent many pain filled months hobbling around.
Many of the dredge operations I have seen have no interest or incentive to attempt to return the distubed area to anything resembling it origonal condition. Thereby degrading the creeks for recreational enjoyment

From all the scientific studies I have read and from these personal experiences traversing area creeks, it seems obvious that the state of California should continue the ban on dredging in the creeks and rivers indefinitely.

Please consider these comments and observations in your desision.

Thank you,

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051011(b) (6)

Response to Comment 1

The Department appreciates this information. The effects of dredging activity and potential for gasoline discharges were addressed in the DSEIR under Impact WQ-2. The effects of dredging activity on potential turbidity discharges were addressed in the DSEIR under Impact WQ-3. The proposed regulations have been amended with additional measures to prevent fuel spills.

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(b) (6)

Subject: Suction Dredge Mining DSEIR
Date: Tuesday, May 10, 2011 3:31:17 PM PT
From: (b) (6)
To: mstopher@dfg.ca.gov

Dear Mark,

I write this letter to state my concerns about suction dredging. I live in the Klamath River watershed that supports critical habitat for anadromous fish species. Some of these populations are endangered. Any activity that has the potential for further disrupting these fish populations should be banned. To date there is not clear evidence on the postive or negative effects of suction dredging. However, due to the very nature of the activity, if dredging is allowed in spawning grounds or even potential spawning grounds, this is bound to have a negative impact on fish populations. Another issue with this activity is that high water temperatures are known to negatively impact fish migration and on the Klamath has been linked to severe fish kills. Water running through a suction dredge is heated. Othe negative effects of this practice include, pollution from the motors and people littering - we find more mining related trash in the river than any other trash during our annual river cleanups.

As with other practices that directly impact the environment, gold mining can be done in a more eco-friendly manner. Please maintain the ban on suction dredging. It would be a sad thing to allow a practice that has a detrimental effect on critical endangered species.

Thank you for considering my concerns.

Truly,
(b) (6)

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051011(b) (6)

Response to Comment 1

There is no available data to suggest that use of dredging equipment has a substantial effect on temperature. The potential for suction dredging activity to indirectly affect water temperature is considered minimal, as discussed in the DSEIR under Impacts WQ-3 and BIO FISH-8.

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(b) (6)

This SEIR fully omitted the benefits of suction dredgers taking these elements out of our waterways. No one else takes these out of our waters, yet the dredgers do it for free, and this obvious benefit is curiously omitted from the study. **Why?**

Humphries report acknowledges that suction dredges capture 98% of the mercury they encounter (this, even using the old-style crash box style dredge!), yet there is NO mention of this good public benefit in the SEIR. **Why not? Who decided to forgo or eliminate this information from this study?**

Further comments about Mercury

I am not a scientist, but I am a common sense type of individual. Here are some issues I have problems with, and would like the Department's clarification:

PAC Note: In March 2010, PAC members were briefed that the DFG was going to be relying on information from a study currently being done by Charles Alpers, and since the report was not finished yet, nor peer reviewed, they could not give us a copy of the report. Alpers made a power point presentation and I took 58 pages of notes, this being the case. (Charles Alpers report was published January 2011). In between this time, it was discovered that the root water samples in Alpers report had come from a mercury treatability project (see Dave McCracken attachment). Next, it was discovered that Alpers was a chief consultant, together with Carrie Monohan from the Sierra Fund, on the NID Combie Reservoir project, where they propose using a cutter head dredge to remove approx 100kg of mercury over a 3-5 yr period, (dredging 7-7, 6 days a week, not including Federal holidays).

I see a huge conflict of interest and problem with the very same anti-mining foes being the cheerleaders for a dredging project using larger equipment than I can use, working virtually non-stop for 3-5 years versus my very limited annual season. If Alpers bottom line conclusions towards suction dredge mining causes mercury harm, then his participation and support of the massive cutterhead suction dredging NID project should immediately disqualify his participation in the DF&G SEIR for major conflict of interest! Further, and more confounding, is that the DF&G would build the entire SEIR around a "SCIENTIFIC REPORT BEING CONDUCTED" that was not even finalized until a year later!! ***Tell me, how is this scientifically acceptable?***

Thank you for your time.
(b) (6)

Attached:

Letter to Mark Stopher dated 6 March 2010 from (b) (6)

Mark Stopher
Acting Regional Manager

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051011 (b)

Response to Comment 1

The USGS studies were independently reviewed and assessed based on their scientific merit, and they were published prior to the public release of the DSEIR.

Response to Comment 2

In response to the attached comment letter from (b) (6) dated March 6, 2010, please see MR-WQ-1, -5, and -13.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

RE: Suction Dredge Permitting Program
Draft Subsequent Environmental Impact Report, February 2011

Dear Mr. Stopher:

The U.S. Environmental Protection Agency (EPA) has reviewed the above-referenced document. We are concerned that four significant and unmitigable impacts to water quality have been identified from the proposed Suction Dredging Permit Program (Program): Effects of Mercury Resuspension and Discharge, Cumulative Impacts of Mercury Resuspension and Discharge, Effects of Resuspension and Discharge of Other Trace Metals, and Cumulative Impacts of Turbidity/TSS Discharges. These outcomes conflict with EPA and the California Water Boards' many efforts to reduce pollutants and toxicity in our waters. Any such program must assure the activities do not cause or contribute to exceedances of applicable water quality standards.

EPA and our Water Board partners are committed to the restoration of water quality limited waterbodies, particularly as these impairments directly affect beneficial uses including critical and sensitive aquatic resources such as Pacific Salmon stocks. EPA is concerned that the Program is not fully protective of key beneficial uses such as anadromous species habitat. More focused and science-based studies would help CDFG develop a Program to improve habitat conditions for our imperiled fisheries.

Based on our review, EPA believes that the data supports the **No Project Alternative**. EPA recommends that CDFG reconsider reissuance of the Program until CDFG has worked with EPA, the State Water Quality Control Board, the Regional Water Quality Control Boards, and other State and local departments to ensure impacts are avoided, minimized and mitigated, and that the Program is consistent with the environmental and health protection activities of other agencies. EPA also recommends CDFG reconsider reissuance of the Program until CDFG has coordinated with affected Tribes and EPA to ensure Tribal concerns are considered.

EPA appreciates the opportunity to comment on the DSEIR. We look forward to working with CDFG and other agencies to identify the best approaches to developing a program to achieve the multiple goals of our agencies. If you have any questions, please contact me or refer staff to Wilson Yee (415) 972-3484 or John Tinger (415) 972-3518.

Sincerely yours,

Alexis Strauss
Alexis Strauss
Director, Water Division

10 May 2011

Enclosure

Printed on Recycled Paper

Mercury and Methylmercury Effects (WQ-4, CUM-7); Other Trace Metals (WQ-5)

The DSEIR finds that both direct effects and cumulative impacts of mercury (Hg) resuspension and discharge from dredging activities, and, similarly, direct effects of resuspension and discharge of other trace metals, have the potential to be significant and unavoidable. Impacts include both water quality as well as human health, as activities may discharge the most reactive form of Hg. These impacts would be due to (1) increased total Hg loading to the same water bodies and downstream waterbodies, (2) increased methylmercury (MeHg) formation in downstream reaches and waterbodies, and (3) bioaccumulation in aquatic organisms in downstream reaches and waterbodies. A comprehensive set of actions to mitigate these potential impacts through avoidance or minimization was not identified in the document, noting that a feasible mitigation program needs development.

EPA is concerned about the effects of resuspension and transportation of Hg to downstream reaches and waterbodies, especially in Hg-impaired watersheds. The DSEIR notes the current development of the American River Mercury TMDL and the Sacramento-San Joaquin Delta Methylmercury TMDL. However, the document does not consider or discuss how the proposed Permit Program will comply or coordinate with these efforts. EPA believes that all direct effects of dredging, including disturbance, collection, and safe disposal of mercury and other metals, need to be considered in the environmental analysis, and appropriate mitigation measures developed and implemented by the Program. Furthermore, EPA believes that removing mercury-impaired waterbodies from consideration in the Program is a viable way to mitigate impacts.

EPA recommends that CDFG coordinate with EPA, the State Water Resources Control Board (State Board) and the Regional Water Quality Control Boards (Regional Boards), the Department of Public Health, and the Department of Toxic Substances Control to ensure that the Program supports the goals of restoring Hg and MeHg-impaired waterbodies; fully meets metals drinking water standards in surface water systems; ensures the safe recovery, storage, transport and disposal of any hazardous materials that may be encountered by dredgers, and conforms with State and Federal Anti-Degradation Policies.

Turbidity/TSS Cumulative Effects (CUM-6)

The DSEIR finds that even with proposed mitigation measures, contributions of turbidity and TSS from suction dredging activities to sediment-impaired waterbodies would be significant and unavoidable. Additionally, sediment loading may contribute to other water quality impairments by altering nutrient loading and temperature regimes, or degrading waters used for drinking water supply.

EPA is very concerned the Program will contribute pollutant sources and loadings to waterbodies impaired due to sediments or sediment-related impairments, without adequate management measures. The DSEIR does not consider or discuss specific sediment-related TMDL goals or requirements. Existing TMDLs have not evaluated the contributions from suction dredging activities and, consequently, may not have allocated waste loads to these activities. If the Program were to go forward, the relevant Regional Boards would need to amend TMDL analyses to account for any new loads from the suction dredging activities, if dredgers are allowed to discharge sediment. However, because suction dredging activities are new dischargers and therefore controllable, waste load allocations may limit the amount of

sediment discharged by dredgers; such limits will need to be incorporated into the Program through permits to dredgers. In addition, new discharges of a pollutant to impaired waterbodies may be restricted.

EPA believes that exclusion of waterbodies impaired due to sediments (either directly or indirectly) from the Program is a viable way to mitigate impacts that needs to be fully explored by CDFG. EPA recommends that CDFG coordinate with EPA, the State Board and the Regional Boards, and the Department of Public Health, to ensure that the Program meets the requirements of existing and future TMDLs addressing sediment-related impairments, fully meets turbidity drinking water standards in surface water systems, is consistent with any new source restrictions, and conforms with State and Federal anti-degradation policies.

Section 402 of Clean Water Act applies to Suction Dredging Mining Operations

EPA concurs with the summary provided in Chapter 4.2 of the DSEIR on the regulatory overview of suction dredging mining operations within the context of the Clean Water Act. As noted in the DSEIR, the State Board and/or the Regional Boards may require suction dredge operators to obtain NPDES permits to ensure compliance with the CWA, the Porter-Cologne Act, and with California's water quality standards. As noted above, many of the waterbodies in which suction dredging will discharge are water-quality-impaired for sediment and/or mercury. Special considerations for new discharges which would contribute additional sediment and/or mercury loads to an already impaired waterbody would need to be addressed prior to allowing such discharges to occur. EPA recommends CDFG reconsider reissuance of the Program until CDFG has coordinated with the State and Regional Boards and EPA to ensure suction dredgers are properly authorized.

Protection of Coldwater Fisheries and Listed Species

The DSEIR concludes that there will be less-than-significant direct effects to all life stages of salmonids, their prey, and habitat types (BIO-FISH-1 to BIO-FISH-11) with mitigation measures. The DSEIR provides data showing the effects of suction dredging activities on adult spawning habitat, egg-to-fry survival rates, and juvenile entrainment of salmonids, lamprey, and other non-salmonids. EPA appreciates that watersheds within the range of the Federally endangered Central California Coast Coho ESU are closed to the Program, and, further, that restricted temporal windows for activities may mitigate identified impacts.

It is unclear that direct and cumulative impacts to individuals, subpopulations, and populations of Chinook and Steelhead, also Federally threatened or endangered, as well as Pacific lamprey, whose status is less understood, are equally considered. EPA recommends the Program incorporate protections to ensure the viability of these other populations, as the effects of excessive turbidity, thermal refugia loss, loss of protective cover, and habitat complexity are also serious limitations to these species. Temperature and sediment TMDLs in Northern California watersheds have been developed to minimize stressors and target increases in thermal refugia, protect stream geomorphology, and enhance streambank stabilization through protection of the riparian zone to restore beneficial conditions. The Program should ensure that it meets the requirements of existing TMDLs aimed at restoring and protecting habitat requirements for these species.

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051011 EPA9 (Environmental Protection Agency: Region 9)

Response to Comment 1

Comment noted and considered. The SEIR is primarily a disclosure document, and thus it is appropriate for the document (Chapter 4.2 and Chapter 5 of the DSEIR) to identify the potentially significant and unavoidable water-quality impacts where they occur. Additionally, the DSEIR identified potential mitigation measures that could be developed and implemented that may avoid, reduce, or otherwise compensate for the identified impacts. However, as noted in the DSEIR, the Department does not have jurisdiction or authority to develop or implement many of the potential mitigation measures that could be effective for mercury control. See MR-GEN-6.

Response to Comment 2

Comment acknowledged. The Department has coordinated extensively with SWRCB throughout the development of the proposed regulations. See also Response to Comment 1, above, and MR-GEN-6, regarding the scope of the Department's regulatory authority relative to the impacts identified in the comments.

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And, these “Best Management Practices” pamphlets are supposed to mitigate to below significance a whole host of potential impacts: from wildfires to toxic materials to human waste to endangered species to state and federal park rules. This “pamphlet” will likely be both large and unread.

The Proposed Program and DSEIR is not a sufficient document because it fails to require the Proposed Program to adopt viable measures to obey California and local laws regarding water quality, environmental health, protection of historic and cultural resources and other laws. Requiring distribution of a pamphlet on “Best Management Practices” to be adopted voluntarily is not a sufficient mitigation measure. This alone should render the Proposed Program and DSEIR an insufficient document.

Recommended Action: The regulatory program needs to require that all rules and regulations to protect water quality, ecosystems and historical and cultural sites are obeyed. A brochure suggesting voluntary actions to protect California’s resources cannot be used as a mitigation measure. Instead, the Department needs to specifically outline all the protocols and regulations that suction dredge miners must obey as part of the rule-making process. These regulations must be clearly defined and the consequences for breaking the rules must be defined as well. This includes new regulations addressing:

- Safe handling, storage, transport and disposal of mercury encountered while suction dredge mining as directed by Prop 65 and consistent with CA Department of Toxic Substances Control and State Water Resources Control Board regulations;
- Appropriate precautions to protect cultural and historical sites, including the requirements of the Native American Heritage Commission for identifying and reporting cultural sites and activities; and
- Requirements of the Clean Water Act that mandate no degradation of water quality or contamination of the state’s water.

Comment #4: This document proposes a program with significant and unavoidable impacts to water quality, specifically from mercury (*Impact WQ-4*).

The Fish and Game DSEIR chapter on Water Quality and Toxicology (Chapter 4.2) describing why there are significant and unavoidable impacts to water quality from suction dredging is one of the best summaries of data on the subject and we commend these efforts. However, the document falls down after carefully describing the impacts of mercury by ignoring these significant impacts and adopting a program that does nothing to mitigate these impacts.

The proposed program allows suction dredge mining in areas known or likely to be contaminated with mercury: Millions of pounds of mercury were released into Sierra Nevada rivers and streams during Gold Rush mining activities, one of the most environmentally destructive periods in California’s history. Today, dozens of streams and rivers in the state are listed as impaired for mercury by the

SWRCB and are included on the 303d list, many of which would have active suction dredging mining allowed on them under the proposed program. Miners admit to encountering liquid mercury in the course of suction dredge mining.

Table A included at the end of this document lists the mercury-impaired streams and rivers in the Sierra Nevada and the proposed use classification under Fish and Games Recreational Suction Dredge Mining program.

Mercury from historic mining activities likely presents a hazard in more streams than are currently 303(d) listed. Because the 303(d) listing process is data driven, it should be noted that the 303(d) listing process (described on page 4.2-11, lines 37-44) does not necessarily completely represent the actual number of impaired water bodies. In particular, water bodies in rural or remote areas where there is not an active data collection program may not be represented in the listing process as noted on page 4.2-12, lines 2-3 of the DSEIR.

As more data is collected, additional water bodies are being added to the 303(d) list. The state has completed compilation of the recommended 2010 update of the Section 303(d) list, which identifies an additional 1,464 listings that will require TMDL development, and 195 recommended delistings (SWRCB, 2010). EPA approval of the list is pending, at which point the state will have a fully adopted 2010 Section 303(d) list.

Many streams that were actively mined during the Gold Rush and have a very high likelihood of being impaired due to mercury contamination have not been tested and therefore are not listed as mercury-impaired. For the streams for which there is no information, is it is reckless to propose suction dredging mining. For streams for which there is known mercury contamination it is reckless and irresponsible and illegal to propose suction dredge mining resume at these locations, and yet that is exactly what this program does.

Suction dredgers target areas with the most mercury: Suction dredge miners may target deep sediments (i.e., those too deep to be available to scour under winter flows), and thus mobilize sediment that may not be mobilized by typical winter high-flow events. Sediments in the historic gold-bearing and gold-mining areas of California that would be targeted by suction dredgers also may be elevated in mercury, compared to sediments in other non-mining areas. (page 4.2-52 line 9-12)

A handful of suction dredge miners mobilize as much mercury as an entire season of winter storms: Within areas of highly elevated sediment mercury concentrations, a single suction dredge operator using an average size (4 inch) dredge could discharge approximately 10% of the entire watershed mercury loading during a dry year over an average suction dredging time of 160 hours. By inference, the analysis indicates that larger capacity dredges or multiple dredges operating in similar sediments with highly elevated sediment mercury concentrations could potentially contribute a much larger proportion of the watershed load than 10%. (page 4.2-52 lines 23-29)

Suction dredging activities likely mobilize mercury that is highly reactive, therefore most dangerous to human health and wildlife:
Suction dredging discharge and transport of total mercury occurs primarily in the summer rather than the winter, while winter is when most background mercury is transported to reservoirs. Although the precise implications of this are not known, it is known that methylation is generally more pronounced at higher temperatures and lower oxygen environments, both of which are more likely under summer conditions than winter conditions. (page 4.2-52 lines 41-45) The increased surface area of mercury and increased potential for downstream transport will likely enhance reactivity and transport to areas favorable to methylation (i.e., downstream reservoirs and wetlands). Moreover, resuspension of sediments containing Mercury in oxygenated environments has been shown to increase levels of Mercury (II) R, which has been shown to be directly related to methylation rate. (page 4.2-52 lines 1-6)

The Proposed Program and DSEIR fail to protect the waters of the state from contamination by mercury and fail to explain why there is any public good in accepting the deterioration of California's water quality. The Department states that it has no responsibility for ensuring that laws protecting health and safety are obeyed as part of this program, and does not even explore reasonable mitigation measures to ensure such protection. This renders the document insufficient for decision making.

Recommended Action: The DSEIR needs to be re-drafted with restrictions in place forbidding any suction dredge mining in a water body that is 303(d) listed as impaired for mercury or other toxic metals, or that is otherwise known or suspected to be contaminated by naturally occurring or introduced mercury. This would include almost any water body in the historic gold country where mercury was commonly used in the 19th century. All areas that are suspected to be contaminated by mercury should be closed to suction dredging and remain closed until testing has confirmed that no mercury is present in the sediments of that stretch of water.

Comment #5: The DSEIR fails to require common sense mitigation measures to reduce problems associated with mobilizing mercury. Potential mitigation measures to reduce the impact would necessarily involve actions to avoid or limit total mercury discharge from suction dredging activities in areas containing elevated sediment mercury and/or elemental mercury. .

Recommended Action: The DSEIR and regulations need to be redrafted to limit mercury discharge by requiring the following actions:

- **Stay out of areas where there is mercury:** Identify river watersheds or sub-watersheds where sediment mercury levels are elevated above regional background levels or where elemental mercury deposits exist and establish closure areas to avoid suction dredging within these areas. No such data currently exist to comprehensively identify mercury "hot-spots"; however,

data, especially from Sierra Nevada watersheds impacted by mining, suggest that sediment mercury levels at these sites are all elevated above background levels. This action could involve a phased study to identify the presence of such areas based on intrinsic properties including proximity to mines, hydraulic and channel features, and other factors.

- **Make the nozzle small:** Limit the allowable suction dredge nozzle size and/or allowable seasonal duration of dredging activity within water bodies known to contain sediment elevated in mercury or that contain elemental mercury deposits. Although smaller nozzle sizes would still cause mercury releases when dredging mercury-enriched sediment, the amount of mercury discharged would be lower than dredging with larger nozzle sizes.

- **Special permit in hot spot areas:** Implement a special individual permit system for suction dredge operators in areas where mercury "hot-spots" exist. The permit system would be designed to require assessment of the area prior to initiation of dredging activity and issuance of terms and conditions to ensure that mercury hot-spots are identified and avoided or other provisions are implemented to ensure that the dredging activity does not result in substantial discharge of mercury downstream from the site.

- Implementation of such mitigation actions, implementation procedures, monitoring, and enforcement may reduce potential impacts. However, because not all locations of elemental mercury deposits are known, it is uncertain how feasible it would be to identify sites containing elemental mercury at a level of certainty that is sufficient to develop appropriate closure areas or other restrictions for allowable dredging activities. (page 4.2-53 and 54)

The program recommended by Fish and Game incorporates none of the above recommendations, and dredging is allowed on well-documented mercury impacted waters with an 8 inch nozzle (see table below).

Comment #6: The DSEIR presents scientific evidence to establish that suction dredge mining in waters impaired with mercury is deleterious to fish, and then makes the inconsistent finding that suction dredge mining is not deleterious to fish. As discussed below, Chapter 4.2 Water Quality and Toxicology does describe the significant and unavoidable impacts from suction dredge mining to the water quality and aquatic resources of the State of California's streams and rivers including on fish health and the health of other aquatic organisms.

The DSEIR states that suction dredge mining where mercury is known to be present is deleterious to fish because of the effects of mercury on fish reproduction. The DSEIR finds, on page 4.2-55 lines 3-4, that aquatic life beneficial uses are the most sensitive beneficial uses to ambient water body concentrations of most trace metals.

Mercury (Hg) is the constituent that poses the greatest toxicological risk to humans and fish and wildlife in areas where suction dredging activity might occur. Potential impacts of mercury and other heavy metals on fish and aquatic organisms are also discussed in Chapter 4. *Biological Resources*, page 4.2-14 lines 31-34. In addition, as noted in the Literature Review (Appendix D), suction dredging activities typically target the known gold-bearing streams and rivers of California where much of the historic mining activity took place after the California Gold Rush of 1849. (page 4.2-14 lines 35-38)

Elemental (i.e., liquid) mercury was used extensively in gold mining processes and much of the mercury was discharged or wasted directly to streams and river channels, resulting in extensive areas of mercury-enriched channel sediments and watershed-wide contamination with elemental mercury. (page 4.2-14 lines 38-40)

Mercury is a toxic constituent that bioaccumulates in the food chain of aquatic organisms and terrestrial wildlife, and is ultimately a human health concern, primarily through the consumption of mercury-contaminated fish. Methylmercury (MeHg) is a more bioavailable form of mercury that is produced from inorganic mercury by specific types of aquatic bacteria in rivers and reservoirs. (pages 4.2-14-15)

The major pathway for human and wildlife exposure to methylmercury (MeHg) is consumption of mercury-contaminated fish. Dietary MeHg is almost completely absorbed into the blood and is distributed to all tissues including the brain. In pregnant women, it also readily passes through the placenta to the fetus and fetal brain. MeHg is a highly toxic substance with a number of adverse health effects associated with its exposure in humans and animals. High-dose human exposure results in mental retardation, cerebral palsy, deafness, blindness, and dysarthria in utero and in sensory and motor impairment in adults. Although developmental neurotoxicity is currently considered the most sensitive health endpoint, data on cardiovascular and immunological effects are beginning to be reported and provide more evidence for toxicity from low-dose MeHg exposure (U.S. EPA, 2001). In birds and mammalian wildlife, high levels of MeHg can result in death, reduced reproduction, slower growth and development, and abnormal behavior (U.S. EPA, 2010). (page 4.2-15 lines 8-18)

Mercury Hurts Fish and People too: The Sierra Fund's recent study on sport fish consumption at mercury impacted water ways describes the potential for a serious public health threat. The Gold Country Angler Survey quantifies the methylmercury exposure of more than 150 anglers at mercury-impacted waterways in the Yuba, Bear, and American and Deer Creek watersheds. Findings of the Gold Country Angler Survey include people that are exposed to more than three times the recommended safe level of mercury through sport fish consumption in the American River watershed. The significant and unavoidable impacts of recreational dredging activities in mercury-impaired water bodes would only worsen this public health issue, by propagating mercury dispersal and incorporation into the aquatic food chain, increasing the mercury levels in fish, and increasing mercury exposure to people that eat sport fish in the Sierra Nevada.

Recommended action: The Sierra Fund recommends that DFG redraft their program to not allow suction dredging in known or suspected mercury impaired water bodies as it is clear that suction dredge mining in water bodies contaminated with mercury is in fact deleterious to fish

Comment # 7: The DDSEIR proposes a program that the Department does not have the resources to monitor or enforce. These regulations add more rules to the program, but no additional enforcement funds or resources are included in the program. The Department asserts that it cannot spend any additional funds on monitoring compliance with its own regulations, and relies on compliance with voluntary actions outlined in the "brochure" to mitigate all impacts on fish. Other regulations protecting water quality, historical sites, aesthetics and more are not even mentioned, much less a strategy for enforcing regulations to abate the known, significant and unavoidable impacts of their proposed program.

In effect the DSEIR and proposed regulations outline a program that has the potential to encourage more damage to water quality, historic sites, noise, wildlife and more – with absolutely no plan or even acknowledged responsibility for enforcing any rules to mitigate this damage.

The Department has had real trouble getting compliance by suction dredge miners with the regulations enacted in 1994. Requiring compliance with suction dredge regulations has been nearly impossible. As part of our work to understand the impacts of suction dredge mining, The Sierra Fund conducted a survey of how suction dredge regulations are enforced on federal lands held by the Bureau of Land Management (BLM) and the United States Forest Service (USFS). Our report, which was included in the literature review conducted as part of the DSEIR process, found that suction dredge regulations are already nearly impossible to enforce. The result of our survey showed that even suction dredge miners with egregious violations of suction dredge regulations faced almost no consequences in the past – and no additional consequences are contemplated by this document.

Currently, a DFG warden that finds violations of suction dredge mining must rely on local enforcement agencies to prosecute the violation or shut down the operation. This means that the warden will issue a notice of violation to the miner and ask that the violations cease. If the miner chooses to not to shut down their operation, the case is turned over the local district attorney who decides whether or not to pursue the case. In the rare cases where the district attorney has taken on the case it takes time, effort and substantial resources by local government to try the case and implement the enforcement action. The rural counties most impacted by suction dredge mining rarely find that this kind of enforcement action is viable on their tiny budgets.

Recommended Action: Compliance with the laws of the state of California needs to be a top priority of this program. Many of the serious impacts of suction dredge mining could be avoided if all of the rules protective of the environment were enforced. The DSEIR needs to be redrafted to require:

051011 SierraFund

Note that many of the comments provided in this letter have been addressed by Master Responses, as indicated in Appendix J. The responses below address issues that were not addressed by Master Responses.

Response to Comment 1

The comment letter restates many of the impacts identified in the DSEIR and recommends implementation of mitigation measures for mercury that were identified in the DSEIR (page 4.2-53, lines 38–46, and page 4.2-54, lines 1–16). However, as noted in the DSEIR, the Department does not have jurisdiction or authority to develop or implement these mitigation measures. See MR-GEN-6.

Response to Comment 2

The DSEIR's assessment of mercury identifies that fish may be affected by mercury uptake (see page 4.2-50, line 9–18 in the DSEIR); however, as noted, potential lethal levels for fish are not typically present in the environment. Thus, in citing page 4.2-55, lines 3–4, of the DSEIR, the comment is not correct that potential direct effects on fish from dredging-related mercury discharges is the most sensitive receptor. The citation is within the discussion of Impact WQ-5 for other trace metals. As noted in the DSEIR (p. 4.2-51, lines 3–7), mercury bioaccumulation in upper trophic level wildlife and in humans that consume aquatic organisms is the primary concern, as evidenced by known fish-tissue levels that exceed applicable human-health criteria. As such, the Department was correct in its conclusion that suction dredging under the proposed regulations would not be deleterious to fish, per se, as a result of mercury contamination.

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State Water Resources Control Board

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Edmund G. Brown Jr.
Governor

MEMORANDUM

TO: Mr. Mark C. Stopher
Acting Regional Manager
Department of Fish and Game
601 Locust Street
Redding, CA 96001

Thomas Howard

FROM: Thomas Howard
Executive Director

DATE: May 10, 2011

SUBJECT: **STATE WATER RESOURCES CONTROL BOARD, REGIONAL WATER QUALITY CONTROL BOARD, AND PEER REVIEW COMMENTS ON THE DEPARTMENT OF FISH AND GAME'S DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT ON SUCTION DREDGING**

Thank you for the opportunity to comment on the Department of Fish and Game's (DFG's) draft Supplemental Environmental Impact Report (SEIR) on suction dredging. This memorandum contains our comments and also attaches comments from Regional Water Quality Control Board staff and, as discussed below, from scientific peer reviewers. As you know, the State Water Resources Control Board (State Water Board) is the statewide agency charged with water quality protection. As such, we have been concerned for many years about the water quality impacts of suction dredging. In 2007, we held a public hearing to receive comments on this subject. We also provided initial comments to DFG as it began the scoping process for the present rulemaking effort. In a contract executed in June of 2009, the State Water Board provided $500,000 and made staff available to DFG in order to ensure that the SEIR fully addressed the water quality impacts from suction dredging. This contract required submittal for scientific peer review of the water quality portions of the SEIR. These comments are attached to this memorandum for your consideration.

We would like to commend DFG on the SEIR's discussion of the water quality impacts from suction dredging. The analysis presented is sound, thorough, and reflective of the best science available on his topic. Specifically, we concur with DFG's initial determination that suction dredging has the potential to contribute to: (1) watershed

mercury loading to downstream reaches within the same water body and to downstream water bodies, (2) methymercury formation in the downstream reaches/water bodies, and (3) bioaccumulation in aquatic organisms in these downstream reaches/water bodies. We also concur that the associated increase in health risks to wildlife (including fish) or humans consuming these organisms is considered a potential significant and unavoidable impact. Finally, we concur with the finding that under the proposed program, mercury discharges would make a cumulatively considerable contribution to existing cumulative impacts related to watershed mercury loading, methymercury formation in downstream areas and bioaccumulation in aquatic organisms.

Given these unavoidable impacts, we consider the No Program Alternative to be the alternative that is best supported by scientific information regarding water quality impacts related to remobilizing mercury. The No Program Alternative, a continuation of the current suction dredging moratorium, would provide the best water quality protection at no cost to the State. The other alternatives, including DFG's Proposed Program, would result in mercury discharges that would likely require issuance of National Pollutant Discharge Elimination System (NPDES) permits. If DFG's proposed program is implemented, the Water Board would likely need both to embark on a costly program to develop a permit to address mercury discharges from suction dredges, and to use scarce resources to ensure compliance with permit conditions through inspections and enforcement. The fiscal costs are unjustifiable considering the minimal economic benefit suction dredging provides, as documented in Appendix H of the SEIR.

Our specific comments are attached. As mentioned above, we have also attached comments from Regional Water Quality Control Board staff and from the scientific peer reviewers. Thank you again for the opportunity to comment. If you have any questions, please feel free to contact either me at (916) 341-5615 or Rick Humphreys at (916) 341-5493.

Attachments (see list next page)

Reason: Providing examples of how other states have dealt with mercury will allow comparison with DFG's proposal.

ES-14, 22 **Delete "Although the regulations under the Proposed Program would reduce the potential for flouring and reduce the potential incremental contribution of the suction dredge discharges to the significant cumulative impact". Replace with "Mercury discharges would continue under the Proposed Program."**

Reason: The SEIR does not contain or refer to any evidence that any of the proposed methods of operation, BMPs, and nozzle size restriction would reduce elemental mercury flouring.

ES-16, 24-44 (and corresponding full discussion) If DFG does not select the No Program Alternative and instead selects the Water Quality Alternative, this alternative should be revised to include additional areas with known mercury contamination.

Reason: The Water Quality Alternative is described solely in terms of water bodies listed for mercury or sediments. However, we are aware of widespread mercury-contamination of sediments in areas whose water bodies have not yet been listed for mercury. Listing under Section 303(d) of the Clean Water Act is an arduous and lengthy procedure at best. The procedure is even more arduous for mercury, since the listing process currently depends on relatively expensive and time-consuming fish tissue sampling and analysis. As indicated in the draft SEIR, significant mercury discharges can be expected if dredging is allowed in the areas where mercury occurs, regardless of whether the areas have been formally listed. Therefore, a true "Water Quality Alternative" would include an approach like that used by Wyoming, that would address all areas with mercury-contamination in sediments rather than only those that have been listed for mercury.

ES-17, 23 **Change "chosen" to "identify".**

Reason: The change makes the sentence correct with respect to the CEQA requirement as stated in Cal. Code of Regulation, title 14, Section 15126.6(e)(2).

Ch 2-7 **If DFG does not select the No Program Alternative, we recommend that the use of the terms "permittee" and "no person" be clarified.**

The proposed regulations use the terms "permittee" and 'no person" interchangeably, and that may cause confusion. For example the proposed regulation on page 2-21, line 14 states, "No person shall import any earthen material into a stream, river, or lake." DFG's regulations should clarify that this prohibition pertains to all persons engaged in activities related to suction

dredging, whether the person actually has a permit or is merely assisting another person who actually has a permit. However, DFG's regulations obviously cannot apply to all persons regardless of whether they have any connection to suction dredging activities.

Ch 2-10, 15 **If DFG does not select the No Program Alternative, we recommend specifying a maximum horsepower (Hp) rating (for example, 5 Hp).**

Reason: As stated above, from a water quality perspective, the smaller the volume of sediment dredged, the better. We would expect that, all other things being equal, the greater the horsepower of the engine, the more volume could be dredged. DFG's basis for not including a horsepower restriction appears to be suction dredgers' claims that engine horsepower has little effect on dredge performance compared to nozzle size. However, the SEIR does not include any test results or any other evidence to back up the claim. In contrast, manufacturer's information (Keene 2010 catalog) suggests that a 1 horsepower increase equates to a 5.5% increase in "performance" (presumably volume capacity).

Ch 2-21, 16: see discussion above under ES-8, 3.

Ch 2-22, 1: see discussion above under ES-7, 25.

Ch 3-4, 32 **Recommend deleting lines 32 to 43 and replace with "<u>The volume of sediment moved by a suction dredge is based on nozzle size and engine horsepower (as well as operator-dependent factors such as operating time). According to manufacturer's catalogs (e.g., Keene, 2010), dredges with small diameter nozzles (e.g., 2 inches and less) and low horsepower engines (e.g., 5 horsepower and less) have less sediment-excavating capacity than dredges equipped with large diameter nozzles and high horsepower engines.</u>**

Reason: See Reason above for Ch 2-10, 15.

Ch 3-5, 1 **Comment – The statement implies that DFG's reason for selecting a 4 inch maximum diameter nozzle is based on its popularity among dredgers as opposed to its technical merits for protecting fish.**

Ch 4.2-1, 13 **Change "waste" to "pollutants."**

Reason – The Clean Water Act regulates the discharge of pollutants not waste.

Ch 4.2-18, 27 **Comment** – Wading bird poisonings by lead shot that lands in marshes and carrion eater poisonings by eating animals that have been killed by lead shot are documented. However, we are not aware of any documentation of bird poisonings by ingesting lead buried under feet of steam sediment,

presumably because birds are not physically able to get at lead buried by stream sediment. Lead that suction dredgers recover while dredging may be deeply buried and thus, be beyond the reach of waterfowl. Consequently, the main beneficiaries appears to be the dredgers, who cast diving weights from lead they recover or sell it as scrap. Unfortunately, if they melt lead to cast weights in their camps, they release lead fumes unless, as seems unlikely, they use a fume hood.

Recommend that lines 27-29 be deleted.

Ch 4.2-28, 18 **Insert after "limited.": "<u>However, any such discharge would require a permit under the applicable federal and/or state water quality laws.</u>"**

Reason: The public should be made aware that other permits, such as a Water Board NPDES permit, may be necessary.

Ch 4.2-28, 20 **Delete – "<u>Because dredging activities are largely conducted on a seasonal, temporary, and intermittent basis in California, any water quality degradation that may occur is expected to be infrequent and dispersed and thus not cause substantial or long-term degradation of water quality.</u>"**

Reason: The language is speculative, since the SEIR does not provide information that supports this assertion.

Ch 4.2-33, 1: see above under Ch 4.2-28, 20.

Ch 4.4-11, 23 **Delete – "<u>However, since the total number of suction dredgers state wide is small and the number of violations anticipated to be even smaller, such effects would not constitute a significant impact</u>."**

Reason: First, the statement is speculative. Second, the impact of hazardous material violations by suction dredgers should not be presented as a statewide average. The suction dredge survey (Appendix F) found that suction dredging is concentrated in 18 rural counties (and Los Angles) with the highest levels in occurring in Sierra, Plumas, and Siskiyou Counties. Using a 20% violation rate (assuming that DFG conducted regular inspections) for 4,000 permit holders under the program, there would be 800 violations, or 44 violations on average for each of the 18 rural counties where suction dredging is concentrated. Based on staff's first-hand observations of suction dredgers' camps in the past, costly hazardous materials cleanups would likely be needed where these violations occur. The cost of such cleanups could be significant to both the rural counties and the federal land management agencies and thus, the impact should be viewed as significant.

Ch 5-29, 23 **Remove – "Additionally, implementation of the regulations under the program related to nozzle size restrictions may reduce the potential for flouring and reduce the potential incremental contribution of the suction dredge discharges to the significant cumulative impact."**

Reason: The statement is speculative because the SEIR does not present any evidence that suction dredges have been tested systematically to determine whether nozzle diameter and engine horsepower affect mercury flouring.

Appendix E, Comparison of Suction Dredge Mining Regulations in the United States

For the Wyoming entry under "Water body restrictions", please change "Yes, based on numerous factors" to "<u>Yes, based on numerous factors including the presence of mercury in stream sediment from historical mining operations.</u>"

051011 SWRCB

Note that the various peer reviews that were included as attachments to this letter have been responded to in Section 3.5 below.

Response to Comment 1
Comment acknowledged.

Response to Comment 2
The intent of the sentence was that the Proposed Program would impose restrictions on dredging operators that would inherently lessen the potential amount of sediment disturbance relative to any other alternative that might impose less control of the activity, including the previous Department regulations. Regulations that would lessen the magnitude of dredging-related sediment disturbance would also lessen the potential mercury discharges, including mercury associated with elemental mercury flouring. Because the baseline assumes that the moratorium is in effect and no suction dredging activity is occurring, the sentence should not be construed to mean that the Proposed Program would reduce mercury compared with existing conditions.

Response to Comment 3
Please see MR-GEN-10.

Response to Comment 4
This comment refers to a statement from the Department's 1994 EIR that was prepared for the previous suction dredging regulations. While this information is of interest, it does not warrant any further consideration in the SEIR.

Response to Comment 5
To date, no other water quality permit (i.e., National Pollutant Discharge Elimination System [NPDES] or otherwise) has been required of an individual for the operation of suction dredging equipment in California. Whether such a permit would be required in the future is speculative. Regardless, the Proposed Program does not authorize violation of water quality standards; thus, the Department and other regulatory agencies are not precluded from enforcing applicable laws if it is found that a dredging operator is in violation of a law.

Response to Comment 6
The Department does not concur that the conclusion is speculative, as suggested by the comment. Rather, the statement is a summary of the finding of potential effects relative to one of the defined thresholds of significance for the DSEIR addressing the potential for water quality degradation (p. 4.2-24, lines 41–42). Based on available information regarding the magnitude of dredging activity under the Proposed Program, there is substantial evidence that the potential dredging-related discharges of contaminants and reduction in water quality would generally result in localized, intermittent, temporary, infrequent, and dispersed effects. Based on these factors, dredging under the proposed regulations would not result in substantial or long-term water quality degradation.

Response to Comment 7
See Response to Comment 2, above.

Response to Comment 8

Please see MR-WQ-8. The Department developed the proposed regulations with input from its enforcement staff and believes that the language is enforceable as written. That said, the Proposed Program does not preclude a RWQCB from enforcing its basin plan objectives, if it determines that an activity is causing unacceptable levels of turbidity/TSS discharge. However, because the effects of turbidity/TSS discharge depend on the dredging and background streamflow and turbidity/TSS levels, it would be difficult, if not impossible, for the Department to develop regulations that would address every potential water-quality condition.

Response to Comment 9

Comment acknowledged.

Response to Comment 10

The Department appreciates this input; unfortunately, while the comment does express an opinion regarding the magnitude of impacts, it provides no evidence which could be used as the basis for making an alternative impact conclusion. Please also see MR-WQ-8 regarding potential effects of the Program on turbidity/TSS discharge.

Response to Comment 11

Comment noted regarding water quality effects of the Program related to potential mercury discharge. Regarding potential Program-related effects on discharge of trace organic compounds, as described in the DSEIR, there is limited data regarding the potential effects of suction dredging on trace organic-compound disturbance and discharge. However, based on the best available information regarding the characteristics of dredging activity anticipated under the Program (e.g., intensity, frequency, duration), properties of trace organics (e.g., not anticipated to be present as "hot spot" sediment deposits, strong affinity for adsorption to particulate matter), and stream conditions where dredging activity primarily occurs (e.g., location, available dilution), it is considered unlikely that dredging-related discharges of these compounds would result in elevated concentrations in the receiving water that would lead to adverse effects on beneficial uses. The lack of knowledge of elevated contaminant concentrations in freshwater sediments, as suggested by the comment, does not constitute substantial evidence that the impact would be more severe than described in the SEIR.

Response to Comment 12

Please see the MR-WQ-8 regarding potential effects of the Program on turbidity/TSS discharge.

Response to Comment 13

The California Office of Environmental Health Hazard Assessment (OEHHA) 2001 document contains extensive detail on derivations of criteria for different populations that is not included in the OEHHA 2008 document, and thus was not considered relevant for presentation in the DSEIR. The OEHHA 2008 Fish Contaminant Goal for sensitive populations is cited in Table 4.2-2. Fish contaminant goals are based solely on public health considerations without regard to economic considerations, technical feasibility, or the counterbalancing benefits of fish consumption; these goals assume consumption of one 8-ounce fish meal per week (32 grams per day) for a lifetime. OEHHA sees fish contaminant

goals as providing a starting point for OEHHA to assist other agencies that wish to develop fish-tissue-based criteria with a goal toward pollution mitigation or elimination. The DSEIR considered the fish contaminant goals, along with other criteria, in making its assessment of suction dredging's potential impacts on mercury. The OEHHA 2008 advisory tissue levels incorporated policy-level factors associated with benefits of fish consumption into their calculation, and provide ranges of tissue levels for which different consumption rates are advised for two populations (children age 1–17 and women age 18–45, and all others). Although these are important guidelines that the state uses to advise potential fish consumers regarding potential dangers of consuming fish, the assessment of effects of suction dredging on mercury relative to the thresholds of significance did not require these advisory tissue levels to be presented.

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(b) (6)

Comments by (b) (6) (U.S. Geological Survey) on Draft Subsequent Environmental Impact Statement on Suction Dredging (Feb. 2011 draft)

1. Because the USGS is a science agency and not a regulatory agency, these comments do not address any of the policy or regulatory aspects of the draft SEIR. The purpose of these comments is to address the accuracy of the SEIR with regard to citation of data and interpretations from USGS reports and other sources cited in USGS reports.

2. (Table 3-1, p. 3-6 to 3-7) Table 3-1 cites information about commercially available suction dredges, citing Keene (2009) [Ref#: 751]. For each diameter of nozzle size, only a single horsepower (HP) is indicated. However, the Keene (2008a) catalog [Ref#: 677] lists several available horsepower engines for some nozzle sizes. For example, a 6-inch nozzle is available with engines ranging from 13 to 32 HP, whereas Table 3-1 indicates 14 HP for the 6-inch nozzle (presumably from Keene, 2009).Therefore the data analysis, which is based on relatively small motors, should indicate that more discharge is possible with larger motors for a given nozzle size.

3. (Table 3-2, p. 3-8) Table 3-2 indicates that the volume of sediment moved is the "maximum reported". There is at least a factor of 10 difference in the data in Keene (2008a) [Ref#:677], which has larger values, vs. Keene (2009) [Ref#:751], which has smaller values. Both of these references are cited as sources of information for this table. Thus, it should be made clear which source the data is from, and why that source was chosen.

4. (p. 4.2-33, line 20-24) The draft SEIR describe three aspects to the USGS characterization efforts: (1) "Hg concentration and speciation in sediment of various size fractions," (2) "Hg and MeHg concentrations in local biota," and (3) "assess the practicality and potential impact of using suction dredging for removing Hg from an area contaminated with Hg". All three should be considered as "field and lab" activities, rather than just (1) "lab", (2) "field", and (3) "field" activities.

5. (p. 4.2-33, line 24) The "laboratory study" should be described instead as the "sediment characterization study".

6. (p. 4.2-33, lines 41-44) The drafte SEIR states: "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." (emphasis added)

Better justification should be given for using sample Pit #2:BC as a "worst case" scenario. Fleck et al. (2011), p. 80, mention "…dredging of the Hg-rich layers exclusively, a situation that is unlikely given the variable spatial distribution of these Hg-rich layers." It is important that the likelihood of encountering material similar to that found in Pit 2:BC and Pit 2:CS (Compact Sediment layer), which had a similarly high concentration of THg, > 10 ug/g, is considered, so that the chemical data can be put in proper perspective.

7. (p. 4.2-35, lines 2-4) The draft SEIR states: "However, it should be noted that few, if any, other sediments containing hydraulic mine debris in California have been characterized with respect to Hg, so it is possible that other similar sites would contain similarly high levels."

There are other studies not cited in the draft SEIR (by USGS scientists based in Menlo Park, CA) that have characterized placer mine debris with respect to Hg in the Clear Creek watershed (Shasta County, CA). See Ashley et al. (2002), Slowey et al. (2005) and Ashley and Rytuba (2008). The placer mine debris in the Clear Creek watershed is considered primarily dredge tailings but may include hydraulic mine debris. One sampling site where water and sediment were collected is described by Ashley et al. (2002) as "hydraulic mine drainage tunnel".

Ashley, R.P., and Rytuba, J.J., 2008, Mercury geochemistry of gold placer tailings, sediments, bedrock, and waters in the lower Clear Creek area, Shasta County, California; Report of investigations, 2001-2003: U.S. Geological Survey Open-File Report 2008-1122 http://pubs.usgs.gov/of/2008/1122/

Ashley, R.P., Rytuba, J.J., Rogers, R., Kotlyar, B.B., and Lawler, D., 2002, Preliminary report on mercury geochemistry of placer gold dredge tailings, sediments, bedrock, and waters in the Clear Creek Restoration Area, Shasta County, California: U.S. Geological Survey Open-File Report 2002-401, 47 p. http://geopubs.wr.usgs.gov/open-file/of02-401/

Slowey, A.J., Rytuba, J. J., and Brown, G.E. Jr., 2005, Speciation of mercury and mode of transport from placer gold mine tailings: Environmental Science and Technology, v. 39, p. 1547-1554.

It is possible that other sites, not yet characterized, could have higher Hg concentrations that those observed in sample Pit #2:BC.

8. (p. 4.2-39, Figs. 4.2-9 and 4.2-10) It should be indicated that the figures from Fleck et al. (2010) are based on dredge sediment discharge data from Keene (2009) [Ref. 751].

9. (p. 4.2-44, line 10) Keiu (2004) is not in reference list for section 4.2.

10. p. 4.2-44, lines 11-13) Quotation marks regarding definition of reactive Hg(II) are opened but not closed.

11. (p. 4.2-45, line36) It should be "BAF of fish to sediment MeHg" rather than "BAF of sediment MeHg to fish".

12. (p. 4.2-26, line 6) Delete comma.

13. (p. 4.2-26, line 24) Typo – "Because…"

14. (p. 4.2-26, line 30) Should be “Marvin-DiPasquale et al., 2011)”

15. (p. 4.2-27, line 4-5) A reference should be cited for the national average for Hg in trout. The value cited (0.11 ppm) is consistent with data in Scudder et al. (2009) for rainbow trout and brown trout.

16. (p. 4.2-48, line 14) Should cite a reference for smallmouth bass Hg data from Englebright Lake. May et al. (2000) USGS Open-File Report 00-367 (not in References) reported 0.63 ppm; the draft SEIR reports 0.66 ppm. There are other published data available such as Davis et al. (2009) [Ref#:510] and the follow-up SWAMP report on lakes and reservoirs (Davis et al., 2010, SFEI —not in References).

17. (p. 4.2-48, line 21-22) Should be “Marvin-DiPasquale et al., 2011)”

18. (Figs. 4.2-19 and -20; p. 4.2-49 and -30; captions) “The draft SEIR states” “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.”

This is incorrect. All material used in spiking experiments was suspended for 7 days prior to the spiking experiment. On the graph, Day 0 refers to the mixture of spiking and receiving sediment being preserved for analysis without any incubation time, and Day 6 refers to spiked material that incubated for 6 days.

19. (p. 4.2-49, line 2) The citations “Heim, 2003” and “Slotton, 2003” should be changed to “Heim et al., 2003” and “Slotton et al., 2003”.

20. (P. 4.2-49, lines 9-11) Ambiguity should be clarified. Last sentence of paragraph should read “The same experiment using sediment from Pit#1 as spiking sediment and Delta sediment as receiving sediment showed no impact…”

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051111(b) (6) USGS

Note that numerous minor text changes were recommended by this letter. These have been incorporated into Chapter 4 of this document, but not all are shown here.

Response to Comment 1
Comment acknowledged.

Response to Comment 2
See MR-WQ-5.

Response to Comment 3
The sediment mercury concentrations in the cited references fall within the range of sediment mercury concentrations represented in the DSEIR. For example, the hydraulic mine drainage tunnel in the Ashley et al. 2002 reference contained mercury concentrations similar to those in Pit #2:BC (on the order of approximately 100 nanograms per gram), while other measurements within the references fall between Pit#1 and Pit#2:BC levels.

Response to Comment 4
The Department agrees that the text should read as the comment suggests (see Chapter 4).

Response to Comment 5
The source of this data was Scudder et al. 2009, as the comment indicates.

Response to Comment 6
The reference for this data was:

> Office of Environmental Health Hazard Assessment (OEHHA). 2008. Evaluation of Potential Health Effects of Eating Fish from Selected Water Bodies in the Northern Sierra Nevada Foothills (Nevada, Placer, and Yuba Counties): Guidelines for Sportfish Consumption. Pesticide and Environmental Toxicology Section. Office of Environmental Health Hazard Assessment. California Environmental Protection Agency. Oakland, California.

Response to Comment 7
In response to this comment, the text of the DSEIR has been changed in several locations. The captions to Figures 4.2-19 and 4.2-20 are revised as follows:

> Day 0 indicates the sediment was not incubated following suspension for 7 days and spiking into the receiving sediment. ~~non-suspended prior to spiking into the receiving sediment.~~ Day 6 indicates the sediment was incubated for 6 days following suspension for 7 days and spiking into the receiving sediment ~~suspended for 6 days prior to spiking into the receiving sediment~~.

Language on page 4.2-48 is revised as follows:

> Recent experiments have shown that sediments from Pit #2:BC increased methylation relative to the control sediment when spiked into Englebright Lake

receiving sediment following suspension for 7 days. Being suspended for a period of ~~6~~7 days, ~~and~~ then spiked into Englebright Lake receiving sediments at a ratio of 1:50, followed by incubation for 6 days, doubled MeMercury production in the Englebright sediment when compared to the control, which was unspiked Englebright sediment (Figure 4.2-19; Marvin-DiPasquale 2011).

Language on page 4.2-49 is revised as follows:

Experiments have shown that sediments from Pit#2:BC doubled methylation relative to the control sediment ~~when~~ after being suspended for a period of 7 days and then spiked into Delta receiving sediments~~, and~~. ~~a~~After being suspended for a period of ~~6~~7 days and then spiked into Delta receiving sediments, followed by incubation for 6 days, these sediments tripled MeMercury production within the receiving sediment (Figure 4.2-20).

Responses to Individual Comments Related to Cultural Resources

With one exception, all comment letters referring to cultural resources are believed to have been adequately addressed through the Master Responses.

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STATE OF CALIFORNIA Jerry Brown, Governor

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April 21, 2011

Suction Dredge Program Draft SEIR
601 Locust Street
Redding, CA

Re: **Comments on the Department of Fish and Game Draft Subsequent Environmental Impact Report (SEIR) for the Suction Dredge Permitting Program - SCH # 2005-09-2070**

To Whom It May Concern:

Native American Heritage Commission (NAHC) staff has reviewed the above referenced Draft Subsequent Environmental Impact Report (SEIR) for the Suction Dredge Permitting Program. The NAHC has been identified a state *trustee agency,* as determined in the *Environmental Protection Information Center v. Johnson (1985) 170 Cal App. 3rd 604,* for the protection of Native American human remains and associated grave items and traditional cultural places, as identified in Health and Safety Code §7050.5, Public Resources Code (PRC) §5097.98, §5097.94 and §5097.993. For the reasons cited below, the NAHC believes that the protections for *Historical Resources*, *Traditional Cultural Properties*, *Unique Archaeological Resources*, and Native American human remains and associated grave items proposed in the SEIR are inadequate.

Mitigation for *Historical Resources* and *Traditional Cultural Properties* Inadequate

As SEIR states "Riverine settings are considered highly sensitive for the existence of significant archaeological resources" (p. 4.5 – 14). The document clearly indicates that suction dredge mining has the potential to impact significant *Historical Resources*, including *Traditional Cultural Properties* (mitigation measure CUL-1, p. 4.5-11), and *Unique Archaeological Resources* (mitigation measure CUL-2, p. 4.5-14) "through riverbed suctioning and screening activities that could disturb or destroy cultural materials which may be located just below the surface of the riverbed or along its banks." (p. 4.5-14) The SEIR states that these impacts are *Significant and Unavoidable*. According to the SEIR, the level to which these impacts might occur is unknown. Due to the statewide scope of the program, consultation and study to assess the actual impact "were not feasible" (p. 4.5-14). Furthermore, the document states the California Department of Fish & Game (CDF&G) does not have the jurisdictional authority to mitigate impacts to *Historical Resources* (p. 4.5-14) or *Unique Archaeological Resources* (p. 4.5-15), as defined by CEQA. The NAHC also believes that the SEIR does not adequately protect Native American Human remains and associated grave goods (mitigation measure CUL-3, p. 4.5-15).

The Department's only answer in protecting these one-of-a-kind cultural resources is to provide an "informational packet", acknowledged to be "advisory", to suction dredge operators. For *Historical Resources* and *Unique Archaeological Resources* the "packet" will include

measures regarding the identification and avoidance of resources if they are encountered during dredging activities (p. 4.5-13). Information is also to be included regarding the legal obligation to protect Native American human remains and associated grave goods under Health and Safety Code §7050.5 and PRC §5097.98.

Even if suction dredge operators had the will to actively protect *Historical Resources* and *Unique Archaeological Resources* from their activities, they do not have the knowledge and expertise required to do so. In the vast majority of cases, it is far more likely that if these resources are encountered and recognized that they will be subjected to looting. Even in the case of Native American human remains and associated grave items, which are protected by state law, there is no assurance in the SEIR that CDF&G will make any effort to ensure that miners are complying with these state laws.

CEQA requires lead agencies to consider the effects of a project on a *historical resources* and *archaeological resources* as stated Guidelines §15064.5 and mitigate those effects pursuant to Guidelines §15064.5(c). It must also assess the effects of the project on *Unique Archaeological Resources*, as defined in PRC §21083.2(g), and mitigate those effects in pursuant to PRC §21083.2(c). It states that mitigation measures must be "feasible" meaning "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors (Guidelines §15364). " It is clear to the NAHC that the mitigation measures proposed in the SEIR are not in accordance with the intent of CEQA.

<u>*Findings* for the Protection of Cultural Resources are Not Justified</u>

The SEIR devotes significant detail to "findings regarding the significance of the Proposed Program's impacts on biological resources" (Chapter 4.3). It has no detail regarding its findings on the Programs impacts on *Cultural Resources*, other than to state that it has no authority to propose specific mitigation measures. To support its decision on actions regarding impacts to *Cultural Resources* a lead agency must prepare written findings of fact for each significant environmental impact identified in the EIR to avoid or substantially reduce the magnitude of the impact with substantial evidence supporting the conclusion and an explanation of how the substantial evidence supports the conclusion. To simply state that it does not have the authority to propose mitigation without explanation is inadequate. CEQA Guidelines §15091(a). *Findings* states:

No public agency shall approve or carry out a project for which an EIR has been certified which identifies one or more significant environmental effects of the project unless the public agency makes one or more written findings for each of those significant effects, accompanied by a brief explanation of the rationale for each finding.

The undefined *findings* regarding Cultural Resources that the CDF&G seem to be referring to in the SEIR appear in subsection (2):

Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency.

If CDF&G does not have authority to mitigate impacts to cultural resources, the NAHC believes that the agency is obligated to identify and consult with the agency that does to mitigate program impacts to *Historical Resources* and *Unique Archaeological Resources*, and to make a reasonable effort to protect Native American human remains and associated grave items. CDF&G certainly did not consult with the NAHC regarding the suction dredge permit program mitigation in preparation of the SEIR. The CDF&G also did not identify any other agency that might have regulatory authority to address program mitigation. In fact no State Agency has specific regulatory authority for the protection of cultural resources, as they are defined in CEQA.

No *Statement of Overriding Considerations*

The SEIR does not contain a "Statement of Overriding Considerations." Lead agencies must find that the benefits of the project outweigh the unavoidable adverse environmental effects. When approving a project with unavoidable environmental effects, lead agencies are required to prepare a Statement of Overriding Considerations and must be based on substantial evidence (Guidelines §15093). CEQA requires the decision-making agency to balance, as applicable, the economic, legal, social, technological, or other benefits, including region-wide or statewide environmental benefits, of a proposed project against its unavoidable environmental risks when determining whether to approve the project. If the specific economic, legal, social, technological, or other benefits, including region-wide or statewide environmental benefits, of a proposal project outweigh the unavoidable adverse environmental effects, the adverse environmental effects may be considered "acceptable." Again, the agency must state in writing the specific reasons to support its action based on the final EIR and/or other information in the record. The statement of overriding considerations must be supported by substantial evidence in the record. It should also be included in the record of the project approval and should be mentioned in the notice of determination.

The NAHC does not believe that the Suction Dredge Permit Program's benefits outweigh the unavoidable adverse environmental impacts this statewide program will have on *Historical Resources*, *Unique Archaeological Resources* and Native American human remains and associated grave items. If CDF&G believes that permitting the activities of what are essentially hobbyist gold miners is of such *overriding* importance that it is willing to jeopardize the California's historical and archaeological heritage, CDF&G should justify their rationale in the SEIR.

***Cumulative Impacts* Not Documented**

The SEIR does not address the potential cumulative impacts of this program on *Historical Resources*, *Unique Archaeological Resources* and Native American human remains and associated grave items. CEQA Guidelines §15355 describes *cumulative impacts* as "two or more individual effects, which when considered together, are considerable or which compound or increase other environmental impacts." CEQA Guidelines §15130(a) states "An EIR shall discuss cumulative impacts of a project when the project's incremental effects is cumulatively considerable, as defined in section 15065(c). This section addresses *Mandatory Findings of Significance* where the project "has possible environmental effects which are individually limited but cumulatively

considerable." The SEIR does not describe the cumulative impacts of the program on cultural resources. The NAHC believes, when considered statewide, with individual permits potentially in the thousands, that the cumulative impacts of the Suction Dredging Permit Program will be considerable. As such, this effect must be described and analyzed in the SEIR and is not.

Conclusion

While, as stated above, the NAHC is considered the state *trustee agency* for the protection of Native American human remains, associated grave goods, and traditional places, as identified in Health and Safety Code and Public Resources Code, it has no specified regulatory authority, as does Fish & Game for fisheries and other wildlife. CDF&G did not identify the state agency that has the regulatory responsibility for protecting these resources in the SEIR, stating only that the Agency did not have that authority. In reality, no state agency has regulatory authority needed to protect cultural resources in this case. The NAHC is of the opinion that if the CDF&G cannot protect *Historical Resources*, *Unique Archaeological Resources* or adequately protect Native American human remains and associated grave items in the face of this statewide program of this magnitude, it is irresponsible for CDF&G to propose the implementation of the Suction Dredge Permit Program. The NAHC unequivocally endorses the *No Project Alternative.*

Sincerely,

(b) (6)

Office Manager
Native American Heritage Commission

CC: State Clearinghouse

042111 NMHC

Response to Comment 1
Please see MR-CUL-1 and MR-GEN-6.

Response to Comment 2
Please see MR-GEN-6.

Response to Comment 3
CEQA does not require a statement of overriding considerations to be included in the DSEIR. Instead, it is included as part of the findings that are adopted at the time of project approval, after an FEIR has been completed, if there would be any remaining significant and unavoidable impacts resulting from the proposed project after mitigation. (CEQA Guidelines, § 15093.) While impacts on cultural resources from suction dredging were found to be potentially significant on a site-specific basis, the Department is not aware of any evidence that suggests these impacts would be widespread. Because the impacts on cultural resources under the Proposed Program are anticipated to be very limited, the Department does believe this issue serves as a reasonable basis for not approving the Proposed Program.

Response to Comment 4
In preparing the DSEIR, the Department was not able to find any evidence to support the idea that suction dredging, collectively, has a cumulatively significant impact on cultural resources. Similarly, the Department was not able to find evidence that a cumulatively significant impact on cultural resources in riverine areas from factors not related to dredging exists, to which suction dredging could make a considerable contribution. The comment does not provide evidence of any such cumulative impacts. As such, CEQA does not require that the DSEIR consider this issue in the cumulative impact analysis.

Response to Comment 5
The Department agrees that, with the exception of locations under the jurisdiction of SLC, no state agency has authority to require mitigation for impacts on cultural resources. That said, it is possible that local land use agencies could adopt policies or ordinances that could serve as suitable mitigation. Even so, as stated above, the anticipated impacts of the Proposed Program on cultural resources are not expected to be of sufficient magnitude, such that they would serve as a reasonable basis for not approving the Program.

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4.3 Responses to SWRCB Peer Reviews

This section presents the peer reviews of the water quality analysis conducted on behalf of SWRCB. Each peer review letter has been provided, bracketing the individual comments in numeric order. Responses to issues raised in each letter follow immediately after the letter, sequentially.

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(b) (6)

(b) (6) **Ph.D., Department of Biological Sciences, Dartmouth College**

The purpose of this peer review is to determine whether the scientific basis of the findings concerning water quality impacts of suction dredging for gold are both supported by the literature evaluated by the consultant team contracted by the Department of Fish and Game (DFG) and are based on sound scientific knowledge, methods, and practices. I have limited my comments to findings on the impact of resuspension of mercury and other toxic metals because those are the areas of research with which I am most familiar. These are both areas for which the impacts are considered potentially significant. I have addressed the two questions as they pertain to the findings on mercury and other toxic metals and have added my comments below in italics.

(a) In reading Chapter 4.2 of DFG's in the context of the entire Suction Dredging SEIR, are there any additional scientific issues that are part of the scientific basis not described above? If so, please comment with respect to the statute language given above in the first three paragraphs of Attachment 2.

2. Mercury. Pages 4.2-33 to 4.2-54. Available evidence suggests that suction dredging has the potential to contribute substantially to:

- **Watershed mercury loading (both elemental mercury and mercury-enriched suspended sediment) to downstream reaches within the same water body and to downstream water bodies.**
  I concur that the scientific evidence for this finding is scientifically sound.

- **Methylmercury formation in the downstream reaches of the same water body and in to downstream water bodies (e.g., the Bay-Delta) from dredging caused mercury loading.**
- *I concur that the scientific evidence for this finding is scientifically sound. The studies conducted by Marvin-DiPasquale (2011) are strong support for this finding.*

- **Mercury bioaccumulation and magnification in aquatic organisms in downstream reaches within the same water body and downstream /water bodies.**
  While the scientific data for Hg bioaccumulation downstream of gold dredging operations is minimal, I do strongly concur that mercury bioaccumulation and biomagnifications in downstream aquatic organisms could be substantially increased by the formation of methylmercury from dredging caused mercury loading. Not only would the total mercury burdens increase in biota but the percent of the total that is methylmercury could also increase as the inorganic mercury is transported to higher methylation systems such as reservoirs, floodplains, and wetlands.

- **Increased methylmercury body burdens in aquatic organisms which increase the health risks to wildlife (including fish) and humans consuming these organisms.**
- *I strongly concur that the scientific evidence for this finding is scientifically sound. Methylmercury is largely transferred to higher trophic levels via consumption of food and is preferentially assimilated in animal tissue relative to inorganic mercury. As a result, fish are almost 100% methylmercury. Thus, piscivorous wildlife and humans who consume fish can be exposed to levels of methylmercury that have reproductive, developmental, and neurological consequences.*

In California, suction dredging frequently occurs in streams that were contaminated with mercury beginning in the Gold Rush. Suction dredgers encounter mercury in the forms of elemental mercury, mercury alloyed with gold (amalgam), and mercury-enriched sediment. Both elemental and reactive mercury are adsorbed onto the sediments. Suction dredgers recover and process amalgam because it contains gold. Suction dredge sluices do not capture 100% of the mercury, amalgam, and gold in sediment that passes through them (losses are in the percent range). In addition, suction dredgers dredge fine grained sediment (i.e., 63 micron and smaller) in mercury contaminated streams is at least 10x higher in mercury that what would be considered background for an uncontaminated stream. Suction dredges do not recover sediment finer than 63 microns.

Suction dredges then release mercury and mercury enriched fine-grained sediment that was formerly buried. This mercury may then be transported to aquatic environments where it can be converted into bio-available methylmercury.

I concur with these statements and the potential for methylmercury exposure in aquatic environments downstream of suction dredging activity.

3. Other Trace Metals. Pages 4.2-54 to 4.2-59. Available evidence suggests that while suction dredging has the potential to remobilize trace elements (e.g., cadmium, zinc, copper, and arsenic), the levels of increase:

- **Would not be expected to exceed state or federal water quality criteria by frequency, magnitude, or geographic extent that would result in adverse effects on one or more beneficial uses.**
- *I do not concur with this statement since the spatial variation in toxic metal concentrations in stream sediments is great and dredging activities in toxic metal hotspots could result in mobilization of metals to the water column that would exceed state or federal criteria.*

- **Would not result in substantial, long-term degradation that would cause substantial adverse effects to one or more beneficial uses of a water body.**

While other trace metals do not have the same propensity to biomagnify as mercury, there is still the possibility of these other metals to be bioaccumulated by aquatic invertebrates and fish (Chapman 2003; and the many papers by NS Fisher and his colleagues). I disagree with the assessment in the SEIR that aquatic organisms do not take up metals bound to sediments or only a limited amount from water:

"….metals that are bound to sediment particles are not bioavailable to fish and benthic macroinvertebrates and thus are not in a form that can cause toxicity to aquatic life. Moreover, the dissolved fraction of metals measured is not all bioavailable for uptake by organisms".

Aquatic organisms can bioaccumulate metals from ingesting particles, both organic and sedimentary. They can also take up a great deal of metals from water particularly when the pH and dissolved organic matter conditions are both low (common in these mountain streams). The degree of toxicity from the exposure would entirely depend on the concentrations of metals and the chemistry of the water as the SEIR suggests. But these routes of exposure should not be underestimated since the extent of hotspots and the effects of gold dredging on mobilization of these metals are poorly known.

- **Would not substantially increase the health risks to wildlife (including fish) or humans consuming these organisms through bio-accumulative pathways.**
- *I do not agree with the statement which precedes this finding (p. 4.2-58, lines 29-33) and states that "because trace metals addressed in this assessment are not bioaccumulative constitutuents, the potential to mobilize the trace metals discussed herein would not substantially increase the health risks to wildlife or humans…". The metal contaminants other than mercury being considered here are certainly bioaccumulated by aquatic invertebrates and fish but are not biomagnified like mercury. There is an enormous literature about the exposures and and bioaccumulation of toxic metals by aquatic fauna that supports this but these studies are not included in this SEIR.*
- *"*

  As I have stated above, I do believe that aquatic organisms, e.g. fish, can take up metals from particle ingestion and via uptake from water. Thus, fish could be exposed to health risks from the mobilization and transport of metal contaminated sediments. By dredging up deeper contaminated sediments that may not have been in contact with biota prior to the disturbance of gold dredging, the operation could result in exposures to these metals in surface sediments downstream in which benthic infauna live and benthic feeding fish consume their prey. There is a broad literature that suggests that benthic infauna toxicity is related to porewater concentrations of metals (Besser et al. 2009; D. DiToro and his colleagues). There was no mention of these studies in the review and also no mention of porewater measurements of metals in the areas downstream of contaminated hotspots. Moreover, there are possible indirect effects of metals on fish due to the metal toxicity effects on invertebrate prey that then result in changes in the food

web and subsequent decreases in food availability for fish (Iwasaki et al. 2009). Finally, while chronic or acute effects of metals from disturbed sediments may not be a problem, the effect of metals in hotspot areas likely already have impacts on invertebrate communities (e.g. decreases in diversity) and disturbance from dredging would likely exacerbate that impact (Lefcort et al. 2010)

- **Would not exceed CTR metals criteria by frequency, magnitude, and geographic extent that could result in adverse effects to one or more beneficial uses, relative to baseline conditions, unless suction dredging occurs at known trace metal hot-spots (e.g., caused by acid mine drainage caused trace metal contaminated sediment and pore water) where high metal concentrations and bio-available forms are present.**
  Until better identification of the geographic extent of hotspots is conducted for mercury or for other trace metals, I don't think that this finding is very useful. If there are extensive hotspots in these watersheds, it is likely that the CTR metals criteria could be exceeded and adverse effects could result.

In California, suction dredging frequently occurs in streams that were contaminated with trace metals beginning in the Gold Rush. Historic base metal mines align along the Sierra Nevada foothill copper belt, and are found in the Klamath-Trinity Mountains. Historic base metal and gold mines discharged their waste to steams if possible until the practice was prohibited in about 1910. In addition, many abandoned base metal mines still discharge metal-rich, acid mine water to streams in California. Although trace metal levels in Sierra Nevada streams have not been thoroughly evaluated (except for site specific data at form mine clean up projects), Regional Water Quality Control Boards have designated numerous stream segments as impaired because of trace metals. Suction dredges discharge trace metal contaminated sediment when operating in a trace metal-contaminated stream

Given that there are many trace metal contaminated streams in which suction dredging is likely to occur, the effects of metal bioaccumulation and toxicity to downstream fauna could be significant.

(b) Taken as a whole, is the scientific evaluation of the water quality effects of suction dredging presented in Chapter 4.2 of DFG's Suction Dredging SEIR based upon sound scientific knowledge, methods, and practices?

For the most part, the SEIR is based on sound scientific knowledge except for the points made above. However, the lack of information on the mercury and other toxic metal distributions in the watersheds is a very important and problematic: "not all locations of elemental mercury deposits (and other metal contamination) are known, the feasibility with which sites containing elemental mercury (or metal contaminated sites) could be identified at a level of certainty that is sufficient to develop appropriate closure areas or other restrictions for allowable dredging activities, is uncertain at this time." This

uncertainty makes the protection of aquatic resources throughout these watershed extremely difficult.

I also feel that while the review of the Hg literature is extensive and up to date, the review of literature for other toxic metals is less extensive and possibly incomplete. There is an assumption made that metals will be entirely bound to sediments and not bioavailable to aquatic fauna. The references below are just an example of some of the information that would have been useful to this SEIR.

References:

Angelo, RT; Cringan, MS; Chamberlain, DL, et al. 2007. Residual effects of lead and zinc mining on freshwater mussels in the Spring River Bason (Kansas, Missouri, and Oklahoma, USA. Science of the Total Environment 384: 467-496.

Besser, JM; Brumbaugh, WG; Allert, AL, et al. 2009. Ecological impacts of lead mining on Ozark streams: toxicity of sediment and porewater. Ecotoxicology and Environmental Safety 72: 516-526.

Chapman, PM, Wang, F. Janssen, CR, Goulet, RR, Kamunde, CN. 2003. Conducting ecological risk assessments of inorganic metals and metalloids: Current status. Human and Ecological Risk Assessment 9:641-697.

Iwasaki, Y; Kagaya, T; Miyamoto, K, et al. 2009. Effect of heavy metals on riverine benthic macroinvertebrate assemblages with reference to potential food availability for drift feeding fishes. Environmental Toxicology and Chemistry 28: 354-363.

Lefcort, H; Vancura, J; Lider, EL. 2010. 75 years after mining ends stream insect diversity is still affected by heavy metals. Ecotoxicology 19: 1416-1425.

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Response to Comment 1

The Department appreciates the comment's general support for the analysis and conclusions of Impact WQ-4, which addresses potential effects of Program implementation on mercury.

Response to Comment 2

The comments regarding bioavailability of particulate-bound trace metals and bioaccumulation of trace metals in general are noted. The SEIR will be modified as follows.

Page 4.2-56, lines 1–3 of the DSEIR have been changed as follows:

> This is important to consider in this assessment because metals that are bound to sediment particles are ~~not~~ less likely to be bioavailable to fish and benthic macroinvertebrates when ingested and thus are ~~not in a form that can~~ less likely to cause toxicity to aquatic life.

Page 4.2-58, lines 29–33 of the DSEIR have been changed as follows:

> Finally, because trace metals addressed in this assessment are not ~~bioaccumulative constituents~~ biomagnified up the food chain as higher trophic-level organisms consume aquatic organisms that have accumulated trace metals in their tissues, the potential to mobilize the trace metals discussed herein would not substantially increase the health risks to wildlife (including fish) or humans consuming these organisms ~~through bioaccumulative pathways~~.

In addition, contrary to the comment, which appears to misinterpret the conclusions of Impact WQ-6 regarding hot-spot trace metal deposits, the DSEIR's analysis acknowledges that not all hot spot deposits are known. Thus, in addition to the potential effects of suction dredging in known hot spot locations, such as 303(d)-listed water bodies impaired by trace metals, dredging-related disturbance, resuspension, and discharge of trace metals that may be present in unknown hot spot deposits are also considered a potentially significant impact.

Response to Comment 3

The Department agrees that the potential for unknown hot spots of mercury and other trace metals poses the possibility that implementation of the Proposed Program would result in impacts on beneficial uses and other resources (e.g., wildlife). As noted in the DSEIR, because identification of unknown hot spots is difficult, Impacts WQ-4 and WQ-5 are considered potentially significant and unavoidable.

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To: Rick Humphreys, Mine Cleanup Coordinator
Groundwater Protection Section
Division of Water Quality

From: (b) (6)
Assistant Professor
Civil and Environmental Engineering
University of Virginia

Date: May 2, 2011

External Peer Review of the Water Quality Impacts of Suction Dredging for Gold Presented in the Draft Subsequent Environmental Impact Report of February, 2011

This review centers around the potential impacts of suction dredge mining on water quality and toxicology (Chapter 4.2 in the Suction Dredge Permitting Program: Draft Subsequent Environmental Impact Report), specifically the effects on turbidity/TSS, mercury, trace metal, and trace organic compounds mobilized into the river system as a result of suction dredging operations. Throughout this review Chapter 4.2 is referred to as the report. References are made to Attachment 2, which details the issues to be addressed by the peer reviewers.

The report summarizes a literature review, and makes statements regarding the significance of turbidity/TSS, mercury, trace metal, and trace organic compounds released as a consequence of suction dredging on water quality. Overall the report suffers from a lack of the quantitative data needed to judge the appropriateness of suction dredging for all of California. Many of the studies in the literature are specific case studies and applicable only under river and dredging conditions similar to those applied in the case studies. Extrapolation beyond case study conditions can only be done with caution, especially given the diverse physiographic conditions in California. Many of the sections in the report also fail to consider all of the potential impacts of each parameter to the watershed as a whole or the downstream portions of the river systems. This leaves the report lacking in completeness and the conclusions difficult to justify in some cases.

Each water quality parameter is addressed separately in this document. There is first a summary of the findings followed by detailed comments on specific lines of the report.

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Turbidity/TSS

The report classified the effects of turbidity/TSS as 'less than significant.' The information presented in the literature has too many gaps to conclude that the impacts from suspension and mobilization of fine sediments are in fact less than significant. The report states that the plumes created by the dredges will elevate levels of turbidity and total suspended solids up to 300-340 mg/L. The values are presented as an upper limit but derive from a single case study conducted in an area with coarse substrate, a 4" nozzle and no other dredges operating in the immediate area. This scenario is not a worst case scenario as larger nozzles (up to 10") are known to be used in suction dredging, there are often multiple dredgers in the same watershed or on a single river reach. The cited study did not explore in depth the potential impacts of several dredges or larger nozzle sizes. Therefore the estimate of 340 mg/L cannot be used as the maximum value. Because there are no limitations on the number of dredgers allowed per watershed, the dredgers don't have to report where they are dredging, and there is limited monitoring of the watersheds, it is feasible that there could be several dredges in the same watershed. It is expected that if/when suction dredging is allowed there will be multiple dredgers operating along rivers within easy access points from campsites. It would be more reasonable for the literature summary to cite the 340 mg/L estimate and apply a multiplier determined by the expected number of dredgers in a single area.

The turbidity section is focused on the distance the visible turbidity plume travels from a single dredger. The report finds that the individual plumes would not cause long term degradation of water quality with regards to turbidity and TSS. However, the literature looking further downstream at the impacts of transported sediment on mercury accumulation with lake aggradation indicate that there is a greater amount of sediment mobilized and transported than what was measured by literature cited in the turbidity section. Admittedly there has been more quantitative research into the transport of mercury, but the studies showing downstream deposition of fine sediments are indicative of upstream releases of fine sediment into suspension. There is limited mention of reservoir infilling presented in the turbidity section and the case studies that discuss the potential to have the sediment transported downstream and accumulate in reservoirs behind dams are not emphasized. While this impact may be minimal for a single dredge, the combined impact of all of the dredges releasing sediment downstream would compound the negative effects. Over time the storage capacity of a reservoir would be reduced requiring an expensive dredging operation to remove excess sediment, and a safety hazard if the dam fails.

The cited studies acknowledge that the plumes could exceed turbidity objectives, but state that the plumes would not negatively affect aquatic organisms. In contrast, other studies that have shown that as the sediment settles out of the water column that it does have an impact on mussels in the downstream reach. The dredge tailings resulted in the death of a majority of each mussel species observed, and none of the organisms were able to escape from the tailings that deposited on them (e.g. Krueger, Chapman, Hallock, and Quinn, 2007). Again, the downstream impacts of the release of sediments into suspension need to be more fully considered.

Fine sediment that creates turbidity will deposit on the surface of the stream bed, potentially infilling any open spaces in the sediments and burying any aquatic insects or mussels. As the sediment accumulates on the channel bed, it will smooth the bed surface and reduce surface

complexities. If a number of dredgers operate in a single area, the amount of sediment released and deposited downstream could be enough to fill in any natural pools in the channel, which are often sites of important aquatic habitat. Most of these negative effects receive little mention in the literature review on water quality. They are discussed at greater length in the geomorphology section but deserve mention here as well because the added sediment deposition will affect overall stream health. While the turbidity studies have not detailed a significant negative direct effect on aquatic life, they have shown an effect on aquatic habitat.

The literature reviewed in the report is not sufficient to classify turbidity and TSS as either 'significant and unavoidable' or 'less than significant.' By the definition presented on page 4.2-24 significant impacts include "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… by frequency, magnitude and geographic extent and would result in adverse effects on one or more beneficial uses." While the increased turbidity and TSS may not result in bioaccumulation, there is not enough information about the impacts of dredge nozzle sizes larger than those presented in the literature, channel beds with significant fine sediment content, or multiple pieces of equipment operating in the same watershed to definitively rule out the potential to cause a significant impact. The data presented in the literature are from a sequence of individual case studies from streams with coarse substrate, using equipment that is smaller than specified by the regulations, and without any other dredging operations occurring nearby. If the regulation is to explicitly specify require that dredgers conform to these conditions, the impact may be 'less than significant,' but there is not enough information to consciously deem the impacts less then significant at this time.

In order to make a valid conclusion more information is needed in areas with silty substrate, using the maximum allowable equipment size, and with several dredges operating in the same watershed. These types of quantitative studies were not included in the literature considered in this report. The report makes note of these data gaps on page 4.2-21 line 43 "… the available data likely does not address every possible combination of variables in which turbidity/TSS discharges may occur." However, the language of the report minimizes these issues in the individual impact sections.

<u>Specific Comments on IMPACT WQ-3: Effects of Turbidity/TSS Discharges</u>

4.2-28 line 31: "resuspension of coarse and fine sediments into the water column by suction dredging activity is a function of several factors…" One of these factors is the number of dredgers operating in a watershed or river reach. Please specify the number of dredgers and their locations relative to each other.

4.2-29 line 14: the distance of the turbidity disturbance has been underestimated because the cited studies would not provide an accurate estimate. Harvey (1986) studied a site with a 100% gravel surface. The amount of fines that could have been suspended and created turbidity was negligible at best. Somer and Hassler (1992) conducted their studies under conditions that would minimize turbidity plumes. The dredging was conducted without any other nearby dredgers, using the small size 4" nozzle, and during high flows, which allowed for the fastest possible dispersal of suspended material.

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4.2-29 line 16: “maximum reported TSS concentrations were up to 300- 340 milligrams per liter (mg/l) immediately downstream of the dredge, decreasing to background levels within 160 meters (Thomas 1985).” This finding derives from one case study from Montana. The stream bed in the case study was primarily gravels and cobbles, which would have minimal fine sediment available for suspension. Thus, this study is not a reliable source from which to estimate maximum TSS concentrations. It is from a state with a very different physiographic setting, from a stream with higher grain size distribution then is reasonable for a maximum scenario, and result from use of a 6.4 cm nozzle, which is much smaller than the regulatory maximum for recreational dredgers of approximately 18 cm in most areas.

4.2-29 line 23: “In one case, a turbidity plume was said to extend “well over a mile,” but turbidity levels from this plume were “within limits” (USFS, 1996). This study underestimates turbidity levels because the samples were taken below the mixing zone. If the samples were taken within the turbidity plume, the levels would have been much high and likely above acceptable limits.

4.2.29 line 24: “The extent of the turbidity plume is influenced by the composition of the streambed, dredging in streams with higher proportions of fine materials will generate a more extensive turbidity plume (Harvey 1982, Harvey 1986). Also, observations of large dredges and many dredges in a water course suggest that the turbidity increases can be large.” By these statements, the author communicates the limitations of his study and warns against broad extrapolation of the results. This kind of cautionary language needs to be included in the report. Showing data from a majority cobble stream or smaller dredging nozzles than the regulation stipulates is not giving an honest representation of the potential impacts of turbidity or TSS.

4.2-30 line 21: “affects and entire” - should be ‘an’ and not ‘and’

4.2-31 line 39: The impact of suspended solids on burial of non-mobile organisms is mentioned in the report, but no real solution considered or provided. Research from Washington State suggests dredge tailings have a significant impact on the lifespan of mussels in the streams. While there wasn’t a large impact on the organisms as they passed through the equipment, there was a very high mortality rate of those that were buried in the tailings.

Krueger, K., Chapman, P., Hallock, M. and T. Quinn. 2007. Some Effects of Suction Dredge Placer Mining on the Short Term Survival of Freshwater Mussels in Washington. *Northwest Science* **81**(4): 323-32.

4.2-31 line 36: “Thomas (1985) and Harvey (1986) indicate that in some streams where dredges operate at low density, suspended sediment is not a significant concern because effects are moderate, highly localized and readily avoided by mobile organisms.” Both of these studies underestimate suspended sediment as a result of the large grain sizes of the river substrate.

4.2-32 line 14: In addition to underestimating the TSS and turbidity values by presenting data from “average” scenarios and not worse case, no exploration is made into quantifying the impacts of having several dredges working together or in the same watershed. It is reasonable to expect that under those conditions the water would have increased suspended sediment and turbidity levels. The extent of an increase in turbidity is unknown, but could increase the likelihood of having an adverse impact on the fish and invertebrates.

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4.2-32 line 23-26: The Program is supposed to include additional prohibitions that would avoid and limit potential disturbance of fine sediment, however no specifics are mentioned concerning moving dredging equipment in and out of rivers and the potential damage to the riparian area or channel bank.

Mercury

The report concludes that the effects of mercury discharged from suction dredging are 'significant and unavoidable.' This finding relies heavily on a case study comparing two dredging pits. The report is written with an emphasis on findings from Pit #2, leading the reader to believe that Pit #2 is a worst case scenario but without statistical evidence to prove show this. At the same time Pit #1 is presented as representative of the more common impact of dredging on contaminant transport. However, Pit #1 is a specific case from a channel where mining is unlikely to occur (see specific line comments below). Thus, the estimates of suspended sediment and contaminant concentrations in the water column as a result of conditions at Pit #1 are an underestimate of what should be expected. The impacts of suction dredging on mercury mobilization and transport are potentially more significant then what is presented in the report.

Because the report does not consider all potential impacts of mercury on the system, the conclusion that mercury's effects are 'significant and unavoidable' can be considered conservative. Upon study and analysis of the effects of larger dredging nozzles and mining at hot spots in the river system, the negative impacts of suction dredging on mercury mobilization can be anticipated to be greater. The addition of that information would serve to strengthen the conclusion already made based on a robust body of knowledge.

<u>Specific Comments on IMPACT WQ-4: Effects of Mercury Resuspension and Discharge</u>

4.2-36 line 13: "Humphreys (2005) describes a location where elemental Hg was present and whose sediment Hg concentration was 1,170 mg/kg." These results are from a lab test. The Hg concentration from tests performed on river waters is approximately 10 times higher than the lab test.

4.2-36 line 25: "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)." There are no specifications in the rules that requiring operators to use flare end dredges, so it is not reasonable to assume they will. This was the mention of flare end dredges in the literature.

4.2-36 line 40: "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)." The report defends the use of Pit #1 to represent background levels through literature citations that support the assumption (4.2-35) but an equally thorough case is not made for use of Pit #2:BC as the critical scenario in this analysis. Page 4.2-33 states "Levels from the bedrock contact layer of Pit #2:BC are assumed to be worst case from a mercury release standpoint because they are from a location know to be contaminated with historic gold mining Hg and because they are among the highest levels measured in California." There are no citations associated with these statements to lend credibility to these assumptions. Further, p.4.2-35 states "source assessment and sniping results

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suggested that this location is not a unique hotspot within the South Yuba River Watershed." If it is not a unique scenario, how can it be assumed that this is a true "worst case"?

4.2-36 line 45: specify that mercury discharge rates are from Pit #2:BC

4.2-37 line 10: The reported values cannot be extrapolated. The "worst case scenario" was based on a 6.4 cm nozzle in Montana while in California the dredges are typically 14 to 18 cm. In addition the cited literatures makes note that the results would be much larger if they used a larger dredge, smaller stream channel, or siltier substrate. The report should justify the numerical values picked and assumptions made when estimating values.

4.2-38 line 1: Use of the term "estimated" in the table title implies the table provides values that have been extrapolated from 1 set of measurements taken from 2 sites. The actual studies from which these values were taken should be cited. It is not possible to assess the accuracy of the estimates without knowing how the measurements were made and if any replicate measurements were taken that could provide error bars for the estimates. The report needs to comment on the applicability of these estimates to the entire state of California.

4.2-38 line 11: The wording needs to make clear the length of the data record used to determine normal and dry flow years. As the report is currently written, it may be interpreted to say that a 4 year span to estimate normal and dry years. It would be useful to present a longer span of water data to be able to show how the observed flows compare to a long term data set and what discharge patterns constitute normal and dry.

4.2-42 line 2 -14: "More than the entire permitted population of suction dredgers … would need to be operating… to discharge 10% of the background Hg loading in a dry year using average size… dredges." Again, the wording when presenting information based on the results from Pit #1 is misleading when it implies that the results from one study under specific conditions can be extrapolated to broad conclusions about loading. The report states that these are unlikely conditions (4.2-41), and they should be treated as such throughout the report. Less text should be spent on Pit #1 and more text should be devoted to the conditions of Pit #2? The current report can be misinterpreted due to the limited discussion of Pit #2 to indicate that dredgers would only impact the river under only one specific situation when in reality it is the most plausible situation.

4.2-42 line 10: "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"- where is this 50% estimate coming from? Is it from the Alpers (in prep) data set? Why assume 50% when 4.2-41 states that "During water years 2001-2004, it is estimated that only 40% of total Hg inputs into Englebright Lake were deposited?" The Alpers (in prep) number may not accurately estimate the values transport downstream, as it relies on a single case study, but the report should expand upon the assumption to use 50% and therefore underestimate the values presented.

4.2-42 line 16: what about reservoir sediment accumulation and the impacts of Hg on this?

4.2-43: Figure 4.3-12 and comments derived from these results should reflect that these results are relative to an entire watershed. While the results alone show significant impact from the suction dredgers, the report should mention the likelihood that there could be several dredges in a

watershed at the same time, perhaps after 4.2-42 line 2 "… of the background watershed loading."

4.2-46 line 36: "all taxa collected in 2007 had higher concentrations of MeHg than the same taxa from the same sites in 2008…. Overall, levels in 2008 were statistically significantly higher than levels in 2007." These statements appear contradictory.

4.2-51 line 15: "type sediment.." only need one period.

4.2-52 line 2: "2) estimates of watershed load" - is this water or sediment loadings, please specify.

4.2-52 line 36: Again, this is not where dredging is likely to occur, if the report includes this statement, it should add a statement about the unlikelihood of suction dredging taking place under non-ideal conditions. If the purpose is to show that background levels are not a substantial concern, please explicitly state that.

4.2-53 line 38- 4.2-54 line 16: How are these suggestions going to be implemented? As currently written, they are rather vague, for example not specifying an allowable nozzle size.

The Sierra Club, 2009 produced a document for Oregon that included an extensive list of suggested improvements to suction dredging regulations (i.e., improving and funding increased enforcement and education, identification and requirements of best practices and special rules for mercury). Any improvements to the regulations should consider limiting the number of dredgers per watershed, having the miners applying for the permits that specify machine type, horse power, nozzle size, and both watershed and specific river location where dredging will occur.

Riskedahl, Mark, and Lesley Adams. Letter to Beth Moore. 8 June 2010. Oregon Coastal Alliance. http://www.oregoncoastalliance.org/documents/NEDC%20re%20suction%20dred.pdf. Accessed online on 18 Apr. 2011.

4.2-54 line 11: who would monitor and enforce this?

Other Trace Metals

The release of trace metals is listed as a 'significant and unavoidable' effect of suction dredge mining. This contradicts the findings summarized for other trace metals in attachment 2 (page 3) which indicates that they are not expected to have a significant impact outside of hot spots, and that suction dredging would not "result in substantial, long term degradation that would cause substantial adverse effects to one or more beneficial uses of a water body." The difference may be due to an update but the language of the report could be misinterpreted.

The report indicates that "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…" (4.2-55 line 14). This statement can lead the reader to believe that once outside of the immediate proximity of the dredging operation there are few downstream impacts of the increased release of other trace metals. Instead, because these metals are transported with fine sediments, there is a strong possibility that these contaminants will deposit downstream and accumulate over several seasons. The report identifies suction dredging at river hot spots as

having the potential to severely impact the river by releasing a large quantity of metal into the flow (4.2-58 line 7), but does not then detail the potential for accumulation of these metals although acknowledging that many 303(d) listed water bodies are lower elevation bays and estuaries, where the fine sediments transported downstream from suction dredging sites would be likely to accumulate. There is also no consideration given to the increased probability of trace metal impacts on the river system when multiple dredgers are operating in a single river reach.

Similar to the situation with the turbidity section, there is not a robust body of scientific literature from which to draw quantitative conclusions. However, there is enough information to indicate a possibility of adverse water quality effects from suction dredging. Releases of trace metals with suction dredging would be unavoidable because there are currently no means of tracking where suction dredging occurs or a database of hot spots in California Rivers. Without any record of where the dredging activity is going to take place, there exists the potential for dredging upstream of a habitat sensitive areas. The qualitative evidence of negative impacts from trace metals in hot spots makes dredging location an important factor in the classification of this parameter as 'significant and unavoidable,' and any summary of that section should clearly spell that out for the readers if attachment 2 is to be distributed to decision makers. Thus, in the case of trace metals, the conclusion that impacts are 'significant and unavoidable' derives more from qualitative assessment of the information than from quantitative analysis.

<u>Specific Comments on IMPACT WQ-5: Effects of Resuspension and Discharge of Other Trace Metals</u>

4.2-55 line 14: What about accumulation behind dams, or in pools and riffles? While this may be covered in the earlier report section on Geomorphology, it should be mentioned here as it can impact the overall stream health and quality.

4.2-56 line 20: Is this area a good representative? Does it represent a worst case scenario?

4.2-57 line 9: "particulate-derived metals should not affect downstream sediment concentrations significantly" What about what is bound to fine sediment traveling in suspension down to reservoirs as discussed in the mercury section? It may not explicitly be bioavailable, but it will still accumulate overtime.

4.2-57 line 25: these results are based on a single dredge operating. The report should make mention of the expected results when several dredgers are operating in the same watershed and if they are operating in series? (See USFS, 1996 for the likelihood of having several dredgers in a watershed).

4.2-57 line 26: What about impacts to buried eggs in the dredging areas? Are there any expected impacts to mussels (see Krueger et. al., 2007)?

Trace Organic Compounds

The finding for impacts due to trace organic compounds is 'less than significant.' The literature reviewed for this finding is both quantitative and qualitative. Trace organics are not known to have accumulated in large amounts in the upstream areas of California Rivers. Although there are not estimates of their actual amounts in California Rivers, the conclusions is supported by the

cited literature. Organic compounds travel adsorbed to fine sediment and remain attached to the sediment upon its deposition. Because the compounds to not become bioavailable, even after mobilization and transport, they are unlikely to have any effect on overall water quality. Although the scientific literature on the subject is not extensive, it is complete and supports the finding of a 'less than significant' impact.

Specific Comments on IMPACT WQ-6: Effects of Trace Organic Compounds Discharged

4.2-59 line 19: "trace organic compounds have rarely been observed above public health thresholds in fish in upper elevation watersheds where suction dredging generally occurs."

4.2-59 line 44: "the vast majority of trace organic compounds mobilized by suction dredging would be adsorbed to sediments, most of which would rapidly re-settle to the stream bed within close proximity to the dredging site." A portion of the sediment may be transported far downstream (as stated in the mercury section). While the magnitudes on the individual scale may be small, the potential cumulative impact may be much more significant. The potential for future problems due to the effect of accumulated trace organics should be discussed.

4.2-60 line 18: What about several dredgers operating at the same time?

4.2-60 line 43: "would potential affect sediment…" should that be potentially?

Respectfully submitted,

(b) (6)

Assistant Professor
Civil and Environmental Engineering
University of Virginia

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(b) (6)

Response to Comment 1

While the Department agrees that the analysis could have benefitted from having additional quantitative data, there was no choice but to use the data that were available. The Department disagrees with the assertion that the available data were insufficient for the purposes of making impact conclusions. The available data, used in conjunction with professional judgment and generally accepted scientific principles, allowed the Department to make realistic conclusions supported by substantial evidence. Please also see MR-WQ-8 regarding potential effects of the Program on turbidity/TSS discharge.

Response to Comment 2

The potential range of dredging-related turbidity/TSS discharges indicated in the literature reviewed was considered in determining the significance of Impact WQ-3. As acknowledged in the DSEIR, dredging-related turbidity/TSS discharge concentrations could exceed basin plan water-quality objectives in the localized areas downstream of dredging activity, and it was acknowledged that the available scientific data concerning water quality effects of suction dredging activity are relatively limited. Thus, the potential for organisms to be affected within the localized area of the dredge plume is acknowledged, including downstream sedimentation of benthic organisms and their habitat (see p. 4.2-31, lines 39–44). However, the potential adverse effects on organisms suggested by this comment do not result in a finding that there would be wide-scale effects from Program implementation that would rise to a level that would adversely affect beneficial uses. Moreover, the Program requires dredge operators to take care to avoid dredging silt and clay materials, which would reduce the potential worst-case adverse effects of turbidity/TSS discharges suggested by this comment. Additionally, as noted in Impact WQ-3 (DSEIR page 4.2-32, lines 30–40), the Program includes enforceable provisions that would limit potential adverse effects of turbidity/TSS discharges, and no aspect of the Program would preclude other regulators, such as the RWQCBs, from enforcing water quality standards.

Response to Comment 3

The assessment of Impact WQ-1 (p. 4.2-25) addresses the potential effects of dredge site development and use, and the Program would prohibit mechanized winching, removal of vegetation, dredging outside of the wetted channel, and diversion of flows.

Response to Comment 4

See MR-WQ-5.

Response to Comment 5

Comment acknowledged. This comment does not substantially alter the assessment or its conclusions.

Response to Comment 6

Comment acknowledged. This comment does not substantially alter the assessment or its conclusions.

Response to Comment 7

The Department agrees that it cannot be assumed that dredgers would use the most current technologies, and such a requirement would be outside of the Department's authority (see MR-GEN-6).

Response to Comment 8

See MR-WQ-5.

Response to Comment 9

This comment is acknowledged. However, doing as the comment suggests would not substantially alter the assessment or its conclusions.

With respect to the second part of this comment, the comment implies that the worst-case value used for TSS in the total recoverable mercury calculations could actually have been much greater, in that higher values of TSS are plausible. Because the assessment using the TSS values in the DSEIR concluded that violations of the California Toxics Rule limit were feasible, and because the outcome of the entire assessment concluded a significant and unavoidable impact, assessing with higher values of TSS would not substantially alter the assessment or its conclusions.

Response to Comment 10

Although providing more data on historical flow patterns at the site and what constitutes a normal and dry year would add context to the discussion, it would not fundamentally alter the assessment or its conclusions.

Response to Comment 11

See MR-WQ-5.

Response to Comment 12

The assumption that 50% of the mercury entering Lake Englebright passes through the reservoir is based on literature estimates provided in Alpers et al., in prep., as discussed on page 4.2-41 of the DSEIR. Although the 40% number cited in Alpers was not used explicitly, these data were relied on to make an assumption of the 50% transport level. Revising this

to 40% deposited in Lake Englebright would not substantially affect the assessment or its conclusions.

Response to Comment 13

Sediment mercury concentrations in reservoirs were considered in the analysis of potential methylation and bioaccumulation of mercury in reservoirs.

Response to Comment 14

The analysis does indeed consider the effects of multiple dredges operating simultaneously in a watershed.

Response to Comment 15

On page 4.2-46 of the DSEIR, lines 38–39 have been modified as follows:

> Overall, levels in ~~2008~~2007 were statistically significantly higher than levels in ~~2007~~2008.

Response to Comment 16

Watershed loading refers to watershed loading of mercury resulting from naturally induced resuspension of mercury by high flows.

Response to Comment 17

See MR-WQ-5.

Response to Comment 18

Many of the suggestions in this comment were considered in the development of the proposed regulations. For information regarding the approaches considered but dismissed, see MR-GEN-10 and Section 3.2, "Section 228(g): Permit Cap and Section 228(k)(1): Nozzle Size."

Response to Comment 19

The Department agrees that the body of scientific literature addressing the effects of trace metal discharge resulting from suction dredging activity is limited. Thus, the ability to comprehensively assess the potential effects of Program implementation on trace metals is limited. Consequently, the assessment of potential effects on trace metal discharge is necessarily qualitative, and the ability to provide additional detail with respect to the specific suggestions and questions posed by this comment is limited. However, based on the

characteristics of dredging authorized under the Proposed Program, the zone of deposition downstream of the dredging site would be relatively small and isolated, compared with the stream as a whole, and activity would be intermittent, temporary, and dispersed. Moreover, particulate-bound metals are not readily available to organisms. Thus, with the exception of potential disturbance of stream areas with elevated trace metals, such as known Section 303(d)-listed water bodies, the disturbance, resuspension, and settling of particulate-bound metals downstream of a dredging site is not anticipated to cause sediment concentrations to increase substantially relative to existing conditions. The suspended sediment fraction and other fine-grained silt and clays containing the major proportion of any trace metals that may be present would be distributed downstream and be subject to continual resuspension and transport. Thus, the potential for sediment trace-metal concentrations to increase would be limited to a localized area immediately downstream of dredging sites, and concentrations would be attenuated farther downstream.

Response to Comment 20

The assessment of potential Program-related effects of dredging disturbance and discharge of trace organic compounds is necessarily qualitative owing to lack of quantitative information. Thus, the ability to provide additional detail with respect to the fate of particulate-bound contaminants posed by this comment is limited. However, because trace organic compounds are generally not anticipated to be present in hot spot concentrations in the remote areas where dredging activity primarily occurs, the resuspension and sedimentation that occurs downstream is not anticipated to cause sediment concentrations to increase substantially relative to existing conditions.

To: Rick Humphreys
From: (b) (6)
Re: Peer review of water quality impacts of suction dredging for gold
Date: 4 May 2011

Please find below my responses to the scientific topics to be addressed by reviewers. My scientific background and expertise is limited to question 2. My response to each question is in italics.

Description of SCIENTIFIC Topics
to be addressed by reviewers

1) Sediment/Turbidity and TSS. Pages 4.2-28 to 4.2-33. Available evidence suggests that individual suction dredges have the potential to re-suspend in-steam sediments, resulting in plumes containing elevated levels of turbidity and total suspended solids (TSS) (e.g., up to 300-340 mg/L).

This question is outside of my area of expertise and I therefore do not have a comment.

2. Mercury. Pages 4.2-33 to 4.2-54. Available evidence suggests that suction dredging has the potential to contribute substantially to:

- **Watershed mercury loading (both elemental mercury and mercury-enriched suspended sediment) to downstream reaches within the same water body and to downstream water bodies.**

Suspended sediments with mercury can travel great distances downstream from point sources (see response for next bulleted question).

- **Methylmercury formation in the downstream reaches of the same water body and in to downstream water bodies (e.g., the Bay-Delta) from dredging caused mercury loading.**

The formation of methylmercury downstream from a point source of mercury is a known, but only recently quantified phenomenon for higher trophic level, terrestrially-based organisms (e.g., songbirds and bats). A recent study on the South River, Virginia found point source related contamination for mercury at levels of significant reproductive concern to 137 km downstream. Therefore, mercury can travel at great distances, and often times not methylate at levels of concern to fish and wildlife until it is deposited in areas that have great abilities to methylate.

- **Mercury bioaccumulation and magnification in aquatic organisms in downstream reaches within the same water body and downstream /water bodies.**

Suspended sediments with mercury can travel great distances downstream from point sources and have an ability to methylate at levels that can create adverse impacts to aquatic and terrestrial organisms (see response for above bulleted question).

- **Increased methylmercury body burdens in aquatic organisms which increase the health risks to wildlife (including fish) and humans consuming these organisms.**

Increased methylation and availability of mercury can have individual and population level impacts to aquatic and terrestrial organisms, including vertebrates such as fish, amphibians, birds and mammals. Based on studies in the eastern United States, piscivores are at high risk to methylmercury contamination and toxicity because they often occupy elevated trophic positions where the biomagnifications of methylmercury can have its greatest impacts. The toxic levels of methylmercury causing significant reproductive impacts in avian piscivores is well established in the Common Loon by Evers et al. 2008 and Burgess and Meyer 2008. Based on these and other studies, the dietary criterion listed in Table 4.2-2 for avian wildlife of 0.02 mg/kg is out-dated and should not be used. Yeardley et al. 1998 used an existing dietary criterion that does not represent actual toxic thresholds for avian piscivores and therefore should not be used as a reference for dietary criteria (e.g., the citation of this paper simply continues that incorrect assertion for a dietary criteria).

Also, the dietary criteria used for avian piscivores should not be used for avian invertivores. Recent evidence demonstrates that avian invertivores are often more sensitive that avian piscivores based on Heinz et al. 2009. Based on recent evidence, invertivores (songbirds and bats) that have a diet originating from wetland habitats can have the ability to be at greater risk to environmental mercury loads vs. piscivores.

Burgess, N.M. and Meyer, M.W. 2008. Methylmercury exposure associated with reduced productivity in common loons. Ecotoxicology 17:83-91.

Evers, D.C., L. Savoy, C.R. DeSorbo, D. Yates, W. Hanson, K.M. Taylor, L. Siegel, J.H. Cooley, M. Bank, A. Major, K. Munney, H.S. Vogel, N. Schoch, M. Pokras, W. Goodale, and J. Fair. 2008. Adverse effects from environmental mercury loads on breeding common loons. Ecotoxicology 17:69-81.

Heinz, G., D. Hoffman, J. Klimstra, K. Stebbins, S. Kondrad, and C. Erwin. 2009. Species differences in the sensitivity of avian embryos to methylmercury. Archives of Environmental Contamination and Toxicology. 56:129-38.

In California, suction dredging frequently occurs in streams that were contaminated with mercury beginning in the Gold Rush. Suction dredgers encounter mercury in the forms of elemental mercury, mercury alloyed with gold (amalgam), and mercury-enriched sediment. Both elemental and reactive mercury are adsorbed onto the sediments. Suction dredgers recover and process amalgam because it contains gold. Suction dredge sluices do not capture 100% of the mercury, amalgam, and gold in sediment that passes through them (losses are in the percent range). In addition, suction dredgers dredge fine grained sediment (i.e., 63 micron and smaller) in mercury contaminated streams is at least 10x higher in mercury that what would be considered background for an uncontaminated stream. Suction dredges do not recover sediment

finer than 63 microns.

Suction dredges then release mercury and mercury enriched fine-grained sediment that was formerly buried. This mercury may then be transported to aquatic environments where it can be converted into bio-available methylmercury.

3. Other Trace Metals. Pages 4.2-54 to 4.2-59. Available evidence suggests that while suction dredging has the potential to remobilize trace elements (e.g., cadmium, zinc, copper, and arsenic), the levels of increase:

This question is outside of my area of expertise and I therefore do not have a comment.

4. Trace Organic Compounds. 4.2-59 to 4.2-60. Available evidence suggests suction dredging has the potential to remobilize trace organic compounds if present:

This question is outside of my area of expertise and I therefore do not have a comment.

The Big Picture

Reviewers are not limited to addressing only the specific issues presented above, and are asked to contemplate the following questions.

> **(a) In reading Chapter 4.2 of DFG's in the context of the entire Suction Dredging SEIR, are there any additional scientific issues that are part of the scientific basis not described above? If so, please comment with respect to the statute language given above in the first three paragraphs of Attachment 2.**

The scientific issue of greatest concern is the use of older references that have been superseded by more recent information.

> **(b) Taken as a whole, is the scientific evaluation of the water quality effects of suction dredging presented in Chapter 4.2 of DFG's Suction Dredging SEIR based upon sound scientific knowledge, methods, and practices?**

The scientific evaluation of the water quality effects of suction dredging is generally based on sound scientific knowledge, however, recent scientific studies are not well represented and therefore information presented in this document may not be relevant.

CONCLUSIONS: *The scientific merit of this report is high. However, recent advances in the understanding of mercury transport in riverine ecosystems and the effects of methylmercury in wildlife are not well represented. Recent findings should be recognized as they may have significant ramifications in decision-making. Streams and rivers that have significant wetland areas should be of particular concern for mercury remobilization by suction dredging, even if dredging activities are over 130km upstream.*

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(b) (6)

The Department appreciates the peer review performed by (b) (6) on behalf of SWRCB. The comments provided do not substantially alter the assessment or its conclusions.

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Response to specific questions listed in Attachment 2: Description of Scientific Topics to be Addressed by Reviewers. The responses follow the 1-4 numeration of the attachment. Statements within each of those four headings have been alphabetized in sequence.

1. Sediment/Turbidity and TSS:

1a. Agreed. The scientific literature and physical dispersion models indicate that suction dredge plumes are localized, persist only during dredging activities, and are usually, rapidly dispersed downstream to background TSS levels. This is consistent with my observations of suction dredging operations in California rivers.

1b. Agreed. The scientific literature has shown that plumes at suction dredging may exceed California Basin Plan objectives.

1c. The scientific literature indicates turbidity and TSS concentrations within suction dredging plumes will not normally exceed 50 NTUs and 340 mg/L, respectively. As the report states, some organisms – especially sessile organisms - may be adversely impacted (including killed) by the turbidity and TSS in the plumes, but it does not appear that turbidity and TSS will cause populations measurable adverse impacts to populations of those organisms. Moreover, the proposed criteria for suction dredging will protect sensitive populations by regulating the location and timing of that dredging.

1d. Agreed. The scientific literature indicates that suction dredging turbidity and TSS commonly returns to background levels downstream within hundreds of meters.

1e. As noted above (1c.) "report states, some organisms – especially sessile organisms - may be adversely impacted (including killed) by the turbidity and TSS in the plumes, but it does not appear that turbidity and TSS will cause populations measurable adverse impacts to populations of those organisms. Moreover, the proposed criteria for suction dredging will protect sensitive populations by regulating the location and timing of that dredging."

1f. Agreed. The long-term effects of individual plumes with regards to turbidity from suction dredging should be negligible, based on the requirements proposed for individuals using suction dredges in California waters. These include the requirements on the areas that may be dredged and the treatment of tailings.

2. Mercury

2a. Agreed. It is likely that suction dredging will remobilize mercury in buried sediments within waterways that were previously contaminated from mercury and/or gold mining activities. Much of that mercury will be associated with the finest fraction of those sediments (<63 μm), as reported in the scientific literature. Since those small grain size sediments are not recovered in suction dredging operations and they are suspended longer that larger grain sediments, the mercury associated with the finer sediments will tend to be dispersed to the greatest distances from suction dredging operations.

2b. Agreed. Some of the elemental and cationic mercury remobilized by suction dredging will be converted to organic mercury (e.g., methylmercury) downstream from that activity. This conversion will probably be greatest with mercury associated with fine grained sediments mobilized by that activity, because those resuspended sediments will subsequently be deposited in relatively calm waters downstream from the dredging and then buried by other fine grained sediments. That burial will create the suboxic conditions where the microbially mediated conversion of inorganic mercury to organic mercury by sulfate reducing bacteria and iron reducing bacteria occurs.

2c. Agreed. The scientific literature shows that the bioavailability, bioaccumulation, and biomagnification of mercury is essentially limited to organic forms of mercury (e.g., methylmercury). Since suction dredging operations will remobilize mercury (primarily inorganic species) in sediments (primarily fine grained sediments) and some of that mercury will then be dispersed downstream and deposited in areas that may be relatively more conducive to microbial methylation, some suction dredging operations may cause measurable increases in mercury concentrations in biota downstream from those operations.

2d. Agreed. The threshold for sublethal mercury toxicity in wildlife and humans continues to be lowered, as extensively documented in the scientific literature. For wildlife, the principal problem is associated with the biomagnification of mercury in aquatic food chains; and for humans, the principal of mercury intake is from the consumption of fish. These problems are most often found in areas where industrial activities (e.g., mercury and gold mining) have increased the level of mercury in the environment and/or increased the conditions for microbial mercury methylation (e.g., reservoirs). Consequently, the biomagnification of mercury to potentially toxic levels to wildlife and humans is of special concern in California.

3. Other Trace Metals:

3a. Agreed. Based on the scientific literature, as well as our group's studies of metals in California waterways, it is unlikely that suction dredging operations will measurably increase concentrations of other trace metals to levels that exceed state and/or federal water quality criteria.

Because of the relatively high concentrations of chromium in some sediments in California and recent studies documenting the sublethal toxicity of hexavalent chromium in humans, it is – theoretically – possible that suction dredging could contribute to an increase of hexavalent chromium in an aquifer downstream from that activity. But based on the scientific literature and our group's studies on chromium in California watershed and aquifers, I do not believe that possibility is a legitimate concern.

3b. Agreed. Based on the scientific literature, as well as our group's studies of metals in California waterways, on the proposed restrictions, it is unlikely that suction dredging

operations will cause any substantial, long-term degradation of a water body in California by metals – other than mercury.

3c. Agreed. Based on the scientific literature and the proposed restrictions, it is very unlikely that suction dredging operations will measurably increase concentrations of other trace metals through bioaccumulative pathways to levels that pose a health threat to wildlife or humans.

3d. Agreed. The other metals potentially mobilized by suction dredging activities should not result in concentrations exceeding CTR metals criteria, unless those activities occurred in unique places (e.g., acid mine drainage areas and downstream from a copper mine). The proposed restrictions on suction dredging in such places appear to adequately address that potential problem.

4. Trace Organic Compounds:

4a. Agreed. Based on the literature, there does not appear to be high levels of toxic organic compounds (excluding methylmercury) in potential suction dredging locations in freshwater locations. There may be locations that have relatively high levels of those compounds, but I am not aware of any of them.

4b. Agreed. Based on the relatively low concentrations of toxic organic compounds (excluding methylmercury) reported for potential suction dredging in freshwater locations, there is no indication that activity would increase levels of any of those above state and/or federal water quality criteria.

4c. Agreed. Based on the relatively low concentrations of toxic organic compounds (excluding methylmercury) reported for potential suction dredging in freshwater locations, there is no indication that activity would cause levels of any of those compounds to increase to the point where they had a measurable adverse effect on any beneficial uses of those water bodies.

4d. Suction dredging will mobilize trace organic compounds that have been scavenged onto sediments and/or buried under sediments in water bodies, but I am not aware of any potential suction dredging location in California freshwaters where the amount of any of those organic compounds (with the exception of methylmercury) represents a potential environmental and/or human health threat.

Response to "The Big Picture" questions in Attachment 2:

In general, I am quite impressed with the depth and breadth of the material that I reviewed for the Water Quality Impacts of Suction Dredging for Gold. It shows that (1) a great deal of effort has been invested in the project and (2) the multiple environmental and human health problems that could potentially be caused by suction dredging operations in California's fresh water systems have been carefully assessed. Most

importantly, those assessments are substantiated – whenever possible – by references to peer-reviewed reports in scientific journals and texts.

What makes the assessment so comprehensive is that one of the principal concerns with suction dredging in those water systems – the remobilization inorganic mercury and its subsequent biotransformation to methylmercury that can be biomagnified to toxic levels – has been investigated by the USGS. That study was outstanding. It built on numerous other studies of the sources, transport, biogeochemical cycling, bioaccumulation, and biomagnification of mercury in California's watersheds by multiple investigators at state and federal agencies, universities, and environmental companies. Therefore, while the impact of suction dredging on mercury cycling in California's fresh waters can only be truly quantified by studies at each site and each dredging activity, there is a wealth of information available to address those potential impacts – and that information has been carefully and objectively addresses in the draft report on Water Quality Impacts of Suction Dredging for Gold and the associated material that I reviewed.

My main concern with the material that I reviewed was that it should have been more carefully edited. The errors in grammar and composition, along with the inconsistencies in terminology, sometimes made it difficult – or at least frustrating – to read the material. More importantly, those editorial shortcomings detracted from the scientific rigor of the report.

As noted in my cover letter, I would prefer that the report used terms other than "significant", which has a defined statistical value, and "substantial", which does not have defined value. However, I have not been able to come up with other words for either term that would be more appropriate.

Other Comments:

The following comments address some other questions that I had in reading the material.

Section 228(16) "requires dredgers to avoid the disturbance of eggs, redds, tadpoles, and mollusks" (page 4.3-28 and elsewhere). I am not an aquatic biologist (although my BS and MS were in the biological sciences) so I had to look up what a "redd" was; and the report discusses the difficulties of observing some eggs, tadpoles, and mollusks in fresh water systems Therefore, I wonder how effective that requirement will be.

I believe the "several limitations" to studies discussed on pages 4.3-38 t0 39 are notable.

I find the comment that "Benthic communities seem to recover over time frames of 30-60 days after the disturbance ceases and the adverse impacts of suction dredging are not evident after a year (unless there is a very small population that is threatened or endangered)" is problematic because it appears to assume that there will not be more than one dredging event in a year or dredging events in successive years. Consequently, I have concerns with the subsequent Finding that "If left unrestricted, the impacts of suction

dredging on stream benthic communities would be less than significant with respect to all significance criteria" (page 4.3-39).

"Section 228(k)(2): Prohibits dredging within 3 feet of the current water level; at the time of dredging" is an example of the credibility problems created by poor editing.

I suggest a consistent use of "Hg" or "mercury", "MeHg" and "methyl mercury", and other chemical terminology. The inconsistent use of those terms in Chapter 4.2 and the rest of the material (often within a single paragraph) gives the appearance that chapter was assembled by committee and not carefully reviewed.

"Human health" but not environmental health concerns are listed in the sentence at the top of page 4.2-15, but both "human and wildlife exposure" are then discussed in the following paragraph.

With modern instrumentation, it is possible to measure all trace metal concentrations in essentially any sediment and it is also possible to measure trace concentrations of "synthetic organic compounds (e.g., pesticides)" in even the most pristine environments, so the discussion of those materials should be based on concentrations at potentially toxic levels – rather than simply whether they "may be present" (page 4.2-15).

Rainbow trout are "piscivorous", just less piscivorous than some other fish – in contrast to the statement on page 4.2-47.

"Although smaller nozzle sizes will still cause mercury releases when dredging mercury enriched sediment, the amount of mercury discharged would be lower than with larger nozzle sizes" is (1) grammatically incorrect and (2) only true is the durations of dredging are comparable.

Finally, I apologize for any editorial deficiencies in this brief review. It does not have the importance of your report, so I don't feel it needs rigorous editing. Still, I do feel a little hypocritical about not having someone proof these comments.

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(b) (6)

In general, the Department appreciates the information provided in this comment, and the comment's concurrence with many aspects of the analysis presented in the DSEIR. Responses to specific comments are provided below.

Response to Comment 1

The term "significant" has particular meaning under CEQA, which is distinct from its meaning when discussing statistics. While this does have the potential to generate confusion, the Department has no choice but to use the appropriate CEQA terminology in this context.

Response to Comment 2

Note that under the proposed regulations, many streams throughout California would be closed to suction dredging during the period when dredging would be most likely to disturb redds for sensitive species. Other restrictions are in place to protect tadpoles and mollusks. These measures would prevent the vast majority of disturbance, and thus are considered adequate.

Response to Comment 3

While the Department appreciates the concern expressed in the comment, the comment provides no concrete evidence to support the idea that impacts on the benthic community could be significant.

Response to Comment 4

The assessment did address whether concentrations of toxic substances would be expected to be above water quality criteria (i.e., toxic), as defined in the thresholds of significance.

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