6/12/07 Workshop
Suction Dredge Mining
Deadline: 6/22/07 Noon

From: "MARTIN H. MILas" <mhmilas@yahoo.com>
To: <commentletters@waterboards.ca.gov>
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Subject: Comment Letter #2 -- Suction Dredge Mining

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Hon. Song Her, Clerk to the Board:

The purpose of this comment letter is to follow up on information that was received and referred to at the workshop conducted on June 12, 2007 in Sacramento. I was in attendance and I also was one of those who spoke.

Much reference was made by some of the speakers to a 2005 USGS publication entitled "Mercury Contamination from Historical Gold Mining in California" by Charles Alpers, Michael Hunerlach, Jason May and Roger Hothem. The authors of that article estimate that the total amount of 10,000,000 lbs of elemental mercury was lost to the California environment. About a third of this amount was lost at hardrock mine sites. The remainder is estimated to be in or near California's watersheds, ie, somewhat over 5,000 tons. A concern raised in the same article is that methylmercury, which is derived by a complex process from elemental mercury, is being biomagnified to the extent that some fish consumption advisories have been made.

The complex process that results in methylation is identified by the authors of the referenced article as involving the following components:

"Hg(0), elemental mercury; Hg(II), ionic mercury (mercuric ion); HgS, cinnabar; CH3Hg+, methylmercury; Au, gold; AuHg, gold-mercury amalgam; H2S, hydrogen sulfide; SO4 2-, sulfate ion; DOC, dissolved organic carbon."

Thus, it can be inferred from this information that as long as elemental mercury remains in the waterways of California, then there will be the likelihood that complex processes will continue to generate a constant production of methylmercury and, consequently, continued biomagnification unless the elemental mercury somehow can be removed from the rivers. In other words, California's waterways are a ticking toxic time bomb unless something is done about it.

But what is being done about it?

1. Those who testified in regard to their actual usage of small scale suction dredges established that each year measurable amounts of elemental mercury as well as amalgamated gold-mercury are removed from the rivers of California. They established that due to a lack of any known or widely published state

established disposal sites for elemental mercury, and since this elemental mercury can not legally be disposed of (unlike nearby states such as Oregon and Washington which have demonstrated foresight and leadership in this area), then they are forced to store ever increasing amounts of elemental mercury in places such as garages or basements. These quantities are capable of empirical observation and verification. Thus, the operators of small scale suction dredges have established in an objective way that they do something about removing elemental mercury and amalgamated mercury from the California waterways. Each ounce of elemental mercury removed from the river systems is highly beneficial to water quality because once removed it can never be subjected to the complex processes that result in methylmercury getting biomagnified into aquatic river creatures and thus represents one ounce less to worry about both on a short term and long term basis.

2. Those who spoke against the operation of suction dredges offered no solution to the problem. However, they made some statements that require scrutiny.

a. The allegation was made that a suction dredge causes elemental mercury to flour and thus more easily enter into the complex processes that can result in the formation of methylmercury. This is an unsupported statement and is contrary to the experience of others who testified. It also appears inconsistent with an understanding of the dynamics of suction dredging and it ignores the natural phenomenon known as coalescence. The flouring of liquid mercury describes the reduction of a large globule of elemental mercury into tiny droplets. Coalescence is the opposite. It is the process by which tiny droplets of elemental mercury come together to form a larger globule. If left undisturbed it is the nature of liquid mercury to come together into a large globule. Quite a bit of agitation is required to flour mercury, such as the prolonged agitation in a ball mill. Such comparable agitation does not exist in a small scale suction dredge. The sucessful operation of a small scale suction dredge requires the operator to maintain a constant laminar flow of water. This is so because laminar flow will increase the amount of fine gold retained in the riffles, whereas swirl is to be avoided. The natural watercourse of a river contains plenty of swirling action due to the presence of large boulders. Droplets of mercury will tend to glob together in laminar flow conditions because the droplets will be forced into close proximity with each other while shielded from the force of the water flow. This may explain the experience of one of the speakers on June 12th who described the globules of mercury almost always

forming behind the first riffle of his suction dredge. In summary, the assumption that a suction dredge is capable of flouring elemental mercury is a subjective judgment that is not based on empirical testing. As such it should not be relied upon by the Water Board in reaching a decision.

b. Some speakers opined that disturbances to river sediments ultimately contribute to the biomagnification of methylmercury in river creatures. No studies yet have demonstrated this to be so. However, be that as it may, the opinion itself raises some questions that need to be addressed.

(1) What scale are we talking about? Even a fly fisherman wading in river water causes some turbidity. At what point is turbidity of sufficient scale to result a measurable difference to water quality? Also, what are the characteristics of turbidity causing events that are most harmful? Two different types of events come to mind that beyond question result in major turbidity events: Rainstorms and large scale water releases from dams. Rainstorms result in several impacts: (a) silt in massive quantities is introduced from outside of the river into the river, (b) water volume (pressure) is rapidly and substantially increased and (c) water velocity is increased to levels capable of placing in motion huge boulders the size of automobiles. Suction dredging produces none of these consequences and the puny turbidity plume created by a 5hp suction dredge is dwarfed by a rainstorm that turns the entire river brown for weeks at a time. Likewise water releases from dams turn the water a dark greenish/brown for over a hundred miles downstream and dwarfs the theoretical output of all the suction dredges in California combined operating simultaneously 24/7. These releases (a) increase river volume (pressure) and (b) increase river velocity and (c) they occur during the hot summer months when rainfall is minimal, ie, the same time of the year suction dredging is permitted. Small scale suction dredges, by comparison, only operate inside the river, picking gravel up, filtering it for heavy metals, then re-depositing the cleaner gravel in the same river at approximately the same spot. Suction dredges are incapable of adding volume to the river. Thus, they are incapable of increasing river velocity, since river velocity is totally governed by river volume (pressure). If small scale suction dredges import no silt into the river, if they do not add to river volume and if they can not increase river velocity, by what measurement can they be determined to affect the quality of water?

(c) Some speakers expressed general concerns that

suction dredges contributed to the degradation of the rivers and the aquatic life forms in them. Everyone is entitled to express an opinion, but the Water Board is expected to make judgments based on fact and objective evidence, not opinion. To do otherwise would constitute the type of arbitrary and capricious conduct that the state and federal constitutions forbid to government decisionmakers. The objective reality is that suction dredgers help keep the rivers clean and healthy in many different ways besides removing elemental mercury. For example, they also remove much decomposing lead, caustic batteries, circuitboard parts and other heavy metal detritus. They create clean gravel bars for salmon to lay viable eggs on -- eggs that otherwise deposited on a silty bottom will fungus and decay. They create deep hole refugia that contribute to the survival of fry during the hot summer months on dammed rivers where silting and water temperatures are a grave problem.

In conclusion, I once again call upon the Water Board to find ways to enable all of us to work together to improve the quality of the water in California's rivers, rather than simply to ban a potentially very useful tool. For your ease of reference I have attached a copy of my comment letter dated May 16, 2007. Thank you for considering the points made in this comment letter.

Martin H. Milas, life long environmentalist and occasional dredger.

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To the Hon. Song Her, Clerk to the Board:

The purpose of this e-mail comment letter is to focus on a particular aspect of suction dredge mining that often is overlooked in regard to effects on water quality. Specifically, this comment letter addresses the positive role of suction dredge mining as a valuable resource in the voluntary, no-cost removal of mercury, lead, copper and other toxic metals from California's rivers. Secondarily, this comment letter offers a suggestion that is designed to encourage the voluntary removal of toxic metals from California's waters.

1. It is generally accepted that mercury, lead and other heavy metals are toxic and harmful to all life forms and ultimately work their way up the food chain.

2. It is generally accepted that vast quantities of mercury found their way into California's river beds during a century of unregulated mining activity and that this mercury has accumulated in bedrock cracks and fissures, is not easily dislodged by natural forces, but is removable by vacuuming the bedrock by means of a suction dredge which acts as a filter and captures heavy metals, including mercury, some of which is amalgamated with natural gold.

3. Likewise many tons of toxic lead have accumulated in California riverbeds where it slowly leaches and is absorbed by the water. The source of this lead largely is attributable to hunting and is in the form of bullets and birdshot which lodges in bedrock cracks and crevices. Other sources include fishermen and river rafters who lose lead weights or accidentally drop cameras, cell phones or other circuitboard containing materials into the rivers.

4. Although much study is ongoing, there are no known publicly funded or public agency physical removal operations of any significance at work to actually clean the bedrock of California's rivers and streams of toxic contaminants such as mercury or lead.

5. Suction dredge miners pay a substantial fee for an annual permit to dredge on their federal mining claims

located in California's rivers.

6. In the course of dredging operations significant amounts of mercury and lead are removed each year from the bedrock and gravels of California's waterways at no cost to the public.

7. This is the only known activity that substantially contributes to the actual cleansing of river bottom bedrock cracks and fissures.

8. A suggested incentive plan would be for the State of California Water Boards to offer a reward equal in value to the full or partial cost of the annual dredge permit fee upon the delivery of toxic mercury, lead or other harmful metals that a dredge permit holder has removed from California's rivers at the end of each dredge season.

9. By working together, instead of at cross-purposes, public officials and suction dredge miners can significantly improve California's water quality.

Thank you for considering the contents of this comment letter.

Martin H. Milas, Life-long environmentalist and occasional dredger.