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The underwater gold rush

Emily Guerin | Sep 28, 2012 06:00 AM



The right to dredge part of Idaho’s Salmon River for garnets and gold now belongs exclusively to one man.

That was the decision of the Idaho Land Board last week when it granted Mike Conklin a mineral lease for a half-a-mile stretch of the river below Riggins, a small town near the western border of the state. Conklin plans to scour the riverbed for treasures using a process called suction dredging, a controversial mining practice that has been banned in California because of its negative impacts to water quality and fish habitat.

Conklin isn’t the only prospector in Idaho sucking up a riverbed in pursuit of gold—permits to suction dredge are \$10 and the state’s department of water resources has issued 700 permits this year. Conklin is, however, the first dredger to lease the mineral rights to a section of river, giving him exclusive access to mine that area. Unlike a permit (which can be purchased much like a fishing license), a mineral lease requires approval by the Idaho Land Board, so Conklin’s

request thrust suction dredging into the public eye.



Suction dredging is gaining in popularity as the price of gold has leapt upwards of \$1,700 per ounce. Here's how it works: a powerful under-water vacuum is mounted on a raft, and a scuba diver swims along the bottom of a river with a hose, sucking sediment and gravel into the vacuum. The vacuum separates gold, which is heavier than gravel and other metals, and spits the other materials back into the stream. Suction dredges are popular because they work in deeper rivers and suck up a large volume of the streambed, recovering gold that in the past would have been difficult to find.

Few miners expect large profits from the practice, but enthusiasts say it's a fun way to spend a weekend in the outdoors and make enough money to pay for gas. Some proponents say the practice actually improves water quality by removing mercury and lead from fishing weights from the streambed.

But many environmentalists disagree with that claim and say the dredges release buried mercury into the water and increase turbidity, coating salmon eggs in silt or inadvertently sucking them up (see "Hobby miners flock to public streams," *HCN* 5/1/06). The negative effects of suction dredging on fish are well-documented in peer-reviewed research, and contributed to California's decision in 2009 to put a moratorium on the process (see "Sucking up gold," *HCN* 4/27/11). A rider on this year's budget extended that moratorium indefinitely, unless the state finds a way to address suction dredging's environmental impacts.

Just over the border in Oregon, however, suction dredging is allowed as long as miners get a permit and keep a record of their activity. There are restrictions on how much silt miners can churn up, but little enforcement of those rules.

Technically, all suction dredging without a discharge permit is illegal, but the EPA doesn't enforce the law—yet. The agency is developing a general permit for suction dredge mining in Idaho that it hopes to roll out at the end of this year. Tracy DeGering, an environmental scientist with the EPA, told *Earthfix* that it's likely a majority of Idaho Rivers would be closed to mining once the agency issues a general permit.

In the mean time, suction dredge mining continues in Idaho's rivers and streams, much to the chagrin of Jonathan Oppenheimer, a senior conservation associate with Idaho Conservation League.

“As of right now, there’s no monitoring, no enforcement, there’s rampant violations of state laws (and) federal laws,” he said. “It is the Wild West when it comes to recreational suction dredge mining in Idaho’s rivers and streams.”

Emily Guerin is an intern at High Country News.

Photo of suction dredge on California's Klamath River courtesy Klamath Riverkeeper



Hi Emily, I read your article and noticed an error or two, I'd like to point out:

I will address them one at a time, in order to not overwhelm you or our audience: "Dredging has been banned in CA because of its negative impacts to water quality & Fish habitat"- Yes, it has been banned, but "the Karuk sued, and won a decision saying that the CA DFG had not adequately studied dredge mining's environmental consequences". So.... after that decision, an Alameda County Court told the DFG they needed to do an EIR for Siskiyou County and the DFG decided to do an EIR which instead encompassed the whole state. While this was happening, legislatively, SB670 got passed posing a 5 year moratorium on suction dredging, based upon no scientific facts other than dredging MAY damage the environment and dredging would be reinstated if and when the EIR said there was no damage. The legislators listened to the concerns of the environmental community and passed the bill without any input from the miners. So your statement about suction dredging banned because of negative impacts is wrong. It was banned because of the assumption of something being wrong and the legislators banned it due to political pressure from both Indian Tribes and Environmental Organizations- or another way of saying it- the miners have to prove they are innocent of unspecific charges, rather than the environmentalists proving the dredgers were damaging something after continuously using this type of mining for over 60 years. Apparently in this brave new world of environmental "justice" just the assertion of damage- lacking any evidence- was reason enough to ban the dredgers- as they were guilty until they proved themselves innocent. After the 1.3 million dollar Environmental Impact Report, ordered by the court, had been completed and shown that small-scale gold suction dredging effects were less-than-significant, the environmental community had a legislator slip a ban into a budget trailer bill that was signed by the governor.

So the DFG worked on the EIR and 6 months before it was to be finished the environmentalists floated another stealth bill (AB120) which would have ceased funding for finishing the EIR (the environmentalists, that wanted the EIR in the first place, learned that the results were going to be that suction dredging effect on the environment were less-than-significant and that result was not the conclusions the environmentalists wanted) and would make the dredging ban indefinite unless the dredging program "paid for itself" as funding for DFG programs come from state legislative actions. What was really curious about this bill was that it was added as a budget item, it had no name, no number and no author- and surprisingly enough, it was impossible to track. The miners called every legislator up and down the state asking about the bill and no one knew anything about it. The bill would surface long enough to be voted on (and passed with a super democratic majority) and then it would disappear again. Now why would environmentalists with nothing to hide go to these measures to ensure the passage of their bill which had nothing to do with the budget? My first guess is by attaching it to the budget at the last minute, it didn't get the kind of open debate necessary to pass normal bills- the majority Democrats just signed it and buried it again to re-surface somewhere else. Fortunately for the miners, the governor vetoed the part of the bill about defunding the EIR report. Do you know what the final EIR report said? Take a look here:

Direct Effects on Spawning Fish and Habitat- Less than significant

Direct Entrainment, Burial of Eggs, Larve, etc- Less than significant
 Effects on Early Life Stage Development- Less than significant
 Direct Entrainment of Juvenile Fish- Less than significant
 Behavioral Effects on Juvenile or Adults- Less than significant
 Effects on Movement, Migration- Less than significant
 Effects on Benthic Community, Prey Base- Less than significant

So, I must ask you, where are the damages to the fish? Perhaps there are some environmental spokespeople who have their own agendas. Why else would they try to prevent this information from being released by defunding the completion of the EIR, that **THEY THEMSELVES MANDATED?**



Hi Rick,

Thanks for your comments. After doing more research and speaking with the California Department of Fish and Game, it seems like the 2009 moratorium was based upon a scientific concern that suction dredge mining was harmful to fish. The moratorium gave the department time to find out what those impacts on fish were, and DFG came out with draft regulations last year that would allow mining in some places while avoiding most of the worst effects on fish (like banning mining while they spawned, etc). The recent extension of the moratorium, according to DFG, is to allow time for further study of other environmental impacts of suction dredge mining, like possible mobilization of stream bed mercury. Also, to figure out a new fee structure for mining permits that will give the department more money to monitor the effects of suction dredge mining. But the person at DFG that I spoke with, Senior Policy Adviser Mark Stopher, did say the way the moratorium was extended this summer (tacked onto the budget) was a bit sketchy and could be viewed as just pushing back the day when suction dredging will be allowed in California again.

Thanks again for your comment.

Emily



So, we agree that the moratorium was not based upon the assumption that it was banned because of proven negative fish or water quality impacts, right? There is an assumption, but no proof as of yet. I am working on a follow up comment in regards to the studies dedicated to water quality issues. Probably get it to you later in the day. The whole process that this followed throughout the scientific process and legislative process has been a bit sketchy, to say the least.



Hi Emily, I'm back again (like a bad cold)- more insight to your article. You state "....many environmentalists disagree with that claim and say the dredges release buried mercury in the water and increase turbidity coating salmon eggs- once again the Completed EIR States:

Effects of Contaminant Discharge from dredge site- Less than significant
 Effects of Contaminant Discharge of Oil & Gas- Less than significant
 Effects of Turbidity- Less than significant
 Effects of Trace Organic Compounds Discharged- Less than significant

The EIR stated that the State felt mercury resuspension could be a problem, but the miners are arguing that the studies involved were flawed and included a bias in the interpretation of the data. Check out the articles on the net about "Humbug Creek" in Nevada County, you will find many articles discussing a lack of apparent scientific guidelines being followed.

“The negative effects of suction dredging on fish are well documented in peer-reviewed research..” Really? Which peer reviewed research? I haven’t found an “well documented peer-reviewed research. Opinions, yes- but no peer-reviewed research. In this article of yours, you referenced Dr Peter Moyle's article, which was written a year before the EIR was completed. The completed EIR stated there was less than significant effect. Who is right? Dr Moyle or the DFG? Dr Moyle, himself states in his article he supports a conservative position, because "...we simply do not know much about the effects of dredging on many species....". I don't understand why Dr Moyle would write an article stating "suction dredging is bad for fish" if he didn't know much about the effects of suction dredging on fish? Truly a paradox, I guess. But since he is a scientist, we must assume he doesn't have an agenda, so I guess we should believe what he says, even though he cannot prove his assertion?

And look, another paradox: the CA EIR in Chapter 4.2 Water & Toxicology states "Effects of Mercury Re-suspension and discharge from suction dredging is significant and unavoidable- wow, that sounds serious. Let's look at the "proof"; well, it doesn't exactly show any proof. The authors of the EIR provided no direct dredging evidence to support that statement. In fact they stated in their document "few dredge studies are available regarding how small scale suction dredging specifically affects mercury". There are at least two other studies which the CA DFG decided to not use which showed less than significant effects: US EPA (1999) and Humphrey (2005).

On Humbug Creek on the South Fork of the Yuba river, Fleck (2011) noted in his dredging study, where he was trying to determine how much mercury was released at what best can be considered a mercury superfund site: "It is important to note that the results presented in this publication were not developed using a full-scale dredging operation". Really? What kind of scientific conclusions can you draw about dredging without actually using a dredge? He added “ 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).

Hmmmm, does that sound definitive to you? Scientists making a statement that says they were guessing the effects, since they didn't ACTUALLY use a dredge?

The EIR goes on and states “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”.

Suction dredges don't pollute rivers. Gold dredges have removed thousands of pounds of mercury, lead and iron over the past forty years based on a survey of suction dredge operations conducted by the California Department of Fish and Game. This toxic metal removal is done at no expense to taxpayers.

The basis for SB670, AB120 and the California Department of Fish and Game regulations that attempt to drive suction dredgers out of the rivers is weak science and flawed analysis. The

legislative bills and the structure of the regulations were driven by extreme environmental groups with no interest in the truth, facts or science. They are pursuing their own agenda of a Utopian landscape seen through pastel colored glasses. Their vision of the environment disregards a thousand years of mans interaction with his environment and attempts to impose a vision of the environment where man is only an observer. Sounds like sound science to me. I can see how the same environmentalists who passed the anti-dredging legislation, also claim that dredges release buried mercury in the water are so sure of themselves. It is clear as mud. No agenda there.



Emily,

I am so pleased to learn that you called Mark Stopher for follow up and clarification of the issues in your article. Being a public employee in the middle of the fray Mark had to parse his words so as not to raise the ire of either side. I was pleased that he did stand up and allow that the indefinite action blocking small-scale gold suction dredging indefinitely was “sketchy”. An under statement for sure.

Rick Smith stated that the mercury research was performed below what could be called a superfund site. That site would be Malakoff Diggings a 3,143 acres historical hydraulic mining site. That is a good point relative to choosing this location for performing suction dredge mobilization of mercury studies. This area is totally atypical of the locations that small-scale gold suction dredgers would operate in the State of California.

In a publication by Rick Humphries he said they were sucking up mercury from a pool while beads of mercury could be seen flowing in to refill the area dredged. Even under these extreme conditions Humphries concluded a 4-inch dredge with an obsolete crash box captured 98% of the mercury passed over the sluicebox.

His work has added bits of information to the database of known mercury hotspots. However, his 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 the historical Malakoff Diggings; and, Attempted, using data from a non-dredge study soil pit, 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 used does not allow for 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.

On the very same project the previous year, when a three inch small-scale gold suction 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/cm³ and copper at 8.92 g/cm³ have significantly lower densities than mercury at 13.55 g/cm³. 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.

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