Subject: Proposed Dredging Regulations
Date: Tuesday, May 10, 2011 1:44:57 PM PT
From: Joe Marriner
To: dfgsuctiondredge@dfg.ca.gov

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

Dear Sir,

Please consider my following comments regarding the SEIR and proposed regulations for suction dredging in California.

- SEIR baseline is wrong. I strongly disagree with the department using an arbitrary and misleading baseline in an attempt to make the impact of suction dredging appear greater than they are.
- Mercury is not a byproduct of dredging; in fact dredging removes at least 98% of mercury found in riverbeds. Dredgers should be rewarded, not condemned for their recovery of mercury. A recycling program should be established.
- In my opinion and experience with suction dredging there has been no evidence that dredging harms or endangers any fish. The regulations already in place protect the fish. Dredging helps spawning habitats by creating cold water refuges so fish have a habitat to live in during the warm summer months.
- The identification requirement proposed is not needed, the current system works.
- The DFG should not limit the number of suction dredging permits.
- Onsite approvals should immediately be signed off when approved.
- The DFG should not change the current nozzle size restrictions. There has been no evidence presented to substantiate a need for change. The 1994 regulations should stand.
- DFG should not further the limit places where dredging is allowed.
- Reduction of our existing dredging seasons is unreasonable.
- The proposed 3-foot rule is unreasonable
- Suction dredge regulations should not impose the requirement of Section 1600 Agreements
- Imposition of the 3/32-inch intake requirement on pumps is unreasonable
- Allowance of permit locations must be more broads. Flexibility should be allowed when searching for gold.
- The proposed dredge marking system is NOT workable
- Fuel should be allowed within 100 feet of the waterway if kept within a water-tight container or a boat.
- Limiting the operational hours of dredging is not within your authority.

The 1994 rule and regulations upon suction dredging in California have protected fish and their habitats adequately. There is no evidence that any changes are needed. It is in my opinion that these changes being proposed are just to appease certain special interest groups and are not in the benefit of the citizens of California and of the world. Many of the proposed regulations are not specific enough and will open the door to years of litigation. Changing existing regulations that currently work and protect the environment is a habit we should not get into. The economic impact from the closure of dredging in California has hurt many towns and small communities, when dredging is allowed again this help these communities economically and socially. Some of the proposed regulations will hinder this process. Overall most of the regulations proposed are unnecessary and unsupported by evidence.

Thank you for your time and consideration in this matter.

Sincerely,

Joe Marriner
117 Adele Ave
Rohnert Park, CA 94928

SUCTION DREDGE PERMITTING PROGRAM
Draft Subsequent Environmental Impact Report (DSEIR)
Comment Form

Name: Tibio Martinez
Mailing Address: 539 E. OAK ST

Telephone No. (optional):
Email (optional): tbo_209@yahoo.com

Comments/Issues: To whom it may concern, I find the dredging regulations unfair and based on unproven facts Not to mention prevents me from my mining rights. Not to mention the money I spend on my outings would help the economy all around (gas, food, equipment and such. Thank you for your time

Please use additional sheets if necessary.

SUBMIT WRITTEN COMMENTS (POSTMARKED BY 05/10/11) TO:

Mail: Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001
Email: dfgsuctiondredge@dfg.ca.gov
Fax: (530) 225-2391

Questions? Please call us at (530) 225-2275 • More information: www.dfg.ca.gov/suctiondredge

051011_McLeod

Comment Form

Name: Michael McLeod

Mailing Address: 5725 Meacham
Carson City, NV 89704

Telephone No. (optional): 775-771-3419

Email (optional): Panner5725@Wildblue.net

Comments/Issues: I have been a recreational dredger on the North Fork of the Yuba since 1996. I am concerned on a couple of issues. You study on mercury release seems somewhat flawed. Anyone who has spent time on the river knows that spring flooding moves more material in the spring than any dredger could do in a lifetime. Does Fish & Game have a plan to stop spring flooding? This doesn't include the periodic flooding that occurs such as in 97, 05, 06 and so on. This type of flooding redistributes the material on the river bottoms completely.

Why does Fish & Game want to regulate the number of permits, size of dredge nozzle, and location of dredge? This seems very discriminatory of your agency towards those who dredge. You don't regulate fishermen and hunters the same way. Also when I dredge I remove lead, cans, fish lures, and general trash from the river not including the rest of fishing line. I also see dead fish that have been killed by damage mouths or gills by catch and release fisherman. There should be a happy median that all

Please use additional sheets if necessary.

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parties can agree to. Maybe shorten the season from July to Sept. Hopefully you can come up with something not so restrictive as the suggestions that have been trotted out so far.

Subject: final comments on DSEIR... really, I think these are....
Date: Tuesday, May 10, 2011 7:29:20 PM PT
From: Ken & Debbie McMaster
To: Mark Stopher

Mark,

Thank you for all your efforts, this is not an easy process for any concerned party. Your professionalism is admired... we may not agree on some issues and we probably agree on many others, but I respect your dedication and your respect for others. Thank you.

You know, when I hear a woman, or any one complain about the trash from suction dredgers or trash from rafters or hunters, I wonder why these people do not either avoid confrontation and then clean up after them (a community and societal solution) or the most likely thing to do would be to provide actual evidence to authorities and seek prosecution. Debbie and I have personally packed out many burro loads of garbage left from backpackers and even an abandoned dredge site. We take responsibility for our actions, and sometimes one has to for others, but we don't look a blind eye at the actions or lack of action by others... we are pro-active and care for the environment that we share with others. We even have letters of commendation from Forest Service officials thanking us for our efforts in packing out other's trash.

I do have a positive suggestion. The DFG should review all past special suction dredge permits and any onsite inspections of dredge sites and incorporate those findings into the FEIR. There should be a vast amount of scientific and professional data created by these onsite inspections. Taking my N.F. Trinity River into consideration, the information that I have supplied was not utilized prior to the DSEIR (DFG fisheries biologist Bernard Aguilar recommendation that my proposed dredge operation was not deleterious to fish). It was only until I brought it to the attention of DFG that possible changes could be realized. Certainly, other situations exist where your own DFG fisheries biologists made determinations one way or the other about whether the proposed operation would or would not be deleterious to fish. I believe this approach will provide more in depth information to formulate reasoned decisions.

Please give the dredging community a fair response.

Thank you

Sincerely,

Ken McMaster

Thank you Mark, for your patience and professionalism.

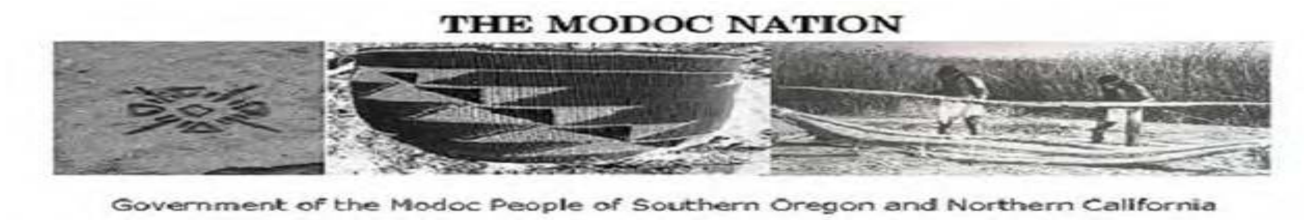
All the best,

Debbie

Subject: most likely my last comments...
Date: Tuesday, May 10, 2011 10:13:24 PM PT
From: Ken & Debbie McMaster
To: Mark Stopher

Mark,
Please accept these comments as part of the official records. This references an article in the ICMJ's Prospecting and Mining Journal of April 2011. In that article, "5th Circuit Ruling may benefit Miner's", the 5th Circuit Court of Appeals ruled that the Clean Water Act "does not empower the agency to regulate point sources themselves" and "the triggering statutory term here is not the word 'discharge' alone, but 'discharge of a pollutant', a phrase made narrower by its specific definition requiring an 'addition' of a pollutant to the water."
This case is National Pork Producers Council v. US EPA (No. 08-61093; 2011). In this case the court addressed the EPA's authority to require permits for 'point source' pollutants when there is no addition of a pollutant to the water. This is the same justification the EPA uses to justify permits for suction dredge mining. Basically, the court decided that moving an object that is already within the water from point A to point B is not a pollutant, that the act is merely a discharge, but not a discharge of a pollutant. It makes very good common sense.... if there are pollutants in a water and a suction dredger moves it or 'discharges' it through their sluice box, the suction dredge operator is not creating any new pollutant or adding any pollutant to a water.
Please review this article and objectively add this information to your analysis. Suction dredging does not add mercury or other pollutants to the water, suction dredging removes lead, mercury, bullets, fishing hooks, etc. from the streams.
I'm going to bed... I'm tired of thinking of these things.
Ken McMaster

Subject: Comments on Draft Suction Dredge Mining EIR
Date: Tuesday, May 10, 2011 12:27:13 AM PT
From: Chief Greywolf
To: dfgsuctiondredge@dfg.ca.gov



May 10, 2011

Mark Stopher
CA Department of Fish & Game
601 Locust Street
Redding, CA 96001

Re: Comments on Draft Suction Dredge Mining EIR

Dear Mr. Stopher,

We writing to express concern about the draft Supplemental Environmental Impact Review (EIR) of suction dredge mining that is currently being circulated for comment by your Department (DFG).

In The Modoc Nations constitution, it states it is our policy to do everthing within our power to protect our ancestral waters for the present and future use of the Modoc people.

We believe that the current EIR proposes draft regulations for mining that are seriously flawed.
The document proposes as its "preferred alternative" draft regulations for suction dredge gold mining that will cause significant and unavoidable impacts on water quality, historical and archaeological resources, noise, wildlife, turbidity and mercury discharge. The new rules open new river and stream segments to dredging where it has already been outlawed by tribal, federal, state or local law, and

allows "mega-dredges" to be used.

The program costs much more money to administer than it brings in to the state. The proposed regulations lack clarity and cohesion, and for many rivers and streams in California are vague, confusing, inconsistent, and contradictory. Finally, the document relies on a definition of "deleterious to fish" that is not consistent with California law or legislative intent in directing funds for development of the EIR.

This EIR needs to be redrafted with an eye toward protecting all of California's fish and wildlife and other natural resources.

It is not acceptable for the DFG to spend $1.5 million on this document andthen fail to issue protective regulations that are appropriate and consistent with California's state laws.

At a minimum the Department should adopt the most environmentally protective alternatives – either the "no project" or "water quality" alternatives outlined in the document.

Thank you for this opportunity to comment on the suction dredge EIR.

Sincerely,

Greywolf, Jeff Kelley

Chief of The Modoc Nation
1473 Glazemeadow St.
Monmouth, OR. 97361
503-838-0280
www.modoc-nation.blogspot.com
The Modoc Nation, Facebook

SUCTION DREDGE PERMITTING PROGRAM
Draft Subsequent Environmental Impact Report (DSEIR)
Comment Form

Name: Cecilia Moe
Mailing Address: 724 Hacienda Ave
Manteca, Ca 95336
Telephone No. (optional):
Email (optional):

Comments/Issues: I disagree with what will happen If this Bill SB 657 is not passed it will effect A lot of people from different Areas as well as my self.

Sincerely
Cecilia Moe

Please use additional sheets if necessary.

SUBMIT WRITTEN COMMENTS (POSTMARKED BY 05/10/11) TO:

Mail: Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

Email: dfgsuctiondredge@dfg.ca.gov

Fax: (530) 225-2391

Questions? Please call us at (530) 225-2275 • More information: www.dfg.ca.gov/suctiondredge

SUCTION DREDGE PERMITTING PROGRAM
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Comment Form

Name:	Dennis Moe
Mailing Address:	724 Hacienda Ave
	Manteca, Ca
Telephone No. (optional):	
Email (optional):	

Comments/Issues: I hope you reconsider on passing this bill SB657.

Dennis Moe

Please use additional sheets if necessary.

SUBMIT WRITTEN COMMENTS (POSTMARKED BY 05/10/11) TO:

Mail: Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

Email: dfgsuctiondredge@dfg.ca.gov

Fax: (530) 225-2391

Questions? Please call us at (530) 225-2275 ● More information: www.dfg.ca.gov/suctiondredge

SUCTION DREDGE PERMITTING PROGRAM
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Comment Form

Name: PHIL MOLICA

Mailing Address: 7898 STOW AVE
STOCKTON CA 95215

Telephone No. (optional): 209 463-7989

Email (optional):

Comments/Issues:

MINING HAS BEEN A WAY OF LIFE FOR ME FOR YEARS, THE INCOME IVE MADE NOT TO MENTION TIMES SPENT OUTDOORS. ABOUT 2600 PEOPLE HAVE BEEN PUT OUT OF WORK THATS JUST MINERS, NOW HOW ABOUT THE MONEY THOSE 2600 MINERS SPEND PUT BACK INTO OUR ECONOMY – TAX MONEY NOT COLLECTED BECAUSE THE 2600 MINERS ARE OUT OF WORK – PLEASE CONSIDER LIFTING THE BAN ON DREDGING

THANK YOU

Phil

Please use additional sheets if necessary.

SUBMIT WRITTEN COMMENTS (POSTMARKED BY 05/10/11) TO:

Mail: Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

Email: dfgsuctiondredge@dfg.ca.gov

Fax: (530) 225-2391

Questions? Please call us at (530) 225-2275 • More information: www.dfg.ca.gov/suctiondredge

SUCTION DREDGE PERMITTING PROGRAM
Draft Subsequent Environmental Impact Report (DSEIR)
Comment Form

Name: RICHARD MOORADIAN
Mailing Address: 1274 WIMBLEDON WAY
MANTECA, CA 95336
Telephone No. (optional): 209.679-1983
Email (optional): HOTSPARKS 57@ NETZERO.NET

Comments/Issues: I HAVE BEEN MINING NOW FOR A FEW YEARS, ASIDE FROM THE POKET OF GOLD (WHICH MEANS MONEY IN MY POCKET) WHICH I PUT BACK INTO OUR ECONOMY. THE TIME SPENT IN THE OUT DOORS WITH FRIENDS BUT MORE SO MY GRANDAUGHTERS IS PRICELESS WHEN WE GO OUT IT NOT JUST ABOUT LOOKING FOR GOLD BUT WE ALWAYS TALK ABOUT THE HISTORY OF MINING, LOOKING AFTER AND TAKING CARE OF THE OUT DOORS WE ALL LOVE AND RESPECT - YES IF YOU TAKING DREDGING AWAY FOR GOOD, WILL IT KEEP ME FROM THE OUT DOORS (OF CORSE NOT) BUT THIS IS A LIFE STYLE IT TRANSFERS INTO EVERY DAY LIFE THE EXTRA INCOME, THE FEELING THAT COMES FROM DOING WHAT THE 49ERS DID MANY MOONS AGO - IT BRINGS HISTORY TO LIFE - PLEASE DONT STOP A LIFESTYLE, INCOME, A WAY TO LOOK AFTER WILDLIFE!

THANK YOU

Please use additional sheets if necessary.

SUBMIT WRITTEN COMMENTS (POSTMARKED BY 05/10/11) TO:

Mail: Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

Email: dfgsuctiondredge@dfg.ca.gov

Fax: (530) 225-2391

Questions? Please call us at (530) 225-2275 • More information: www.dfg.ca.gov/suctiondredge

From: Harley L. Mullen
To: dfgsuctiondredge@dfg.ca.gov;
Subject: Fw: Input to Draft SEIR
Date: Tuesday, May 10, 2011 2:10:39 PM
Attachments: The truth.doc

----- Original Message -----
From: Harley L. Mullen
To: dfgsuctiondredge@dfg.ca.gov
Cc: Jim Foley ; mojavejoe@verizon.net
Sent: Saturday, March 26, 2011 9:42 PM
Subject: Input to Draft SEIR

Attached is a Word copy of an essay of which I am the original author. Please accept this as a miner's input to the SEIR process. Thank you.

Harley L. Mullen
574 Four Mile Brook Rd.
Northfield, MA, 01360

New 49er member.

This essay is being re-submitted with my full mailing address.

A balanced perspective on small scale dredging.

There is an old adage that says, *"If you shout something loud enough, long enough, and often enough……it becomes believable enough, by enough people….to pass as fact."*

Thus is the hope of environmentalists who claim that small scale dredging is harmful to fish. Environmentalists and other special-interest groups have recently been engaged in an all-out assault against small scale dredgers, alleging that this mining activity is harming fish. Well, actually, what they are saying is that this activity "may" harm fish, and on that basis alone, they are seeking to shut down the small scale dredging industry. Their allegations are rife with supposition such as "may", "could", "might", "can", etc. Now, there's a good reason for this.

Generally, when someone is alleged to be causing environmental harm, there are two things. First of all, there is scientific evidence that environmental harm is being caused in the first place….a corpse if you will….a dead herd of buffalo, dead birds laying on the ground, defective eggs, mutant lizards, or in this case, dead or injured fish. Secondly, there is sound scientific proof that a particular activity or situation is causing this harm. Ironically, in the issue of small scale dredging, neither of these two factors is present. Neither environmentalists nor biologists who have monitored small scale dredging for decades have provided any scientific proof whatsoever that a small scale dredger has ever harmed a single fish! Let me repeat that.

Not… one… single… fish!

You can bet your boots that if any such evidence did exist, it would have been bannered and exaggerated all over the news media. Environmentalists would be having a heyday with it. Instead, they are left completely empty-handed. Yet, they continue to press their assault against small scale dredgers, seeking a political solution while circumventing scientific discovery and the public review process in an effort that is completely devoid of a single fragment of proof. The fact is, that small scale dredgers actually help the fish in a number of very important ways. This will be discussed later.

Let us understand something here. Environmentalism is a wonderful thing. It has driven the cleanup of many of our rivers and harbors. It has exposed many pollution sites, and placed the responsibility for cleanup of these sites squarely in the laps of those responsible. And it has fostered protection for endangered species. Unfortunately, as with all good things, there are those who would abuse it. In addition to its great accomplishments, environmentalism has become a powerful and convenient tool for many "NIMBY" (not in my back yard) activists. Environmentalists have often been successful in thwarting roadway and rural development projects, and in keeping Walmart out of town. Often, one of the first considerations of opponents to development is "let's get the environmentalists in here and see if we can stop this." Many of the involvements by environmentalists were not born of concern for the environment, but by political agenda. Opponents of an unwanted presence can challenge this presence with a powerful tool while cloaking themselves in righteous deed. The Endangered Species Act (ESA) which they frequently rely upon has virtually become the preeminent law of our nation, it is so powerful. Environmental laws, as presently written, often permit a small, radical-thinking, agenda-driven, and often misinformed minority to impose their philosophies upon the general masses with little accountability. And, we as human beings often find such power too seductive to sensibly meter. I am a dredger and an environmentally-conscious person. I admire environmentalists for the good that they do, but I cannot admire their sometimes misdirection, and their prostitution of environmental laws as a political tool.

First of all, it is highly obvious that environmentalists and their legal advocates generally know very little about dredging for gold or they would not make some of the outlandish claims that they do. They are largely unfamiliar with the scope and mechanics of a small scale dredge operation and apparently are hoping that the courts in which they plead their cause are equally unaware as well.

It is important to first understand how a dredge works.

DREDGE MECHANICS

A dredge is a small mechanical platform that is mounted on floats. It consists of a small engine, a water pump, an inclined sluice ramp, and sometimes an air compressor to enable the dredger to breathe underwater. A suction hose is attached to the front of the dredge. Water is propelled through this hose by an injection of water from the water pump. This pumped water is injected up the dredge hose at a very shallow angle, and thereby causes greater volumes of water to be propelled up the dredge hose by what is known as the "venturi principle". None of the dredged water or material passes through any pump or mechanical device. The dredged material enters the front of the dredge, where it spreads out, slows down, and flows down over a series of small barriers known as "riffles", and then out the back of the dredge. This section of the dredge is known as the "sluice". It is now important to understand that gold is just about the heaviest thing found in a stream. Gold has a "relative weight" of 19. (Water has a "relative weight" of 1.) Therefore, gold is 19 times as heavy as water of equal volume.

Dredged water and streambed materials easily travel down this sluice mechanism and out the back of the dredge. Because gold is so heavy, it will drop out of the material flow and become lodged in these "riffles". This is how miners capture the gold and not everything else. Other things that are relatively heavy, though not as heavy as gold, will also become lodged in the sluice. This includes "black sand" which contains quantities of iron, fishing lures, tools, metal trash, lead sinkers, nails, bottle caps, beer-can tabs, and just about any other form of human junk that is unearthed by the dredge. Also, another very heavy element, poisonous mercury from ancient mining methods and other industrial contributors is often captured in a dredge and can now be safely disposed of. As you can see, a dredge is somewhat of a "vacuum cleaner" and in addition to capturing gold can help significantly to remove many pollutants from a streambed. This "concentrated" material is usually removed from the dredge sluice at the end of the day and then taken back to a campsite or other location where it is "panned down" with a gold pan. The gold is captured and the trash and pollutants are properly disposed of.

SIZE AND SCALE:

Compared to the natural lay of a stream, dredging activity is quite insignificant. Even in the most heavily dredged regions the area affected by dredging is almost always less than even one percent of the area of a waterway. This has been established by surveys. A dredger who moves a single cubic yard of material has done a very hard day's work. The streambed materials are often impacted and require difficult digging with tools to penetrate. Also, anything too large to go through the dredge hose must be dug up and manually moved aside and a dredger must stop a great many times per day to clear a dredge hose that has become plugged. In addition, a dredger must get fuel to the dredging location along with food and supplies. A dredger must also perform maintenance on his/her dredge and get into a wetsuit and secure all tools that they will need. Also, the water in the stream will often be colder in the early part of the day so a dredger often will not start before mid-day. A dredger must also stop occasionally to rest and consume food or drink and refuel their engine. A typical dredger will usually be accomplishing "productive work" between two and four hours a day in the stream. And, due to the exhaustive nature of the activity, along with things such as weather considerations, a dredger will seldom work every day.

The typical dredging operation involves working a hole down through the streambed material until they reach solid bedrock where gold, being the heaviest thing in the stream, has settled. Gold, as well as all other streambed material is moved downstream by raging winter floods. This gold will readily become lodged in cracks and crevices in the bedrock. It is primarily these imperfections in the bedrock that the dredger is looking for. The dredger suctions the easily-moved materials with the dredge hose. Anything that is too large for the dredge hose must be manually moved to one side. Once the bedrock is reached and cleaned, if reasonable gold has been found, the dredger will usually expand their hole off in another direction, dropping material back into the area they originally dug out. If the yield has not been worthwhile they will usually open another test hole some distance away. There are particular areas of a stream or river where gold is most likely to be found but it is still mostly a matter of chance.

Having provided a basic understanding of a small scale dredging operation, we can now examine some of the claims made by opponents of small scale dredging. These claims have been numerous and are mostly without scientific foundation. Once the allegations are proven false, they simply move on to a different allegation.

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 some of the streambed material is moved. This streambed material can range from fine silt to huge boulders and there can be other things that fall into the stream or river from its banks such as trees and brush. Streambed composition varies from place to place and from year to year.

When salmon spawn in the late fall, they try to select a streambed area that is shallow, relatively flat, free of fast currents, and comprised of loose gravel in which they can lay and bury their eggs. Successful reproduction by fish is highly dependent upon the available quantity and quality of these spawning sites. Once fish lay their eggs, these sites are known as (redds).

Since the composition of tailing piles is often similar to the loose, gravely material that spawning fish prefer, they occasionally select a tailing pile as their spawning site. The extent to which fish select tailing piles is dependant upon the availability of natural beds. A recent biological study in Northern California found that out of a total of 372 "redds", 12 of them, or roughly 3 percent were on tailing piles. Elsewhere, it has been observed that when natural beds are scarce, the selection of tailing piles increases. In rare instances where spawning fish have entered streams in which the streambed has become compacted or silted-over and there are no natural beds available, tailing piles offer virtually the only suitable opportunity to successfully spawn.

There are two primary concerns with regard to the survival rates of the eggs within these redds. Scouring and siltation. Scouring occurs when the unstable material of a streambed is moved downstream. This movement is usually greatest during the winter floods. Siltation, or the covering of redds by silt, is of far more concern than scouring. Although the extent of mortality by scouring is not of a known quantity, mortality by siltation is often complete as the eggs and pre-emergent fish become smothered by silt. Some biologists have even suggested that a certain amount of scouring is actually desirable to limit silting in some of these spawning beds.

Due to the fact that newly created tailing piles may not have had the opportunity to go through a flood event and become flattened and stabilized, there is a potential for more movement and scouring in these piles than there would be in a natural streambed spawning site. This can possibly result in greater mortality for eggs that were laid in fresh tailing piles. It has been noted, however, that once these tailing piles have become flattened and stabilized by winter floods, they can remain viable as a suitable spawning site for a period of several years. This is extremely important in streams where there are few or no natural sites available. Even during the first winter when scouring would likely be at its greatest, these tailing piles afford at least some opportunity to successfully spawn in a stream that might otherwise provide none. And this opportunity can continue for several years. Also, these stabilized tailing piles likely are less susceptible to silting and scouring than natural streambed due to the fact that once they are flattened and stabilized these tailing piles generally remain slightly elevated above the surrounding streambed. And, these tailing piles start out as washed streambed material, therefore they are free of silt in the first place. It is not known how many of the "natural beds" that were counted in this study were actually former tailing piles that have become flattened.

In view of the fact that fish tend to select tailing piles very infrequently, and only as necessary, and that stabilized tailing piles can provide prolonged spawning opportunity where there would otherwise be little or none, it would seem only logical that the known benefits of this relationship far outweigh any possible harm. We must also keep in mind the fact that scouring in a streambed is not "selective" only to fresh tailing piles. The entire streambed is vulnerable to scouring during raging winter floods.

COBBLE PILES:

These are rocks that will not pass through the dredge hose and consequently are piled to one side by the dredger. They usually range in size from roughly 12 inches in diameter down to about 3 inches, depending upon the size of the dredge. Larger than this, the rocks are generally too heavy to pile. These piles represent a certain percentage of the aggregate removed from a dredge hole.

About the most frequent claim by mining opponents is that these piles may divert the flow of water and may "possibly" cause erosion of river banks. At this point in time it would seem proper to mention that dredging into riverbanks, undercutting riverbanks, and doing anything that would cause erosion of riverbanks is strictly forbidden by dredging regulations. There are heavy penalties for violating these regulations and every dredger knows it. Dredging regulations are provided annually when a dredger is issued his/her annual dredging permit. And, dredging operations are frequently monitored by enforcement personnel. Dredging is a tightly regulated and monitored activity.

Secondly, dredging is usually not done adjacent to riverbanks, but closer to the deepest part of the stream or river as this is where the gold has settled. In those places where the deepest channel is along the side of a river or stream, the bank is usually not composed of soil but rather by ledge or gravels. The soil was eroded away eons ago by the natural river currents. It should also be mentioned that these cobble piles are very porous so the water flows through them as well as around them. There is little chance of changing the course of a river or stream. This is a small cobble pile, not a diversion dam. It should be noted that virtually every year during high winter floods, huge boulders and the occasional tree trunk are washed downstream and become lodged in an area where they cause immense changes in the flow of a river or stream and erosion of the river banks. Dredgers, on the other hand, do not begin their activity until the time of year when the water level is lowest and the flow is the slowest, and any hydraulic forces are minimal.

During the heavy winter flooding of 2005/2006, much of the vegetation, trees, and soils were ripped away from the banks of the Klamath River for much of its length, leaving nothing but exposed bedrock. Vast sections of this river were unimaginably altered, and almost unrecognizable from the year before. Unlike the small, temporary alterations that dredgers create, this naturally occurring alteration will not be reversed by winter floods. It was massive, and it is permanent.

It is hard to imagine that a pile of rocks resting on the bottom of a stream or river could provide very much benefit to anyone or anything, but it does. And this one is quite important. It is also a benefit that is carefully not mentioned by environmentalists.

Salmon generally spawn in the late fall in favorable gravel beds that they select as best they can. After a period of incubation, the small fish (fry) emerge from these gravels during the spring months. Many biologists regard this period immediately following emergence, (known as the "juvenile rearing" stage) as one of the most important stages in the life of a fish. It is important that as many of these (fry) as possible survive to the next stage, (smolt stage), which precedes their migration to the ocean. After this general emergence, at the beginning of summer, the dredging season begins.

Immediately after emerging, these fish are very small, they are relatively poor swimmers, and it is during this time that they are in great danger of predation. Fish lay eggs by the billions but only a very small fraction of them ever survive to adulthood. The juvenile stage is a period of very heavy losses. It is extremely important that these juveniles find food to grow as much as possible and it is infinitely important that they are able to find shelter from predation during this stage of their growth. This is where cobble piles come into the picture. Cobble piles provide an excellent refuge for these small fish. The passageways between rocks go deep within the pile, there is sufficient water flow to provide adequate oxygen, and they are virtually free from silt. Due to the varying sizes of the rocks and the resultant caverns, fish of various sizes can find a place within the pile that is most suitable for them. As the fish grow, they can select a different area of the pile. I personally dredged a barren, featureless section of the Klamath River that had been ravaged by the terrible 2005/2006 winter flood. Several mink and otter were present in the area and had virtually rid the area of all fish population except for a very few juveniles that had found refuge in our cobble pile. This pile was also rife with crayfish which would have otherwise been easy prey for these predators.

Shelter from local predation is not the only benefit of a cobble pile. Biologists note that these juvenile fish attempt to remain within a very localized area if they are able to do so, but during periods of high flow such as dam releases, thunderstorms, etc that cause elevated flow, these small fish are often swept away from their preferred safe location as they cannot always find refuge from these currents. This increases their risk of predation elsewhere. Cobble piles and dredge holes provide that needed shelter from these swift waters. These "artificial habitats" are very valuable to small fish. Biologists widely acknowledge the importance of "streambed diversity," and "structural complexity" to the survival and well-being of fish. Furthermore, these artificial habitats are comprised of natural materials, unlike in our oceans where these habitats are created by the intentional sinking of rusting, painted, and oily derelict ships.

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.

And some of the most avid accusers of dredgers are Indian tribes who sometimes “front” for environmental groups, and accuse dredgers of causing harm (without any proof) while their tribal members dip-net and harvest spawning adult salmon by the thousands as these fish are returning to their spawning grounds!!! I can think of a way to help these fish……...right now!!

Dredging is a very visible form of mining. Dredgers do not crawl into a hole in the side of a mountain. They do not dig in a pit that is surrounded by a privacy fence. Their activity is out there for all to see. One can usually look down onto a river and see their dredges floating on the water. There is often a visible plume trailing downstream from them. One can hear the distant drone of a lawnmower-sized engine, and if the stream is exceptionally clear one can sometimes see the dredge hole and cobble pile that are underwater. Dredgers frequently park vehicles beside a roadway, near to where they are working. To some, this intrusion into nature is disturbing. However, at the same time, dredging is perhaps the most reversible form of gold mining that there is. Virtually all traces of dredging activity are obliterated by the winter floods that occur after each dredging season The dredge hole is completely filled in, the cobble pile is leveled, and the tailing pile is flattened and spread out, offering itself as a potential spawning site for years to come.

Mining has been, and still is, important to the growth and wealth of our nation. But, even though our government has enacted mining laws to encourage the exploration and extraction of minerals and valuable metals from our public lands, and confers possessory rights to enable a miner to do so, it is an affront to some people to witness individuals removing valuable metals from public lands which theoretically belong to all of us. Many allege that small-scale dredging is merely a recreational activity. This is not true. Many small-scale dredgers derive part or all of their annual income from this endeavor. Mining laws do not differentiate by how much an individual enjoys this activity. Miners are all bound by the same rules. And, a great many businesses in communities that are nearby to mining activity depend very heavily upon the millions of seasonal dollars that flow into their communities from miners.

When examining environmental issues and trying to decide the proper course of action, we must carefully consider all of the important factors, not just the ones that suit our purpose. We must balance and fairly evaluate all of the scientific evidence, and not allow political agenda to overrule scientific fact. We must seek out the truth, the whole truth, wherever it leads us. During my recent research, I read a USGS paper that acknowledged that dredgers remove mercury from waterways in California. However, a more recent rewrite of that very same paper now omits that fact.

It is reasonable to expect that as members of our scientific community, biologists would be completely neutral in their approach and in their findings, and that their observations would be all-encompassing and that their opinions would be free of political influence. For the most part, this is true. However, upon reading the conclusions of numerous studies it is readily obvious that a few of these studies are slanted against the mining community to varying degrees. Some of these studies merely cite selective components of studies done by others and some of them herald the possibilities of harm while omitting or minimizing potential or known benefits. At least one of them was obviously conducted in a very narrow manner that guaranteed a certain outcome. This is not balanced science. It is natural to mankind to suspect to some degree that an intrusion into our "realm" may possibly be of an unwanted nature but science demands complete objectivity and a complete picture.

Many of these biologists know fully well the extent to which dredgers contribute to the wellbeing of fish. They know fully well that dredgers provide very important benefits to fish at just the right time of year when they are most needed by the fish, and then these alterations are completely obliterated by raging winter floods. They know fully well that the turbidity created by dredgers is a mere drop in a bucket compared to the millions of tons of mud, rocks, boulders, trees, stumps, brush, and other debris that are washed down our waterways during raging winter floods or a single thunderstorm for that matter, which fish routinely endure every year. They know that small scale dredgers are "occasional users" of our waterways, no more so than fishermen, boaters, swimmers, or the seasonal kayak and rafting outfitters who organize daily trips down our waterways involving hundreds of participants who picnic, wade, swim, and camp overnight on the shores of these waterways. And, unlike the highly regulated dredgers, these other waterway users are allowed to trample around in the waterway during a time when there are still incubating egg nests in the gravels!

So let's be honest here, shall we? This debate isn't about the environment, it's about control and politics. The environment is simply the vehicle. There is an old saying that says, "When you are a hammer, the whole world looks like a nail." Environmentalists, even when ill informed, will fight any and all battles in their efforts to establish themselves as the sole stewards of our public lands which belong to all of us, not just a self-appointed few. It is infinitely important that these public lands be set aside and remain equally accessible for the enjoyment and reasonable use by all of our citizens. We must cherish and sensibly safeguard these privileges, lest one day we no longer have them.

Many scientific papers and biological studies as well as personal experience were used in the preparation of this essay. These studies and papers are readily available on the internet. Thank you for taking the time to read this.

From: Rich Nawa
To: dfgsuctiondredge@dfg.ca.gov;
Subject: Suction Dredge Permitting Program and Draft Subsequent Environmental Impact Report
Date: Tuesday, May 10, 2011 10:53:19 AM
Attachments: Nawa 2010 ImpactsMining 6-3-2010.RN final.pdf

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attached report is cited in May 9 comment letter submitted by R. Nawa, Siskiyou Project

Mining Impacts

in the

Siskiyou Wild Rivers Area
Southwest Oregon

June 3, 2010

Richard K. Nawa
Staff Ecologist
Siskiyou Project
950 SW 6th
Grants Pass, Oregon 97526

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Summary

The Siskiyou Wild Rivers area (SWRA) in southwestern Oregon encompasses 6 major watersheds: Illinois River, Chetco River, Winchuck River, Pistol River, Elk River, and lower Rogue River (Figure 1). About 75% percent of these watersheds are public lands managed by the Rogue River-Siskiyou National Forest (RRSNF), Medford District Bureau of Land Management (BLM) and Coos Bay District BLM. The Illinois River Basin was heavily mined for gold and other minerals from the 1850s through the 1940s. Many Illinois Valley streams and rivers were severely damaged from hydraulic mining during this period. In 1989 the Siskiyou National Forest Plan stated that "Mineral development on the Forest in 10 years will increase. The most active mining activity will probably continue to be for gold, although interest in nickel-laterites and chromite areas may be increasing. Physical and biological impacts will have been minimized; however, short-term effects on water quality will continue to be a concern. New discoveries of minerals will bring additional demands for access into the unroaded portions of the Forest" (USDA Forest Service 1989: IV-3). These predictions have proved essentially correct through 2009 and can be expected to continue.

An additional and unforeseen impact is the increased recreational motorized vehicle use of legacy mining routes in serpentine areas where rare plants are vulnerable to destruction and Port Orford-cedar is susceptible to a fatal root disease. Motorized use increases erosion and sedimentation of streams, destroys significant areas of native vegetation including rare plants, introduces invasive weed species, and spreads Port Orford-cedar root disease. Desirable wilderness characteristics such as pristine landscapes, natural vegetation, and solitude in unroaded areas is degraded by the cumulative effect of legacy mining routes and increasing recreational motorized use. The Kalmiopsis Wilderness is degraded by commercial mining facilities on private inholdings. Besides noisy helicopter shuttles, these inholdings create the potential for motorized land travel by miners and equipment through a large portion of the Kalmiopsis Wilderness.

The most serious and ongoing impact is destabilization of streambeds from suction dredge mining. Spawning gravel stability is already a known threat to fall-spawning coho and chinook salmon in southwest Oregon streams because of logging. Researchers have found that chinook and coho salmon have reduced egg-to-fry survival when they spawn in suction dredge mine tailings. Studies of suction dredging found that streambanks are made vulnerable to erosion because the dredging occurs at or too close to the streambank. Sediment eroded at suction dredge mining sites is deposited at downstream locations where it harms aquatic animals. Visible turbidity plumes extend 150-500 ft downstream from dredges. Long term mining camps, noise, odor and the presence of dredges in streams displaces traditional recreationists or reduces the quality of the outdoor experience.

A 2009 legislated ban on suction dredging in California and record high gold prices through 2010 can be expected to increase suction dredge mining and placer mining impacts in the Siskiyou Wild Rivers area. In addition to suction dredging, placer mining operations excavate pits on floodplains and terraces that destroys areas of mature riparian forests and often releases sediment into streams. Placer mining on terraces and floodplains, in-stream suction dredging, and construction/use of mining roads will retard recovery of SWRA streams to former biological productivity and diversity, essentially disrupting desired biological function. Cumulative impacts to formerly pristine streams and impacts to streams recovering from previous mining are increasing. Mineral withdrawal is the only proven remedy to reduce mining impacts and allow streams to fully recover.

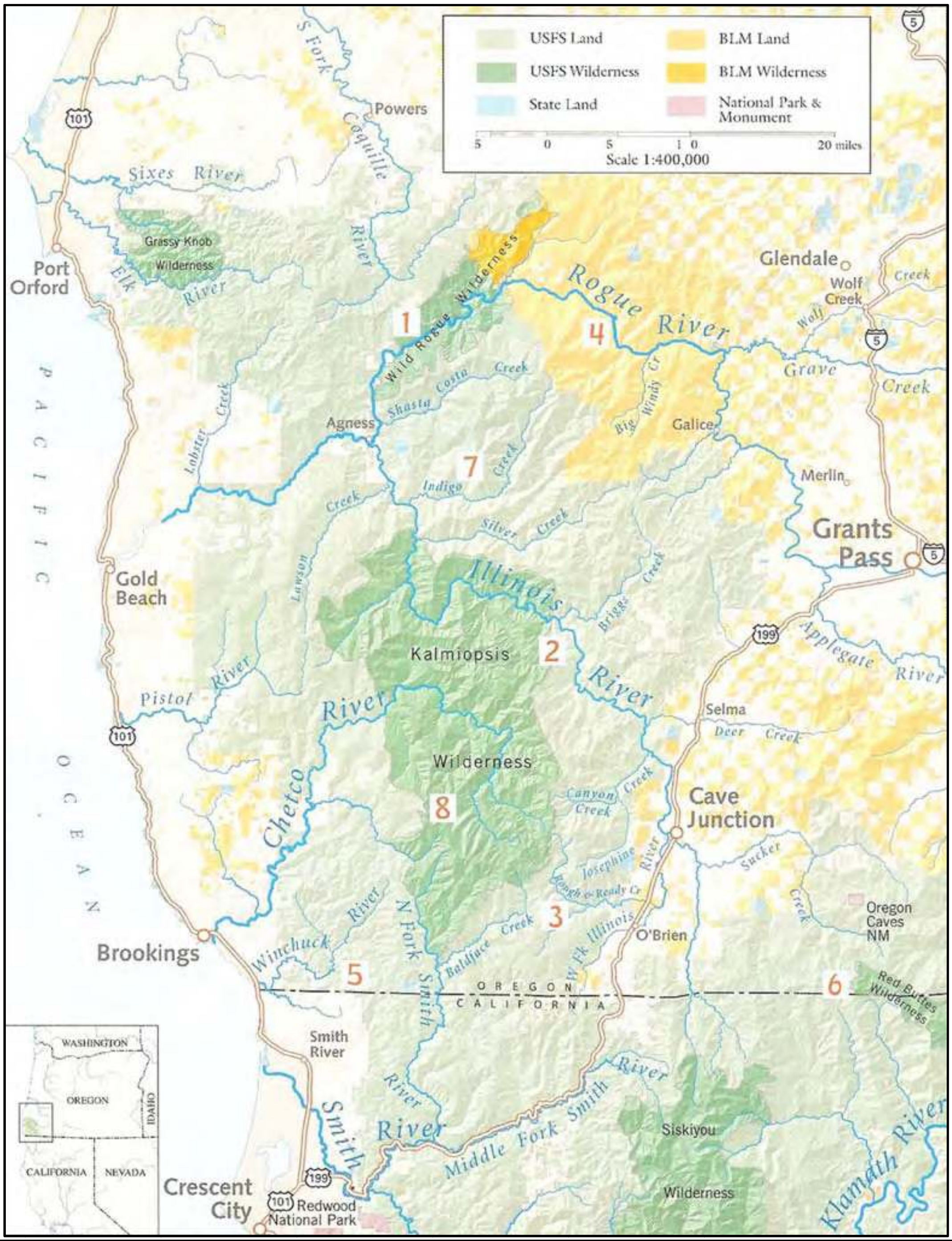

Figure 1. Siskiyou Wild Rivers area of southwest Oregon

Introduction

Despite requirements of the National Environmental Policy Act, no comprehensive description of mining impacts exists for the Siskiyou Wild Rivers Area (SWRA) in southwest Oregon (Siskiyou Project 2009). The purpose of this report is to fill that void and describe impacts associated with all types of mining in the SWRA in southwest Oregon. The best previous attempt to describe mining impacts was a draft programmatic impact statement published by the Forest Service for suction dredging (USDA 2001a). I used unpublished and published information. Bold type highlights the most serious impacts and the best available science for implementing the Endangered Species Act. I primarily relied on my personal observations, government publications, and unpublished reports to demonstrate that impacts described in published literature are indeed occurring in the SWA (i.e. mining impacts are not merely hypothetical). This report will be updated periodically to include the best available science and site specific examples of impacts.

In 1872, the General Mining Act authorized the prospecting and mining for economic materials such as gold on federal public lands. The Siskiyou National Forest Plan (USDA Forest Service 1989: IV-18) states that proposals for mineral exploration and development are negotiated on a case-by-case basis. Impacts are largely determined by the specifics of the actual plans of operations. Some recent examples are the Nicore Mining Plan of Operations (USDA Forest Service 1999) and Tracy Placer Mining Project (USDA Forest Service 2009). Mineral exploration and surface disturbance that do not require a plan of operation have more generic impacts that are less site specific. For example, suction dredge mining impacts are similar because the equipment (usually a 4 inch or smaller dredge operated within salmonid spawning streams) are similar for most suction dredging (USDA Forest Service 2001). Bulk sampling generally involves a small trench less than 0.1 acres. Impacts from mining are lessened by restrictions to protect water quality, riparian vegetation, soils, and rare plants (i.e. surface resources). For example, congressionally designated Wilderness in the SWRA has been withdrawn from new prospecting, mineral entry, and mineral location since December 31, 1984. Similarly, congressionally designated Wild and Scenic or Recreation Rivers have been withdrawn from mineral entry or have access restrictions. The Illinois, Rogue, Chetco, North Smith and Elk Rivers are partially withdrawn within ¼ mile from each bank. Pre-existing mining claims in withdrawn areas may be valid but mining plans of operations in these withdrawn areas are subject to a very high level of restrictions consistent with the intent of Congress for the designated area. The Siskiyou National Forest Plan as amended by the Northwest Forest Plan (USDI/USDA 1994) places minor restrictions on surface mining disturbance in Riparian Reserves, restricts motorized access, and restricts locations of processing facilities. Despite adoption of mining standards and guidelines in the Northwest Forest Plan, annual mining in Riparian Reserves has continued to be a chronic cause of stream degradation and retards recovery to former (pre-mining) aquatic productivity and ecologic integrity (Nawa 2002).

Types of Mining in the Siskiyou Wild Rivers Area and the 1872 Mining Law

Gold and other valuable minerals occur in lode or placer deposits. Mining claims on federal lands are either lode claims or placer claims. Originally, all gold and other valuable minerals are located within solid rock, often as veins in quartz. Lode mining is also called hard rock mining to differentiate it from soft rock mining which is excavation of softer minerals such as salt, coal or oil sands. Lode deposits of gold were primarily mined from the 1850s to 1940s by underground methods. The process of lode mining generally involves the labor of many miners working together to extract gold or other valuable minerals with tunnels in a mountain or large open pits (Nevada). Lode mining has not been recently attempted in the SWRA because of high start-up costs requiring considerable capital investment.

Placer deposits are formed when lode deposits are disintegrated by natural erosion, such as water flowing over the rock. Placer deposits can be unconsolidated surface sediment or much older buried sediments. Placer deposit of loose surface soil or gravel contains gold or other valuable mineral such as nickel laterite or chrome. Dredging recovers gold from sediments within the wetted stream channel. Historically, large instream dredges were used but these have been replaced by small portable suction dredges (Agee 2007). Usually one miner or a small group of miners separate out the gold with placer mining. Placer mining can also recover gold from floodplains and terraces with large earth moving equipment and processing machines. Placer mining for nickel laterite and chrome recovers ore from shallow deposits in upland serpentine areas where these minerals are concentrated.

Gravel mining extracts commercially valuable rounded rock from riverine areas on private lands, generally for road construction and concrete applications. Quarries on hillsides extract rock suitable for road construction. Some quarries in the area (e.g. Marble Mountain near Wilderville) once provided granite or marble for specialized construction purposes. Gravel and other non-hardrock mining activities are not subject to the 1872 mining law.

Suction Dredge Gold Mining in Streams and Rivers

The commonest mining activity in the SWRA with significant impact is suction dredging for gold in streams. The Siskiyou National Forest (SNF) reports 577 placer claims within streams (USDA Forest Service 2001:37; Figs 1). The Illinois River Basin has the highest concentration of suction dredge mining operations in Oregon (USDA Forest Service 2001:37; Fig 7). Site specific physical impacts to three heavily mined streams in the Illinois Basin were reported by Nawa (2002). California banned suction dredging in 2009. Horizon (2009) has produced a comprehensive literature review of impacts associated with suction dredging for the California Department of Fish and Game. **The most important biological impacts are reduced egg-to-fry survival for Chinook and coho salmon when salmon spawn in suction dredge mine tailings (Harvey and Lisle 1999).** Damage to streambanks and riparian vegetation are important because recovery is slow (Harvey and Lisle 1998). **Introduction of Port Orford-cedar root disease via mining roads is an irreversible impact to the ecological integrity of riparian forests, especially in serpentine areas of the SWRA (Nawa 1997; Hansen et al. 2000).**

<u>Streambank Effects</u>

Although state regulations in both Oregon and California prohibit dredging that results in streambank erosion, streambank excavation and erosion is the most frequent long term visible impact observed with suction dredge mining (Hassler et al 1986; Horizon 2009:4.1-5).**"Dredging that excavates streambanks may have long-lasting effects because streambanks are commonly slow to rebuild naturally"** (Harvey and Lisle 1998; Wolman and Gerson 1978). Similar to these published reports, Nawa (2002:18) found 30 streambank excavations associated with suction dredging along 9.5 miles of stream in the Siskiyou National Forest. Streambank excavations are particularly harmful because nearly all material excavated from streambanks is deposited directly into the stream channel which increases sediment load and greatly increases turbidity (Nawa 2002:20). Some miners also remove protective boulders and cobble that once armored streambanks from erosion (Nawa 2002: 22). An unknown amount of additional sediment beyond what was excavated from streambanks will be added to the stream each year as denuded streambanks continue to erode during winter floods (Fig 2). Streambanks denuded of vegetation have increased erosion of 80% or more (Micheli et al. 2004; Horizon 2009: 4.3-20).

Figure 2. Nearly all protective armoring and riparian vegetation has been removed from this streambank by suction dredge operators, making the streambank vulnerable to increased erosion from winter floods. Briggs Creek, Rogue River-Siskiyou National Forest, 5 September 2001. Photo by Rich Nawa.

Streambed Effects

Undisturbed streambeds are armored with coarse rock that requires relatively high (bankfull) flows to activate bedload movement of underlying fine sediment (Jackson and Bestcha 1982). **Direct effects of dredging include the creation of unnatural pits averaging 1.2-1.5 m in depth and tailings piles that destabilize the streambed through the removal of coarse textured streambed armoring (Stern 1988; Hassler et al. 1986; Sommer and Hassler 1992; Harvey and Lisle 1998; Harvey and Lisle 1999; Horizon 2009-4.14).** Streambed dredging remove the coarse protective armoring and allow the underlying finer sediments to be mobilized by modest (less than bankfull) flows (Nawa 2001:23). Streambed dredging makes the streambed more susceptible to streambed erosion, turbidity, and increased fine sediment deposition. Increased sediment, unstable eroding streambanks, loss of coarse textured armoring, and creation of mid-channel bars combine to destabilize streambeds.

During summer low flows, suction dredge operators sometimes move coarse streambed sediment to channelize flow towards streambanks that causes undercutting and erosion (Horizon 2009:4.1-6; Harvey and Lisle 1998:11). Similar to published reports, Nawa (2002:18) documented flow channelization by suction dredge miners in Briggs Creek on the Rogue River-Siskiyou National Forest.

Turbidity/Total Suspended Solids (TSS)

Visible plumes of sediment (15-50 NTUs; 160-340 mg/L) can be seen between 50 and 160 m (164 ft and 525 ft) below suction dredges but can extend up to 320 m (1,050 ft). These sediment plumes are 2-3 times dirtier than background levels above the dredge (Harvey 1986; Somer and Hassler 1992; Thomas 1985; Griffith and Andrews 1981; Stern 1988; Prussian et al. 1999; ODEQ 2010; Horizon 2001: 4.2-1, 2). Elevated suspended sediment in discharge plumes suppresses algal production which reduces invertebrate and fish production (Lloyd et al. 1987). Based on data from Newcomb and Jensen (1996), Horizon (2009: 4.3-12) calculated that juvenile salmonids may be slightly affected by typical increases in turbidity resulting from a single suction dredge. Multiple dredges, even if plumes did not mix, would have significant impacts because all or a large portion of a stream could be affected and beneficial uses by fish and humans would be impaired.

Size (flow) of receiving water is important and often overlooked. Althouse Creek is a typical low gradient coho salmon stream with elevated fine sediment due to logging, roads, and historic mining. Dredging with a 4 inch dredge created a turbid plume that extended beyond 300ft. (ODEQ 2010:10). Similarly, R. Nawa had to discontinue snorkel counting of juvenile coho salmon when turbid water from a single suction dredge muddied an estimated 1,000 ft of a very small unnamed tributary to Middle Fork Sixes River. The entire water column was muddied and the juvenile coho salmon had no place to escape the turbidity. Dredges in very small coho streams may have disproportionately higher impacts than those commonly reported in the literature (i.e. the smaller the stream the greater the fish impact for a given size of dredge). Conversely, large streams such as the mainstem Illinois River and Applegate River have comparatively small turbidity effects from a 4 inch dredge (ODEQ 2010:10).

Downstream Fine Sediment Deposition Effects to Fishes and Amphibians

Coarse sediments are found immediately adjacent the dredge as tailings. Fine sediment harmful to aquatic organisms is carried by the current and settles out, generally unseen below the dredge site. Thomas (1985) measured a 10-20 fold increase in fine sediment deposited in the first 15 m below the dredge site (Horizon 2009: 4.1-7). Similar significant increases in fine sediment were measured by Harvey et al. 1982, Somer and Hassler 1992, Stern 1988, Prussian et al. 1999, and summarized by Horizon 2009:4.1-7, 8. Sediment impacts are believed to be short-term because sediment flushing flows during the winter obliterates dredge tailings and holes (Horizon 2009:4.1-9,10), however, the sediment impact would affect the critical reproductive period of fall spawning salmon, lamprey, and some amphibians (Harvey and Lisle 1999).

Fine sediments redistributed into streambeds downstream of mining sites reduce the infiltration capacity of the streambed gravels, which can result in isolation of surface and interstitial (subsurface) flows. This hindering of interstitial flow exchange can increase temperature extremes in surface water (higher for longer periods in summer, lower in winter) and contribute to oxygen depletion in interstitial habitat, and may eliminate critical thermal refugia (Bjerklie and LaPerrie 1985). For example, fine sediment fills interstices used by tailed frogs and yellow legged frogs lead to population declines (Welsh and Olivier 1998; Horizon 2009:4.3-19). Sedimentation of habitat downstream of dredging activity can negatively impact the microhabitats of bottom-oriented stream fish such as dace, sculpin, and juvenile salmonids because these fishes rely on cover that can become embedded with fine sediment during dredging operations (Harvey 1986, Baltz et al. 1982; Suttle et al. 2004; and summarized in Horizon 2009: 4.3-8).

Mercury and Other Heavy Metals

The EPA (2010b:15) reports that "[m]ercury was used in historic placer mining operations to amalgamate gold fines. Elemental mercury may be present in stream beds and banks and if remobilized can result in impacts to fish and other aquatic life." Mercury bio-accumulates to top predator fish in areas with historic placer mining (Stewart et al. 2008; May et al 2000; Kuwabara et. al 2002). Mercury residues in fish tissue and fish eggs are harmful to fish reproductive success (Beckvar et al. 2005). The flux of mercury from sediments at the bottom of a reservoir in the Sierras was apparently a "lesser pathway" and resulted in lower mercury concentrations in fish tissue compared to the pelagic (upper water column) food web. The higher rate of mercury enrichment in the pelagic food web was related to mercury in the water column that was continuously being resupplied from mercury in the watershed deposited during historic gold mining. Mercury has concentrated in historic dredge tailings along the Sacramento River (Prokopovich (1984). Similar mining tailings are found along streams in the Illinois Valley (see USGS Quadrangle Maps;Nawa 2002).

The Forest Service conducted a controlled experiment to recover elemental mercury with a small suction dredge from a mercury "hot spot" in the South Fork American River, California (Humphreys 2005). Although the dredge recovered 98% of the elemental mercury, the mercury concentration of the sediment lost by the dredge was ten times higher than the minimum concentration necessary for classification as a California hazardous waste. **Humphreys (2005) concludes that "lost sediment [from suction dredging] with high mercury levels is, in effect, mercury recycled to the environment. Floured mercury in fine sediment and mercury attached to clay particles in suspended sediment may be carried by the river to environments where mercury methylation occurs and where fish have high mercury concentrations."**

Placer mining and suction dredging increases arsenic, lead, zinc, and copper by mobilizing sediments (LaPerriere et al. 1985;Prussian 1999).

Loss of Large Wood and Large Boulders

Harvey and Lisle (1998:12) report that "[d]redge operators may remove coarse woody debris (CWD) and large boulders from stream channels or reduce the stability of these elements by removing surrounding material." Similar to published studies, Nawa (2002:6-24 observed that large instream wood was cut into smaller pieces and boulders winched or removed. **Loss of boulders and large wood reduces the potential for the stream to form pools and thus reduces habitat for aquatic organisms such as salmonids (Horizon 2009:4.3-8, 9; Harvey and Lisle 1998:12).**

Destruction of Riparian Vegetation/Increased Stream Temperatures

Nawa (2002:26) observed that most tree felling and cutting of fallen trees adjacent suction dredge mining operations was done in conjunction with stream bank excavations. Dredgers apparently remove streamside trees and cut roots while excavating stream banks (Fig 1). Removal of streamside trees and shrubs with subsequent streambank excavation makes streambanks vulnerable to accelerated erosion and channel widening. Channel widening and shifting thalweg destabilizes the streambed. Cumulative effects of tree removal would eventually reduce shade, cause stream temperature increases, and retard progress towards cooler, pre-mining conditions (Nawa 2002:26; Spence et al. 1996).

Pool Formation/Loss

Fish may benefit from using abandoned dredge holes (Harvey 1986; Stern 1988; Horizon 2009:4.3-7) but sediment from dredging can fill in pools downstream from dredges resulting in decreased fish use (Harvey 1986; Thomas 1985).

Decreased Fish and Amphibian Reproductive Success

Winter scour of suction dredge deposits is probably the largest impact on fishes, especially for fall-spawning salmonids that spawn in the dredged tailings.

Harvey and Lisle **(1999: 616-617) state the following:**

- **"[M]any more preemergent Chinook salmon were lost from redds on dredge tailings compared with redds on natural substrates."**
- **"[W]here natural spawning substrate is in short supply, large proportions of redds may be located on dredge tailings."**
- **"Our results show that fisheries managers should consider the potential negative effects of dredge tailings on the spawning success of fall-spawning fish, such as Chinook salmon and coho salmon."**

Increased fines sediment in spawning areas due to suction dredging would also be expected to have adverse effects on developing fish embryos and alevins (Merz et al. 2006; Spence et al. 2006; Shumway et al. 1964; Silver et al. 1963; Horizon 2009:4.3-4). Similarly, siltation reduces reproductive success of amphibians (USFWS 2002; Welsh and Ollivier 1998; Horizon 2009: 4.3-18).

Steelhead eggs and developing alevins are harmed or killed when they are prematurely aborted from the streambed by suction dredging as early as June 15 in the Siskiyou Wild Rivers Area (USDA Forest Service 2001; Nawa 2002: 20; Griffith and Andrews 1981; Horizon 2009: 4.3-5). Eleven steelhead redds were found at five sites on Briggs Creek in the Rogue River-Siskiyou National Forest that were either recently dredged or adjacent to mining camps (Nawa 2002:20).

Harvey and Lisle **(1998:9) make the following statements about entrainment:**

- **Griffith and Andrews (1981) found that "sac fry of hatchery rainbow trout suffered >80% mortality following entrainment, compared to 9% mortality of a control group."**
- **"Entrainment in a dredge also would likely kill larvae of other fishes. Sculpins (*Cottidae*), suckers (*Catostomidae*) and minnows (*Cyprinidae*) all produce small larvae (commonly 5mm-7mm at hatching) easily damaged by mechanical disturbance."**
- **"Fish eggs, larvae, and fry removed from the streambed by entrainment that survived passage through a dredge would probably suffer high mortality form subsequent predation and unfavorable physicochemical conditions."**

Eggs of non-salmonid fishes [e.g., lamprey species] that adhere to rocks in the substrate are unlikely to survive entrainment. Lampreys have only a 3%-26% survival rate when passed through a dredge (Beamish and Youson 1987; Kostow 2002:41). **The U.S. Fish and Wildlife Service (2008a:3; 2008b:7; 2009:10;) report that many age classes of Pacific Lamprey ammocoetes can be impacted by mining or dredging activities. As an example, suction-dredge mining is thought to be one of the reasons for the loss of lamprey in the upper John Day River basin in Oregon.**

Entrainment of amphibian eggs, tadpoles, and recently metamorphosed amphibians would likely result in harm or mortality (Horizon 2009:43.3-18). Incubating eggs of amphibians such as the tailed frog (*Ascaphus truei*) would suffer direct mortalities because they breed during the summer when dredging occurs (Corkran and Thoms 1996:81). Dredging displaces and increases mortality of foothill yellow-legged frog tadpoles (Kupferberg et al. 2007 in Horizon 2009:4.3-19). The **USDA Forest Service (2001:107) states that "[w]hen substrate is sucked through a dredge, many aquatic organisms (such as eggs and larva of Pacific giant salamander and tailed frog) can be entrained, resulting in mortality or injury of some individuals."**

<u>Loss and Restoration of Benthic Insects and Invertebrates</u>

Although dredging may destroy all benthic animals within 10 m of the dredge, the areas are re-colonized about 4-6 weeks after dredging ceases (Bernell et al.2003; Thomas 1985; Mackay 1992; Horizon 2009: 4.3-14). While locally severe, the potential loss of invertebrate food sources for salmonids is temporary. Ironically, some of the invertebrates excavated by dredging are made more available as fish are commonly observed feeding below active dredges (Stern 1988; Thomas 1985; Hassler et al. 1986; Harvey 1986; and summarized in Horizon 2009: 4.3-5)

<u>Loss of Bivalves (Mussels)</u>

About 50% of mussels buried by 10 cm-17.5 cm of sand or silt die. Mussels are unable to escape from burial by typical dredge tailings (Krueger et al. 2007; Horizon 2009:4.3-15)

<u>Air quality</u>

Exhaust from suction dredge may cause short term air pollution in a confined canyon with little air movement, but when considered at the state (California) level, impacts were less than significant (CDFG 1994; CDFG 1997; summarized in Horizon 2009: 4.9-2). Emissions from suction dredge engines in Clearwater National Forest would have negligible impacts due to remote location in unpopulated areas and 150 ft spacing between dredges (USDA Forest Service 2009b).

<u>Noise</u>

Noise levels with the operation of an 18 horsepower Briggs and Stratton gasoline powered engine (Table 1) were reported by the Clearwater National Forest (USDA Forest Service 2006) and reproduced in Horizon 2009: 4.10-1)

Based on the assumption that ambient noise level of a quiet wetland is 25 decibels, the Clearwater National Forest concluded that suction dredging noise would result in only slightly-elevated noise levels above ambient (USDA Forest Service 2006 in Horizon 2009: 4.10-1).

Distance (Meters)	Decibel level
4	85
50	63
100	57
150	53
300	47

Table 1. General noise levels of 18hp engines

Noise from helicopters accessing remote suction dredge mining locations within Kalmiopsis Wilderness (Daily Courier 2009) would degrade wilderness experience of hikers, equestrians, and others who seek solitude in the Wilderness.

Economics

The number of permits for suction dredging increases with the price of gold (Horizon 2009: 4.5-3). May 2010 gold prices were at record highs ($1,240 per ounce) and will likely result in increased numbers of suction dredgers and increased impacts to streams during 2010 and into the foreseeable future. Suction dredgers in California's Klamath River Area spend $45-$59 per day (Horizon 2009; 4.6-2). The New 49ers, a mining club in Happy Camp, California, report average yield of 3.5 grams to 1.0 ounce of gold per miner week for groups ranging up to 22 individuals, some of whom were inexperienced (Horizon 2009: 4.6-4). Yields for more experienced miners could be higher. Costs to clean up suction dredge camps and rehabilitate damaged fish habitat are not available but restoration of fish habitat is expensive because of equipment costs. Clean up and removal of waste in remote areas can be very expensive when helicopters are needed (Fig 5).

Placer Mining on Floodplains, Terraces and Uplands

Placer mining for gold commonly occurs on terraces and high floodplains along streams and rivers (Fig 3). Significant impacts are deforestation of the site, loss of stream shade, and loss of wildlife habitat. Ponds used for gold processing sometimes discharge sediment into adjacent streams or breach during high water events resulting in severe sedimentation of downstream habitats and loss of incubating salmon eggs. Access roads and associated dust cause sedimentation of adjacent streams. Some existing examples within the Siskiyou Wild Rivers area are the Defiance Mine on Josephine Creek (ceased operation ca 2006), Tracy Placer adjacent Sucker Creek (ceased operation September 2009) and the Carlin gold mine operating on private land at the confluence of Caves Creek and Sucker Creek. The BLM is likely to approve plans of operation for two more placer mining location on Sucker Creek (USDI 2010).

Figure 3. The Tracy Placer mine destroyed a mature Douglas Fir Forest and caused turbid water to enter Sucker Creek. Rogue River-Siskiyou National Forest, September 2009. The Medford BLM has announced that Mr. Tracy plans to deforest a similar placer mining site 2 miles below this one on BLM lands (USDI 2010). Photo by Shane Jimerfied, Siskiyou Project.

The proposed Nicore Nickel Mine would strip mined 3.1 acres of uplands in the Rough and Ready Creek watershed each year for a period of ten years. Haul routes totaling about 14 miles would have 16 crossings over perennial streams. Roads, mining excavations, and wet stream crossings would increase stream sedimentation harmful to fish and increase pollution of the stream with petroleum products and nickel. About 14 rare plants would be adversely affected. Visually the area would be degraded as viewed from Highway 199 due to roads, truck hauling, and stock piles of mine ore. The wilderness character of South Kalmiopsis Roadless Area would be degraded due to widened roads and heavy use by haul trucks. A recent plan of operation (Freeman 2010) has been submitted to BLM to mine undisclosed minerals within the French Flat Area of Environmental Concern south of Cave Junction, Oregon. This mining operation is likely to adversely impact rare and endangered plants on BLM lands.

Roads, Off Highway Vehicle Use, Encampments and Occupancy

Miners use motorized vehicles to access camps and streams via roads, unmaintained routes, and cross country travel. Impacts associated with mining roads and unmaintained routes are increasing. New roads are being constructed or reconstructed by miners with no notification or oversight by federal land managers or private land owners. In September 2009, a miner reconstructed an abandoned mining road along and across Sucker Creek to excavate a placer mine (Oregonlive 2009). At another location on Sucker Creek at least 2 miles of roads were found in a Riparian Reserves that appear to have been illegally constructed or reconstructed during the 1990s (Nawa 2002:25). During summer 2009, a suction dredger created road ruts and damaged a spring by repeatedly driving an all terrain vehicle from Eight Dollar Mountain Road to the Illinois River in the Eight Dollar Mt. Botanical Area (Nawa 2002:25).

Miners construct dwellings and facilities on SWRA public lands (Nawa 2002:14, 27) and also on remote private inholdings (Daily Courier 2009). Long term camping, trailers, cabins, out houses, road construction, and off highway vehicle use cause soil compaction, soil contamination, chemical and bacterial pollution, litter, vegetation damage, spread of Port Orford-cedar root disease, loss of rare plants, increased fire ignitions, decreased wildlife, increased stream bank erosion, and increased sedimentation (Moyle et al.1996; Harvey and Lisle 1998; USFWS 2002a; Mahrdt et al. 2002; Brodie 2001; Knight and Skagen 1986; Horizon 2009:4.3-21; Nawa 2002:27).

Fish and Wildlife

Gold miners and suction dredgers generally camp adjacent streams in Riparian Reserves where wildlife use is the highest. Occupancy of these sites adversely affects fish and wildlife use in the area due to noise, soil disturbance and destruction of vegetation. Mining cabins in remote areas are often used to support fishing and hunting which reduces local populations of fish and wildlife (Daily Courier 2009; Nawa 2002:27). All fishing is generally illegal in these remote areas. Declining western pond turtles are vulnerable to off highway vehicle use by miners. Soil compaction degrades turtle nesting habitat and eggs incubating in shallow nests may be crushed (Brodie 2001; Horizon 2009 4.3-21). Encampments and off-road vehicles may adversely affect raptors and declining neo-tropical migrants by altering behavior, altering movements, altering distribution, reducing nesting success, and causing unnecessary expenditure of critical energy reserves (Knight 1986; Horizon 2009:4.3-21).

Sediment, Sanitation, Water Quality

High road density within the Briggs Creek Riparian Reserve (7.5 mi/mi^2) is a significant source of sediment because roads leading to mining camps in Riparian Reserves usually lack water bars and culverts (Nawa 2002:23). These poorly designed roads divert hill slope runoff onto the road surface which creates gullies. Five stream crossings along Briggs Creek delivered roadbed sediment directly into the stream and increased the risk of petroleum contamination of pristine steelhead spawning streams (Nawa 2002:24). In September 2009, a miner re-constructed an abandoned mining road along and through Sucker Creek that caused sediment to enter the stream. Mining roads reduce shade to streams and increase stream temperatures by directly destroying riparian vegetation or retards temperature recovery by preventing trees from growing due to motorized vehicle use and compaction.

Remote cabins used by miners usually lack septic systems and long term campsites lack facilities for adequate treatment of human feces (Nawa 2002; Curry Pilot 2009). Dean Swickert (BLM, California) has observed that the mining encampments often pose hazards to the surrounding area due to unsanitary conditions (Horizon 4.7-7). Water quality can be affected because of inadequate treatment of human feces, discharge of contaminants into streams, and contamination of ground water. Trailers and motorhomes used by miners are often parked along streams and the potential exists for waste water to be discharged onto the ground or into streams. Horizon (2009: 4.2.1) speculates that mercury and nitric acid could be spilled while processing gold on site and cause contamination of streams.

Vegetation and Rare Plants

Soil compaction, soil contamination and loss of shade could eliminate or reduce populations of rare plants, especially along streams (Shevock 1996;Horizon 2009:3-21). Riparian vegetation including old growth conifers were cut to reconstruct a mining access road along Sucker Creek (Oregonlive

2009). Motorized vehicle use of mining routes into Botanical Areas and serpentine areas destroys rare plants and contributes to the need to federally list plant species (Nawa 2009:23).

Port Orford-cedar Root Disease and Invasive Weeds

Motorized use of mining access roads and cross country routes increases the risk of spreading Port-Orford root disease and unwanted invasive weeds. Port Orford-cedar is an important component of riparian areas in the Siskiyou Wild Rivers area because it provides shade, streambank stability, and stable instream wood needed for complex habitats used by salmonids and other aquatic creatures (Nawa 1997). The cedar's roots are susceptible to the fatal Port Orford-cedar root disease (*Phytophthora lateralis*) (Hansen et al. 2000). Roads and ATV trails used or created by miners are likely pathways for infestation by the root disease. Infectious spores from dead and dying trees are found in muddy areas along infested streams and roads. Mud infested with spores attaches to vehicle tires, frames and mining equipment. Vehicles transport the infested mud to uninfested areas. Port Orford-cedars along Briggs Creek and Left Fork Sucker Creek are currently uninfected by the fatal disease. Briggs Creek is at high risk for infestation because of high road densities and numerous stream crossings created by miners for access (Nawa 2002). Wet season road closures of mining roads in upper Briggs Creek to reduce risk of disease spread are ineffective because of a vandalized gate at Forest Road 2512-017. Even when gates are locked, recreational motorized users have accessed the unnumbered mining routes along Briggs Creek by driving down a steep embankment from Road 2512-017 and into a mining camp (Nawa 2002). All terrain vehicle access to mining claims along Left Fork Sucker Creek could easily infect that drainage (Nawa 2002). Mining related activities are likely to have contributed to Port Orford-cedar disease infestation of the Little Chetco River in the Kalmiopsis Wilderness.

Vandalism Associated with Mining Access Roads, Mining Sites, and Mining Camps

Mining access roads and camps attract vandals and recreationists who cause additional resource damage (i.e. cumulative effects). Vandals create motorized routes around locked gates and around boulder blocks which destroys vegetation through compaction. Vandals destroy gates or remove boulders to gain access to mining roads that lead to ecologically sensitive Riparian Reserves and roadless areas (Nawa 2002; Nawa 2009). A field visit to the Ray Wolf mining site south of Cave Junction with BLM personnel on February 21, 2006 revealed severe degradation of meadow soils, plants, and hydrology (Nawa 2007). At least an acre of former meadow and riparian vegetation had been churned into mudded ruts by motorized vehicles (Fig 4). All riparian vegetation had been destroyed along a perennial stream for 150 ft. by motorized vehicles. The mine site was used for illegal dumping of solid waste such as televisions, refrigerators, and household garbage.

Figure 4. Off road vehicles used mining roads in Waldo area near Obrien, Oregon to destroy riparian vegetation along a stream. Medford District Bureau of Land Management, February 2006. Photo by Rich Nawa..

Recreation Conflicts

As previously discussed, off-road-vehicle users often use mining routes to vandalize public lands by destroying vegetation, creating road ruts, and damaging streambeds. A few miners reside in remote cabins on public lands in the SWRA where conflicts between miners and off road vehicle users may occur. For example, a miner residing on a mining claim northwest of Cave Junction shot and seriously injured a man operating a off road motor vehicle on a mining claim site (Daily Courier 2009b). Dean Swickert (BLM California) observed that miners are territorial and intimidate others including other miners (Horizon 2009: 4.7-7). For example, in 1994 a miner residing in a cabin along Josephine Creek near Kirby, Oregon shot and killed another miner residing in a nearby cabin on federal lands. Mr. Swickert's observations were corroborated by R. Nawa (Siskiyou Project), who was confronted by miners with firearms while leading a public hike on BLM lands adjacent Althouse Creek near Cave Junction, Oregon. Although illegal, federal mining claims are sometimes posted with "No Trespassing" signs or "Keep Out" signs warning others to stay away from the federal claim areas. Overt violence with firearms, intimidation with firearms, and exclusionary signs discourages legitimate recreational use on public lands occupied or claimed by miners. Miners displace hikers, campers, bird watchers, photographers, botanists, and swimmers.

Bernell et al. (2003) analyzed recreational conflicts related to suction dredging activities conducted in Oregon. Conflict attributed to the presence and actions of miners was fairly common where mining and quiet recreation occurred together. Complaints about suction dredgers from other recreation users cite issues related to access barriers, intimidation, noise, aesthetics, level of development, degraded ecological conditions and safety hazards. The main conflict recreationist have with suction dredging is that they find suction dredgers to be annoying and a nuisance (Bernell et al. 2003). Studies in California also found that suction dredgers and their associated campsites may conflict with other recreation user's expectations and enjoyment of quiet settings and natural areas as a result of aesthetics, sanitation, noise, garbage and air pollution concerns (CDFG 1994; CDFG 1997; summarized in Horizon 2009: 4.7-7). Nawa (2002) reports that his recreational hiking experience with several friends along the Briggs Creek Trail was sullied by the gasoline stench and noise of a suction dredge operating in Briggs Creek.

Mining Trespass on Private Lands

Mr. Dean Swicket (California BLM) "notes that mining trespass and health and safety violations are the primary issues of concern when BLM staff are summoned to suction dredge sites." (Horizon 2009: 4.7-7) Mr. Swickert further stated that "he has observed territorial disputes between miners and landowners citing that miners trespass on private lands." During June 2009, suction dredge miners trespassed across private land with tractor trailers loaded with mining equipment and 5th wheel trailers to establish a large mining camp on BLM lands along Deer Creek near Selma, Oregon (Nawa 2009b).

Roadless Areas/Wilderness Areas

Inventoried Roadless Areas and unroaded areas adjacent the Kalmiopsis Wilderness have hundreds of miles of unmaintained mining routes. For example, the Canyon Creek watershed within the South Kalmiopsis Roadless Area has an estimated 97 miles of unmaintained mining routes (USDA Forest Service 1992:3-10). Use and reconstruction of these routes degrade wilderness qualities. Motorized use of these unroaded areas creates chronic sources of sediment into pristine steelhead spawning streams. During summer 1993, a miner bulldozed a route through a Port Orford-cedar wetland along Silver Creek in the North Kalmiopsis Roadless Area (Nawa 2002:25). Similarly, during summer 2000 a miner constructed or reconstructed roads accessing a claim on Fall Creek, also in the North Kalmiopsis Roadless Area (Nawa 2002:25). Suction dredge miners use helicopters to access claims along Silver Creek in the North Kalmiopsis Roadless Area and to access a mining camp on private land along the Little Chetco River within the Kalmiopsis Wilderness Area (Daily Courier, 2009; Nawa 2002). In 1997, R. Nawa discovered that miners accessing claims in the North Kalmiopsis Roadless Area had discarded several 55 gallon drums that were leaking gasoline (Fig 5). In 1997 and more recently in 2009, miners owning a private inholding along the Little Chetco River have pursued motorized access through the Kalmiopsis Wilderness on 11 miles of long abandoned mining routes. Motorized use on these hiking trails would significantly damage wilderness character of the Kalmiopsis Wilderness and degrade the current high quality wilderness experience (USDA Forest Service 1997).

Figure 5. Suction dredge miners using helicopters abandoned these leaking barrels of gasoline on a terrace above Silver Creek in the North Kalmiopsis Roadless Area. August 1997. Photo by Rich Nawa.

Lode Mining

Tunneling into mountains can produce toxic mine wastes that seriously degrades water quality, kill fish, and prevent restoration of native vegetation. The Siskiyou Wild Rivers area has numerous perhaps hundreds of abandoned mine shafts. Abandoned mine shafts are safety hazards to people entering mine shafts or falling into mine shafts that were excavated vertically. Only the Almeda Mine is known to discharges toxic and highly acidic acid mine drainage into the Rogue River. Susan Lee (BLM project leader) says the polluted water discharged from the Almeda Mine is being remediated with a federal project costing $250,000 (Daily Courier 2009c). The Benton Mine located on a private inholding at the confluence of Whisky Creek and Drain Creek north of Galice, Oregon is the largest underground gold mine in Oregon. Drain Creek, a tributary to Whisky Creek, has been heavily impacted with settling ponds and loss of riparian vegetation. No new lode mines have been excavated on public lands in the SWRA since at least the 1940s and none have been known to be in operation since the 1970s. Due to the remoteness of the SWR A, lode mines could be worked by miners without the knowledge of government regulators. For example, R. Nawa found a mine shaft near Snailback Creek along the Illinois River that appears to have been worked as recently as the 1980s and hikers discovered a miner illegally working a lode claim on Fall Creek.

Stream Diversions and Hydraulic Mining

Historically, streams in the Illinois Valley were hydraulically mined by capturing water in mid-slope ditches and running the water through high pressure nozzles to erode hillsides into sluice boxes to recover gold. Large scale hydraulic mining caused severe sedimentation of streams and destruction of riparian forests (Agee 2007). Hydraulic mining was banned because the increased turbidity in streams from mining would violate state water quality standards and increased sediment would reduce reproductive success of salmonids. In addition, miners usually lack water rights to implement stream diversions needed for hydraulic mining. Mining ditches excavated over 100 years ago remain as visible features on hill slopes in the Illinois Valley and continue to alter local hydrology by capturing surface flows and releasing concentrated flows on hill slopes. Severe gully erosion and chronic turbidity regularly impacts coho salmon spawning in Scotch Gulch, a tributary to the upper East Fork Illinois River (Nawa 2009d). Other small streams in the Illinois Valley are similarly affected. Hydraulic mine tailings of cobbles and boulders persist along Althouse Creek, Sucker Creek, Briggs Creek, Josephine Creek, East Fork Illinois River, main stem Illinois River, and others. Mature forests have established on most of these once barren tailings but some tailings continue to lack forest cover.

Unregulated small scale hydraulic mining continues in the Illinois Valley in remote areas. Nawa (2002) found one small stream diversion where less than 1% of the flow from Sucker Creek was diverted into a 1 inch plastic pipe for 500 ft to service a small 8ft diameter settling pond about 40 ft above the stream. Sediment laden water from the settling pond appears to have overflowed into Sucker Creek. Diverting clean water from a stream and returning turbid water is harmful to aquatic animals. Nawa (2002) reports that Siskiyou National Forest Service stream surveyors have found stream diversions that operated during winter months on Bolan Creek and Canyon Creek in the Illinois Valley. During the late 1980s, water was diverted through a series of ditches and into a pipe to hydraulically mine terraces adjacent to Canyon Creek east of Carpenter Gulch in the Josephine Creek watershed. All vegetation covering about 20 acres was destroyed. Sediment laden water from hydraulic mining flowed directly into Canyon Creek for several winters because there were no holding ponds (USDA 1992:3-10). Similarly, during 1987 a 900 ft long ditch diverted most of the flow from Bolan Creek to service hydraulic mining of hill slopes adjacent to Bolan Creek (Nawa 2002). In April 2000, harmful hydraulic mining of hill slopes and terraces was discovered by the Forest Service in Josephine Creek. Due to the remoteness of streams in the SWRA and lack of effective monitoring, harmful hydraulic mining activities can go undetected for years.

Exploration, Prospecting and Bulk Sampling

Prospecting generally involves excavating shallow pits with hand tools or deeper trenches with backhoes. While individual sites generally have negligible impacts because the area disturbed is small and usually less than 0.1 acre, cumulative impacts are significant because the number of sites and total area impacted continues to increase. The destruction of native plant cover is especially severe in serpentine areas that have been heavily prospected in the past with nearly no reclamation (Fig 6). A compounding factor is that once serpentine soils are disturbed they are very slow to recover former plant species and vegetative cover. The visual impact of soil disturbance and trenches degrades the wilderness character of unroaded areas, especially the South Kalmiopsis Roadless Area which is dominated by serpentine soils.

Figure 6. Exploratory mining trench excavated in serpentine geology with no reclamation and little vegetative recovery. The abandoned trench and many similar ones are located in Rogue River-Siskiyou National Forest southeast of Gold Beach Oregon. June 2008. Photo by Rich Nawa.

Gravel Mining

Gravel mining within or adjacent streams may result in channel erosion, incision, coarsening of streambed material, and loss of spawning gravels for salmonids (Kondolf 1997). Gravel mining occurs in the IllinoisValley and lower reaches of the Chetco River and Rogue River where streambeds are under the jurisdiction of Oregon Department of State Lands and Army Corps of Engineers. Extensive bar scalping in the lower Chetco River has caused the river to widen and become very shallow. Reduced stream depth impedes upstream migration of fall Chinook salmon. Riparian vegetation is unable to establish on floodplains because of annual bar scalping. Gravel pits have been excavated on private agricultural lands along the East Fork Illinois River and main stem Illinois River near Kerby. During winter floods the pits on the East Fork Illinois River have trapped adult and juvenile salmonids during downstream migrations. Capture and removal these stranded fish resulted in severe turbidity to East Fork Illinois River and the water intake for Cave Junction. During most years some or all of the stranded salmonids die, since none are moved back to the river.

Quarries

Quarries are located in upland sites where mined rock is used for local roads. Quarries have adverse visual impacts and reduce wildlife habitat due to permanent loss of forest cover. A quarry on Oregon Mountain in the Oregon Mountain Botanical Area is suspected of spreading Port Orford-cedar root disease and has become a staging area for off road vehicle use in the botanical area.

Cumulative Impacts

The Forest Service (2009a:3) reports that most Illinois Valley streams were being placer mined in the 1850s and the mining continued periodically for much of the later 1800s and early 1900s. Tailing piles from early hydraulic mining are periodically reworked which prevents full recovery. Fish habitat restoration is retarded because miners remove wood habitat structures placed in the stream by fisheries biologists. Recovery of streams and associated riparian areas is also prevented because of clear-cutting to allow excavations associated with placer mining (Fig 3). At least two areas along Sucker Creek and one on Josephine Creek have been deforested since 1980 to provide for placer mining operations. New plans of operation that require forest clearing are being submitted every year (USDI 2010).

Most salmonid spawning streams in the Illinois River basin have high concentrations of mining claims (Fig 7). Each year significant portions of these streams are suction dredged (Nawa 2002) and the potential exists for severe cumulative impacts due to the near continuous series of mining claims along Briggs Creek, Althouse Creek, Sucker Creek, Rough and Ready Creek, and Josephine Creek (Fig 7). Destabilization of streambeds from suction dredge mining is being added to instability caused increased sediment from logging. Cumulative watershed impacts are adversely affecting fall spawning salmon (Frissell 1992).

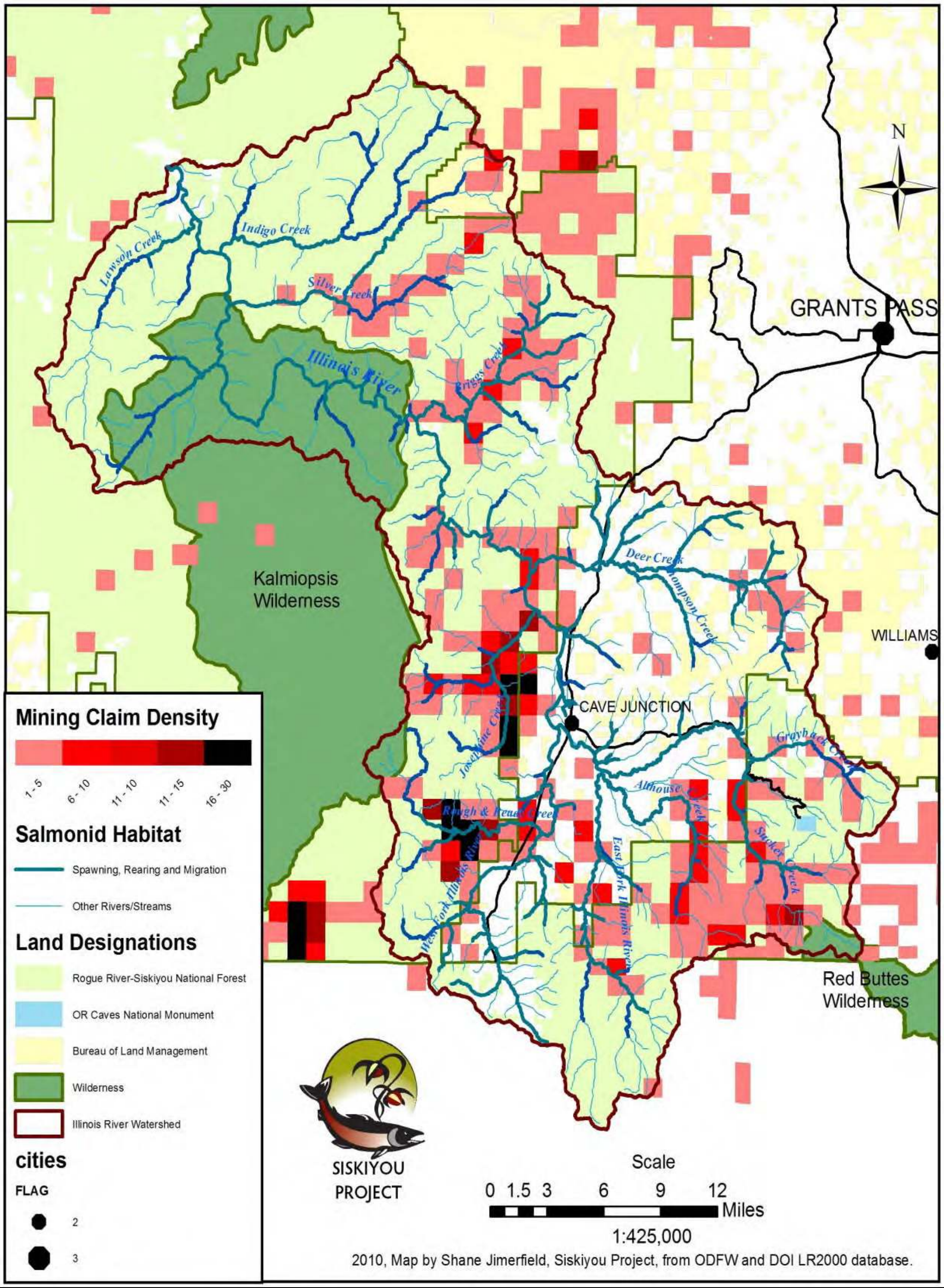

Fig 7. Mining claim densities in relation to salmon, steelhead and Pacific Lamprey spawning, rearing and migration habitat in the Illinois River Basin, Oregon.

Conclusion

Scientific findings compiled in this report demonstrate that mining is harmful, especially in Riparian Reserves. Destabilization of streambeds is inimical to suction dredge mining. Oregon Department of Environmental Quality and Department of State Lands requirements for suction dredging completely fail to address the harm to salmon spawning bed stability demonstrated by Harvey and Lisle (1999). Seasonal dredging restrictions, turbidity plume limits, and prohibitions on bank excavation fail to address the root cause of destabilization of spawning beds, a primary reason for the California ban. Allowing dredging in streams impacted by logging increases reduced egg-to-fry survival. Repeated planer mining pits on terraces and floodplains prevents riparain forest recovery. Collective mining impacts over space and time retards recovery of streams to their pre-mining conditions. Effective monitoring and effective enforcement of mining prohibitions in Riparian Reserves is not likely to occur with current staffing levels of responsible state and federal agencies. Federal Aquatic Conservation Strategy Objectives 3, 5, 8 and 9 cannot be met due to mining- related impacts in Riparian Reserves (USDI/USDA 1994).

My observations and findings reported by numerous other scientists lead me to conclude that the only long-term solution for protection and recovery of Riparian Reserves is mineral withdrawal. Mineral withdrawal of the Smith River National Recreation Area on the Six Rivers National Forest and mineral withdrawal of the Steamboat Creek watershed on the Umpqua National Forest provides certainty that mining related impacts in Riparian Reserves will decrease over time and allow for effective restoration efforts. Much of the upper Chetco River watershed and lower Illinois River in the RRSNF was withdrawn from mineral entry with designation of the Kalmiopsis Wilderness. Mineral withdrawal is long overdue for remaining Siskiyou Wild Rivers' streams threatened by mining.

Acknowledgements

This report was funded by the Lazar Foundation. I greatly appreciate the review comments and scientific advice of Craig Tucker, Jack Williams, Chris Frissell, Carrie Monohan, Shane Jimerfield and one anonymous reviewer.

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From: Rich Nawa
To: dfgsuctiondredge@dfg.ca.gov;
Subject: Suction Dredge Permitting Program and Draft Subsequent Environmental Impact Report
Date: Tuesday, May 10, 2011 10:57:20 AM
Attachments: nawa_2002_ mining_report.pdf

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attached report used as reference in may 9 letter submitted by R. Nawa, Siskiyou Project

Observations of Mining Activities in Siskiyou National Forest Riparian Reserves and Probable Impacts to Aquatic Organisms

March 7, 2002

Richard K. Nawa
Siskiyou Project
213 SE “H” Street
Grants Pass, Or 97526
541-476-6648
rich@siskiyou.org

Abstract

Despite adoption of mining standards and guidelines in the Northwest Forest Plan, annual mining in Riparian Reserves has continued to be a chronic cause of stream degradation. The Siskiyou National Forest has over 1,000 active claims, but there is no systematic monitoring of annual physical impacts caused by mining in riparian reserves. Portions of three streams on the Siskiyou National Forest were surveyed by walking the channel in areas where mining activities have been reported in stream surveys. Besides the commonly reported excavations within the active channel, harmful streambank excavations were found outside the active channel. During summer 2000 and 2001 approximately 125 cubic yards were excavated from streambanks at 10 mining sites scattered along 2 miles of Briggs Creek, a major tributary to the Illinois River. Approximately 340 feet of streambank had protective vegetation and armoring removed. I also quantified active channel excavations and documented riparian tree removal, cutting and removal of instream wood, non system roads adjacent to and across streams, trail construction, accumulations of solid waste, improper storage of petroleum products, denuded campsites, and open pit toilets. Annual monitoring of impacts at specific mine sites would provide objective measures of compliance, increase accountability by individual miners, and create a base line for assessing cumulative effects to specific streams. Mineral withdrawal appears to be the best option for long-term protection of streams consistent with the Aquatic Conservation Strategy.

Contents

INTRODUCTION

Despite adoption of mining Standards and Guidelines in the Northwest Forest Plan (ROD C-34), annual mining in riparian reserves continues to be an annual cause of stream degradation. The Siskiyou National Forest (SNF) reports 577 placer claims within streams (USDA 2001:37), but the SNF has not systematically measured annual physical impacts caused by mining in riparian reserves (for example, volume and area of surface disturbance in stream reaches used by spawning coho salmon). Biological impacts of mining related stream disturbances are difficult to measure and often require intensive field research (Harvey and Lisle 1999). In contrast, local physical impacts to stream habitat from mining are relatively easy to measure and can be tabulated for cumulative impact assessment. The purpose of this study was to identify the kinds of mining related physical impacts, quantify those impacts, and assess the significance of impacts to aquatic organisms.

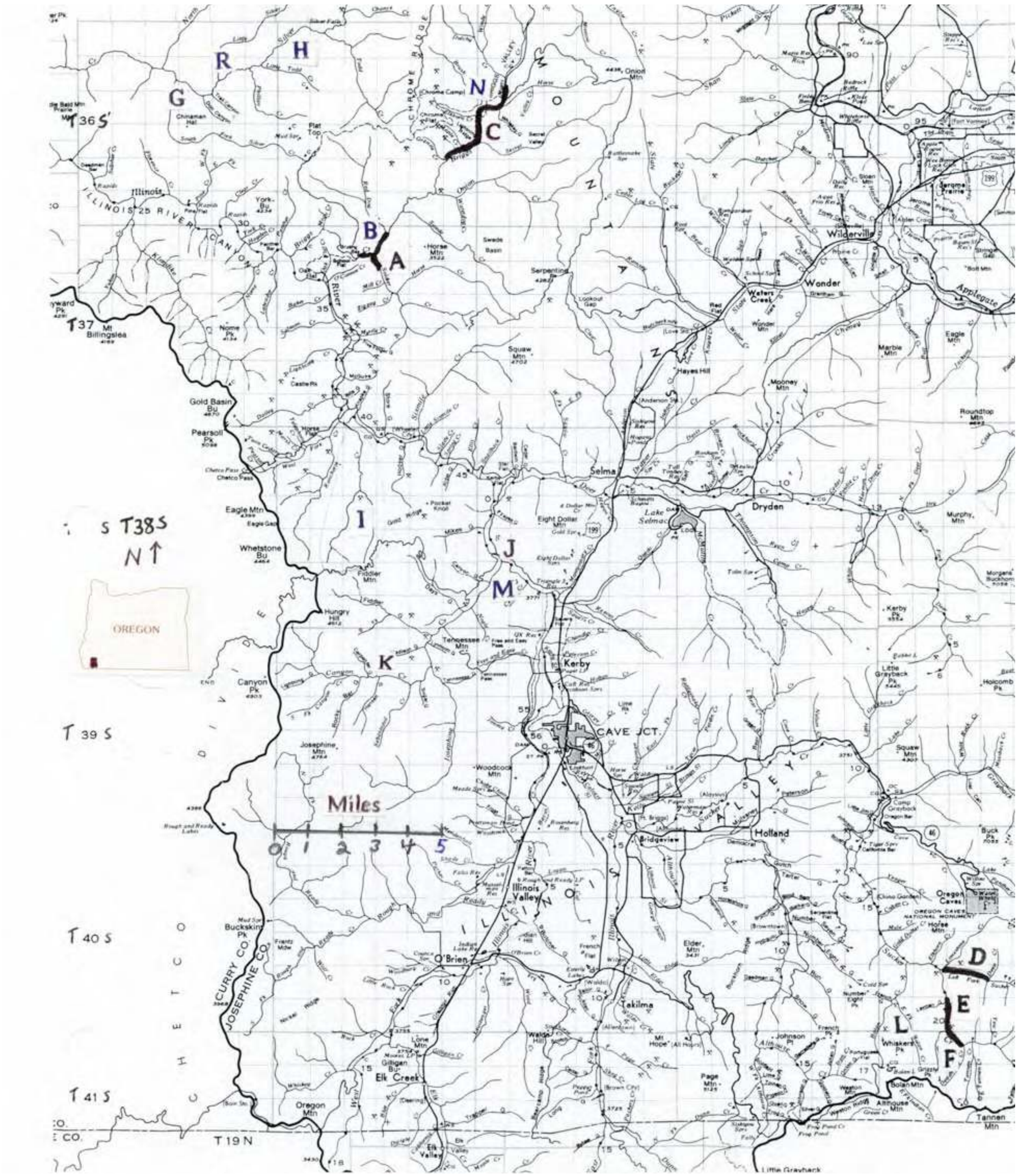
STUDY AREA/STUDY SITES

The study area was the Illinois River Basin in Southwest Oregon (Map 1). This basin has the highest concentration of suction dredge mining operations in the SNF and in Oregon (USDA 2001:37). Study sites were five stream reaches on four streams in the Siskiyou National Forestlands (Map 1, Sites A, B, C, D, and E). Streams and stream reaches were selected based on my knowledge of mining activities and reports of suction dredging found in stream surveys. Each stream surveyed has high densities of mining claims. For example, Briggs Creek has 89 claims and Sucker Creek has 87 claims.

METHODS

I surveyed streams by wading the channel and watching for mining activity. Mining excavations were classified as streambed, streambank or terrace excavations (Figure 1). Lengths, widths, and depths of excavations were measured with a tape or estimated in feet. Minimum depth of shallow excavations was recorded as 1 ft. Year of excavation was usually recorded as 2000 or 2001. Size and volume of older (pre-1950) mine tailings were also recorded. Road and trail lengths were paced or measured from maps. Diameters of severed trees adjacent to mining activities were measured. Areas of denuded vegetation at mining camps were estimated. Nozzle diameters of suction dredges and diameters of plastic pipe used to divert stream flow were measured. Locations of out houses, stream diversions, structures, accumulations of solid waste, petroleum containers, suction dredges, water diversions, steelhead redds and aquatic animals were located on 1:24,000 scale maps and described as discrete observations. Observations were supplemented with photographs.

Map 1. Study streams and locations of selected mining impacts described in text.



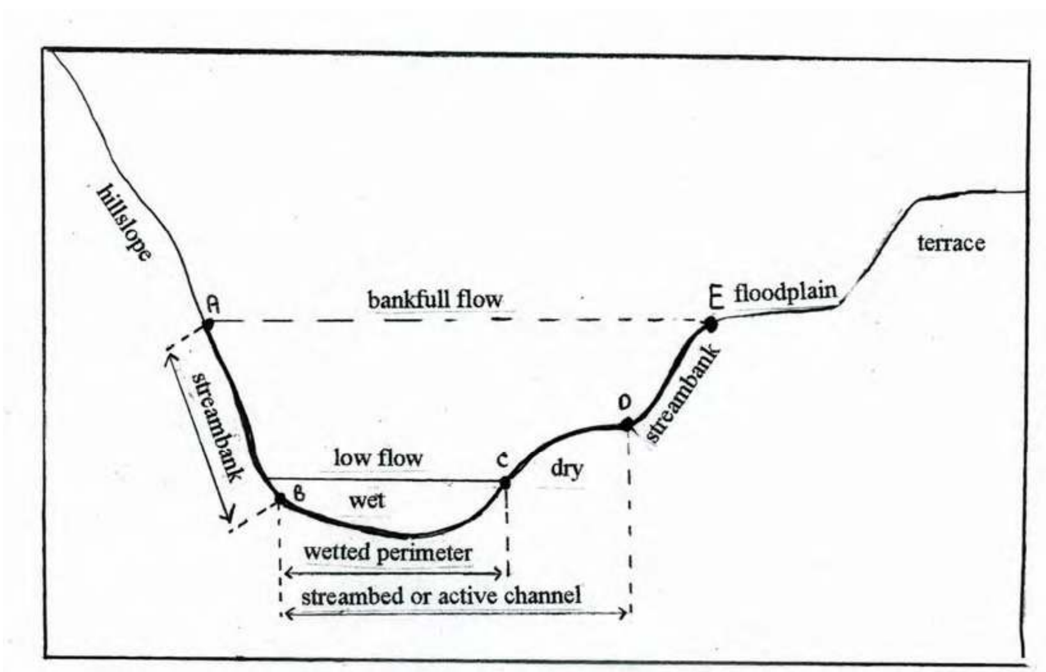


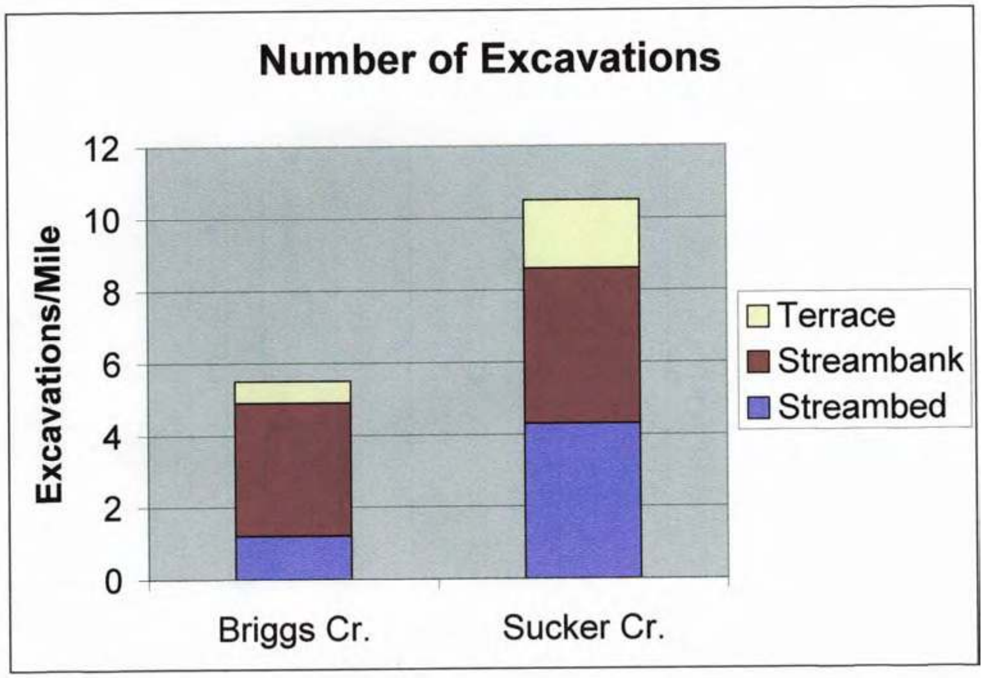
Figure 1. Generalized cross-section of a small mountain stream during summer low flows. The lower extent of the streambank is identified by a change in slope from near vertical to horizontal. Streambanks are steeply sloping or near vertical. The streambed is gently sloping to nearly horizontal. At least one streambank usually extends into the wetted perimeter (the lowermost portion of streambank A-B).

RESULTS

I recorded about 190 observations at the study sites during May-November 2001 (Appendix A) and compiled mining related observations in Tables 1 and 2.

Table 1. Mining excavations found in riparian reserves of four streams in the Siskiyou National Forest, Oregon. N=number of occurrences. Years of excavation in ( ).

Sucker Creek (1.6 mi)	N	Bank ft	yds^3	yds^2
Terrace (2000-01)	3		10	
Streambank (2000-01)	7	113	30	
Streambed (2000-01)	7		156	206
Left Fork Sucker Cr.(1.6 mi)				
Streambank (2001)	1	15	2	
Streambed (2001)	1		3	1
Briggs Cr. (5.1 mi)				
Terrace (1998-00)	3		50	
Streambank (2000-01)	19	355	121	
Streambed (2000-01)	6		225	866
Soldier Cr. (1.2 mi)				
Terrace (1998-00)	3		12	
Streambank (2000)	3	55	29	
All Streams (9.5 mi)				
Terrace (2000-01)	9		72	
Streambank (2000-01)	30	538	182	
Streambed (2000-01)	14		384	1073
Totals	53	538	638	1073



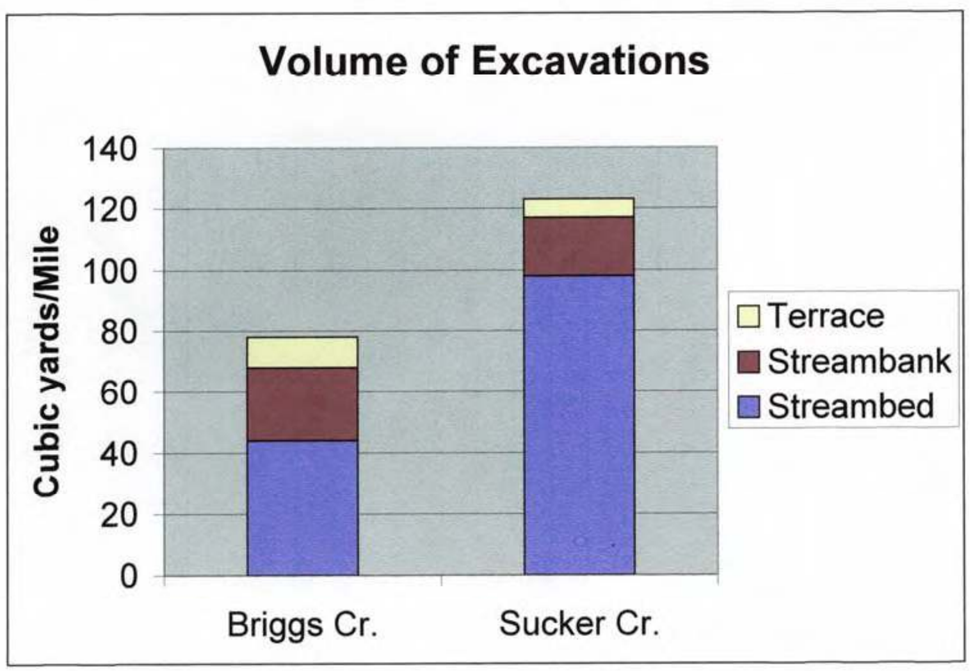


Figure 2. Number (top) and volume (bottom) of excavations from suction dredging along Sucker Creek and Briggs Creek during 2000-2001.

Table 2. Mining impacts and related activities found in riparian reserves along four streams in the Siskiyou National Forest, Oregon.

Creek	Sucker	L.F. Sucker	Briggs	Soldier	Total
Miles Surveyed	1.6	1.6	5.1	1.2	9.5
Roads (mi)	0.6	0.0	5.2	0.2	6.0
Stream Crossings	0	0	5	1	6
Road Density (mi/mi^2)	2.8	0.0	7.5	1.3	4.8
ATV Trail (mi)	0.0	1.6	0.6	0.0	2.2
Existing Trail (mi)	0.3	1.6	0.5	0.01	2.6
New Trail Const. Ft	0.0	220	400	0	620
Reconstruct Trail ft	0.0	162	0	0	162
Hydrology Altered	2	1	2	0	5
Stream Diversion	2	0	0	0	2
Trees Felled	8	0	16	0	24
Fallen Trees Bucked	5	0	3	0	8
Mining Camps	3	1	5	3	12
Outhouses	6	0	0	1	7
Solid Waste	5	2	7	3	17
Petroleum Containers	1	3	2	0	6
Volume oil/gasoline (gallons)	0.2	3.5	0.5	0.0	4.2

<u>Excavations</u>

Streambank excavations were the most common kind of physical impact found, but streambed excavations had higher total volumes (Table 1, Figures 2-5). Most streambank excavations followed the streambank contour but in at least four locations trenches up to 12 ft long were excavated perpendicular to the streambank. Streambank excavation length ranged from 3-88 ft and averaged 18 ft. Estimated volumes of streambank excavations ranged from 0.3-27 yds^3 and averaged 6.1 yds^3.

Area of streambed excavations ranged from 3-277 yds^2 (Avg=77yds^2). Estimated volumes of sediment moved in the streambed ranged from 2-93 yds^2 (Avg=27yds^3). Depth of excavation had to be estimated at most locations making it the biggest source of error. Volume estimates are probably within 50% of actual.

Due to low water conditions during winter 2000-2001 streambed and streambank excavations from summer 2000 were visible during May/June 2001. Terrace excavations persist for many years because they are not affected by winter floods. Historic mining and logging has caused portions of streams to scour to bedrock (e.g. Soldier Creek, upper Sucker Creek) making it impossible to conduct streambed excavations with suction dredges. Streambank excavations dominated in areas where the streambed was scoured to bedrock.

Tailing piles from alluvial excavations prior to 1950 were found along Briggs Creek and Sucker Creek. Two of these moss-covered tailing piles immediately adjacent to Briggs Creek covered 0.5 and 0.2 acres. Five extensive tailing piles along Sucker Creek totaled an estimated 12,000 cubic yards of boulders and cobble (Figure 6). Besides these older (pre 1950) tailings, five smaller piles of boulders and cobble were found on upper Sucker Creek that appeared to be from streambed excavations between 1990 and 1997. These newer tailing piles totaled 134 cubic yards (Map 1 Location F, Figure 7).

Figure 3. During summer 2001, an estimated 7 cubic yards of soil was excavated from 20 ft of streambank (bottom photo) and 5 cubic yards placed directly into Briggs Creek (top photo).

Figure 4. During June/July 2001 about two cubic yards of streambank was excavated into Left Fork Sucker Creek (bottom photo) and about 15 ft of streambank destabilized (top photo).

Figure 5. Approximately 370 square yards of streambed was disturbed making it unsuitable or unsafe for salmon spawning.

Figure 6. Streambed sediment excavated from right bank (A) of Briggs Creek was deposited as a mid-channel bar (B) which now directs flows towards unprotected and undercut streambank (A).

Figure 7. Estimated 4,400 cubic yards of cobble/boulder tailings excavated about 40-60 years ago. Sucker Creek at left remains scoured to bedrock.

Figure 8. An estimated 23 cubic yards of boulders were removed from the streambed to the floodplain of Sucker Creek sometime between 1990-1997.

Road Density

At least 30 percent of the road miles I found in riparian reserves were not on Galice or Illinois Valley Ranger District administrative maps or USGS 7.5' quadrangle maps. Missing roads on recent maps suggests that roads have been constructed or reconstructed since these maps were made and field investigations are needed to avoid underestimating road densities within riparian reserves (Figure 8). For analysis purposes, the riparian reserve was assumed to be a 700-ft wide band containing the stream's active channel. Road densities for each stream's riparian reserve ranged from 0.0 for Left Fork Sucker to 7.5 mi/mi^2 for Briggs Creek (Avg=4.8mi/mi^2).

Motorized Trails

Approximately 1.6 miles of trail along Left Fork Sucker was widened or reconstructed to accommodate ATV's (Figure 9). Similarly about 0.6 miles of the Briggs Creek Trail was used by motorbikes to access mining operations.

Stream Diversions

Two stream diversions were found on Sucker Creek. I estimated that the flow diverted through a 1 inch pvc pipe at less than 1 percent of the streamflow in upper Sucker Creek. A second stream diversion diverted a minor portion of the creek into a wooden trough adjacent to the stream.

Trees Felled/Bucked

Most trees felled were alders less than 12 inches diameter, although one 14-inch diameter Douglas-fir was felled into Briggs Creek and bucked during summer 2001 (Figure 10). At the same location on Briggs Creek a fallen 24-inch diameter maple was bucked and removed from the active channel during 2000-2001 (Figure 11). A 36-inch diameter 20-ft high snag on Briggs Creek had its roots sawn through and its base excavated (Figure 12). Most of the trees felled and bucked along Sucker Creek occurred prior to 2000.

Mining Camps

Denuded and compacted soils at 12 mining camps ranged from .05 to .25 acres (Figure 13). The total compacted area in mining camps was 1.4 acres. Seven outhouses were found at mining camps (Figure 14). Sheds, tables and tents were often found at mining camps but were not enumerated.

Solid Waste

Examples of solid waste were collapsed structures, car batteries, tires, tarps, petroleum containers, plastic buckets, empty food containers, plastic pipe, and abandoned mining equipment (Figure 15). Volumes of solid waste were not recorded.

Figure 9. Sometime during 1975-1990 about 0.4 miles of mining road was bulldozed into very steep slopes above Sucker Creek. Road is not on Illinois Valley District administrative maps or USGS maps.

Figure 10. During summer 2000, a hiking trail along Left Fork Sucker Creek was widened by excavating soil from hillslope to accommodate all-terrain-vehicles (ATVs) used by miners.

Figure 11. During summer 2001, a live 14-inch diameter Douglas-fir tree was felled into Briggs Creek and bucked. Streambank below fallen tree was excavated.

Figure 12. During summer 2000 a fallen 24-inch diameter bigleaf maple in the active channel of Briggs Creek was cut into 2-ft pieces. At the same location a streambank was excavated.

Figure 13. During summer 2001, the roots of a 4 ft. diameter snag were severed and soil dug out from its base.

Figure 14. Year-long mining camp on mining claim along Soldier Creek.

Figure 15. Two adjacent out houses located within 80 ft of Sucker Creek. One on left appears to have been constructed summer 2000.

Figure 16. Discarded plastic barrels, motors, tarps, plastic pipe.

Petroleum Containers

Petroleum containers ranged in size from 1 qt to 2-gallon plastic jugs. All were at least half-filled with oil or gasoline. Five of six containers were located 4-25 ft from the wetted stream (Figure 16).

Figure 17. Two gallons of gasoline left 4 ft from Left Fork Sucker Creek, July 2001.

DISCUSSION

This study provides quantitative data demonstrating that miners construct roads and trails, destroy riparian vegetation, severe instream wood, and excavate streambeds and streambanks in their quest for gold within riparian reserves. Mining impacts must be evaluated within the context that they occur (e.g., stream size, stream habitat conditions and species present). The magnitude and intensity of observed mining impacts was significant because of the sensitivity of small 15-40 ft wide streams to disturbances that affect egg incubation and early development of fishes and amphibians. In addition, the streams surveyed are much below potential for producing salmonids due to cumulative effects from 100-150 years of mining and 50 years of logging.

Mining impacts were similar within and among the streams studied. Similarity of impacts may allow for cautious extrapolation to other streams in the Siskiyou National Forest where riparian reserve mining occurs. Exceptions are large-scale placer mining in Josephine Creek and the use of helicopters to supply mine sites in roadless areas and wilderness (Silver Creek and Chetco River).

Excavations

Streambank excavations were the most frequent impact observed (Table 1). Streambank excavations are particularly harmful because nearly all material excavated from streambanks is directly deposited into the stream channel and increases sediment load. Miners also removed protective boulders and cobble that once armored streambanks (Figure 17). An unknown amount of additional sediment beyond what was excavated from streambanks will be added to the stream each year as denuded streambanks continue to erode during winter floods (Figure 18). Tailings are often left as mid-channel bars (Figure 5) that further direct flow towards erodible streambanks (Harvey and Lisle 1998:11). Trenches dug perpendicular to the streambank will persist for many years and may have beneficial impacts because they function as alcoves or backwater habitat during high flows (my speculation about benefits to fish does not mean that trenches are fish friendly because overall impacts from streambank excavations are overwhelmingly adverse).

Undisturbed streambeds are armored with coarse rock that requires relatively high (bankfull) flows to activate bedload movement of underlying fine sediment (Jackson and Bestcha 1982). Streambed excavations removes the coarse protective armoring and allows the underlying finer sediments to be mobilized by modest (less than bankfull) flows (Figure 19). In other words mining makes the streambed more susceptible to streambed erosion, turbidity, and increased surficial deposition of fines. Increased sediment, unstable eroding streambanks, loss of coarse textured armoring, and mid-channel bars all combine to destabilize streambeds.

Spawning salmon and steelhead are attracted to freshly disturbed or freshly deposited gravels at mined sites. Eleven steelhead redds were found at five sites on Briggs Creek that were either recently dredged or adjacent to mining camps (Map 1 Locations B,C). Steelhead eggs and developing alevins are killed when they are prematurely aborted from the redd by suction dredging as early as June 15 (Harvey and Lisle 1998). Chinook and coho salmon eggs buried in or near mine tailings during October-January are scoured out and killed when winter floods reshape the stream back to pre-mining contours (Harvey and Lisle 1999). Increased channel erosion caused by mining disturbance may also reduce egg-to-fry survival of fall/winter spawning salmon through burial and increased sedimentation.

The surface area of mining impacts to salmon, steelhead and resident trout is not proportional to the total stream area present because spawning gravel is concentrated in the areas being mined. Much of the streambed of upper Sucker Creek and lower Soldier Creek is bedrock. The few depositional areas on upper Sucker Creek suitable for spawning were intensively dredged during 2000 and 2001. Similar concentrations of instream mining and steelhead spawning occurs in Silver Creek where 67% of the steelhead redds during 1997 and 1998 were found in the mainstem above North Fork Silver Creek (Map 1 Location G); the same area where active mining operations are concentrated. Stream areas above the North Fork contain the best deposits of spawning gravel and presumably the best deposits of gold that make these areas attractive to both miners and spawning steelhead. (USDA 1997, USDA 1998)

Excavations in riparian reserves kill other organisms besides salmonids (Harvey and Lisle 1998). Incubating eggs of amphibians such as the tailed frog (*Ascaphus truei*) would suffer direct mortalities because they breed during the summer when dredging occurs (Corkran and Thoms 1996:81). The Klamath smallscale sucker (*Catastomus rumiculus*), sculpins, and mollusks may be similarly affected. Mining camps, streambank excavations, terrace excavations, road construction, road reconstruction, trail construction, and trail reconstruction may affect survey and manage species (USDA/USDI 2000). Pre-1950 tailing piles adjacent to Briggs Creek and Sucker Creek are suitable habitat for survey and manage snails and amphibians.

Post 1994 mining impacts must be considered cumulative in the context of historic mining. Historic (pre 1950) mining on Briggs Creek and upper Sucker Creek removed large amounts of boulders and cobble from the streambed and left them as tailing piles adjacent to the creek. Besides these older (pre 1950) tailings, 5 smaller piles of boulders and cobble were found on upper Sucker Creek that appeared to be from streambed excavations between 1990 and 1997. These newer tailing piles totaled 134 cubic yards (Map 1 Location F, Figure 7). The discovery of five new tailing piles adjacent to the stream indicates that significant removal (not merely redistribution) of cobble and boulders from Sucker Creek has continued to recent decades. Removal of boulders and cobble from streambeds and creation of excavated pits is important because it increases channel erosion (Kondolf 1994) and contributes to increased exposed bedrock. Exposed bedrock increases stream warming, eliminates interstitial spaces needed for aquatic insects, and eliminates the potential for salmon spawning. Exposed bedrock in heavily mined streams is not likely to recover to a pre-mining alluviated state because of chronic disturbance that increases local channel erosion. In other words, suitable spawning gravel is likely decreasing in some mined areas because of chronic streambed disturbance. Measuring streambed substrate over time on heavily mined reaches would determine the significance of trends.

Figure 18. During June/July 2001 several 2-3 ft diameter boulders were winched from a streambank to expose fine textured soil, Left Fork Sucker Creek.

Figure 19. Nearly all protective armoring has been removed from this streambank making it vulnerable to increased erosion from winter floods. Briggs Creek, 5 Sept 2001.

Figure 20. Streambed excavations removes coarse textured rocks and exposes underlying fine sediment to bedload transport during winter flows. Left Fork Sucker Creek, 17 July 2001.

Figure 21. During heavy rainfall, soil from this 1 ft deep gully on a mining access road goes directly into Briggs Creek. Gully is actively headcutting uphill on 20 percent grade.

Figure 22. Mining access road across Briggs Creek has destroyed riparian vegetation. Exposed soil erodes directly into the stream. Wet stream crossings increases risk of contaminating the stream with Port Orford Cedar root disease.

Figure 23. The cumulative effect of allowing miners to discard unwanted items onto public lands for decades. Josephine Creek, Siskiyou National Forest.

Roads and ATV trails

All mining camps were accessed with roads or ATV trails. High road density within Briggs Creek riparian reserve (7.5 mi/mi^2) is a significant sediment source. Roads leading to mining camps often lacked water bars and culverts. Poorly designed roads diverted hillslope runoff down the road surface creating gullies (Figure 20). Five stream crossings along Briggs Creek delivered roadbed sediment directly into the stream (Figure 21) and increased the risk of petroleum contamination of pristine streams.

Mining roads increases the risk of spreading Port-Orford root disease. Port-Orford cedar is an important component of riparian reserves because it provides shade, streambank stability, and stable instream wood that creates complex habitats used by salmonids and other aquatic creatures (Nawa 1997). The cedar's roots are susceptible to the fatal Port-Orford-Cedar root disease (*Phytophthora lateralis*) (Hansen et al. 2000). Roads and ATV trails are potential pathways for infestation by the root disease. Infectious spores from dead and dying trees are found in muddy areas along infected streams. Mud infested with spores attaches to vehicle tires and frames. Vehicles transport the infected mud to uninfected areas. Port-Orford cedars along Briggs Creek and Left Fork Sucker Creek are currently uninfected by the fatal disease. Briggs Creek is at high risk for infection because of high road densities and numerous stream crossings. Wet season closure of mining roads in upper Briggs Creek were ineffective during winter 2001-2002 because of a vandalized gate at Forest Road 2512-017. Even when the gate is locked, recreational four wheelers have accessed the unnumbered mining roads along Briggs Creek by driving down a steep embankment from Road 2512-017 and into a mining camp. ATV use along Left Fork Sucker Creek could easily infect that drainage.

Mining roads are increasing at an unknown rate. New roads are being constructed or reconstructed by miners with no notification of the Forest. For example, at least 2 miles of roads were found in riparian reserves that are not on Forest Service maps or USGS quads (Figure 8). Unmapped roads suggest that these roads may have been constructed or reconstructed within the past 1-20 years. Without Forest Service notification, during summer 1993, a miner bulldozed a road through a Port Orford cedar wetland along Silver Creek (Map 1 Location H). Similarly, during summer 2000 a miner constructed or reconstructed road accessing a claim on Fall Creek (Map 1 Location I). Without Forest Service notification, a miner accessing a placer claim during July-August 1999 created road ruts and damaged a spring by repeatedly driving an ATV from Eight Dollar Mountain Road to the Illinois River in a botanical area (Map 1 Location J).

In this study I measured and reported road miles within riparian reserves but access to mining claims also includes an extensive road network outside of riparian reserves that contributes sediment to streams. The Canyon Creek Watershed Analysis Area (Map 1 Location K) has 97 miles of road, including surfaced, non-surfaced roads and mining tracks (USDA 1992:3-10). Road density is 2.9 mi/mi^2. Elimination of mining roads in the Canyon Area would drop road density to below 1 mile/mi^2. Mining roads and tracks parallel many of the streams in the Canyon Creek watershed.

Mining access roads attract recreational users who cause additional damage outside of the mining season through off road use in meadows that destroys rare plants, including species that are state or federally listed. Road widths and surfaces were extremely variable but all were passable during the summer with a Toyota 4-wheel drive truck, including portions of the Briggs Creek Trail (1132). The 3 month mining season (June15-September 15) in the Illinois Basin does not affect recreational use of mining roads. Recreational use of mining roads in riparian reserves increases the risk of spreading Port-Orford cedar root disease because use occurs during the wet season. Recreational users go around locked gates or destroy them to gain access to mining roads within riparian reserves (Map 1 Location N).

Stream Diversions/Hydraulic Mining

I found one small stream diversion where less than 1% of the flow from Sucker Creek was diverted into a 1 inch plastic pipe for 500 ft to service a small 8ft diameter settling pond about 40 ft above the stream (Map1 Location E). Sediment laden water from the settling pond appears to have overflowed into Sucker Creek. Diverting clean water from a stream and returning the water contaminated with sediment is harmful to aquatic animals.

Forest Service stream surveyors have found much larger stream diversions that operated during winter months on Bolan Creek and Canyon Creek. During the late 1980s water was diverted through a series of ditches and into a pipe to hydraulically mine terraces adjacent to Canyon Creek east of Carpenter Gulch (Map 1 Location K). All vegetation and soil covering about 20 acres was destroyed. Sediment laden water from hydraulic mining flowed directly into Canyon Creek for several winters because there were no holding ponds (USDA 1992:3-10). Similarly, during 1987 a 900 ft long ditch diverted most of the flow from Bolan Creek to service hydraulic mining of hillslopes adjacent to Bolan Creek (Map 1 Location L). As recent as April 2000, harmful hydraulic mining of hillslopes and terraces was discovered by the Forest Service in Josephine Creek (Map1 Location M). Holding ponds on Josephine Creek have been known to allegedly accidentally breach and release up to 1,000 cubic yards of sediment into the stream (USDA 1992:3-10). Due to the remoteness of the Siskiyou National Forest streams and lack of effective monitoring and reporting, harmful mining activities in riparian reserves can go undetected for years.

Trees Felled/Fallen Trees Bucked

Most tree felling and bucking of fallen trees during 2000- 2001 was done in conjunction with streambank excavations (Figs 10,11). Miners apparently remove streamside trees and cut roots while excavating streambanks. Removal of streamside trees and shrubs, and subsequent streambank excavation makes streambanks vulnerable to accelerated erosion and channel widening. Channel widening and resulting shifting thalweg destabilizes the streambed. Some maples and alders appear to have been cut for fire wood. Cumulative effects of tree removal would eventually reduce shade and cause stream temperature increases or retard progress towards cooler, pre-mining conditions. Similar destruction of riparian vegetation has been reported from Alaska (Prussian et al. 1999). During summer 2001, the roots of a 4ft-diameter snag were severed and soil dug out from its base (Figure 12). This snag is certain to fall prematurely, thus reducing available habitat for cavity nesting birds and bats. Anyone who ventures near this snag is in danger of being crushed because most of its support has been cut or undermined.

Mining Camps

Mining camps were located immediately adjacent to streams on high floodplains or terraces. Soil compaction and vehicle use prevent recovery of vegetation. Wood structures, sinks, stoves, plastic pipe and tarps at mining camps are often abandoned and become solid waste. Multiple open pit toilets (outhouses) on Sucker Creek could cause fecal contamination of the stream (Figure 14). Human habitation at multiple camps along a stream reduces suitability for wildlife. Remote areas along streams that would otherwise be refugia for fish and wildlife are likely to be hunted and fished due to the presence of miners. For example, I observed fishing lures and tackle at remote mining cabins along the upper reaches of the Little Chetco River where winter steelhead spawn in the Kalmiopsis Wilderness.

Solid Waste Sites

Cans, plastic containers, tires, tarps, car batteries, and mining equipment are abandoned to become unsightly solid waste. Wooden structures eventually collapse and expose unsuspecting hikers to harm from rusting nails. Some streamside areas resemble junkyards because of concentrations of rusting metal machinery and abandoned equipment (for example, Josephine Creek and Canyon Creek, Figure 22). Plastic sheeting and pvc pipe is often left in the stream to deteriorate.

Petroleum Containers

Gasoline or oil containers left unattended increases the risk of a spill or wild fire. Containers left on gravel bars could be swept into the stream during a summer freshet (Figure 23). During summer 1998, miners abandoned several partially filled and leaking 55 gallon barrels adjacent to Silver Creek (Figure 24, Map 1 Location R).

Wild Fire Danger

Unattended or abandoned petroleum containers increases fire danger. The Forest Service allows miners to operate suction dredges in small streams and operate ATV's on narrow hiking trails during extreme fire danger when logging activities are prohibited. Around noon on 3 September 2001, two miners were observed operating a suction dredge in Briggs Creek during extreme fire danger. The dredge was at the edge of the stream immediately adjacent to a Port-Oxford cedar sapling and recently cut vine maples. The miners had operated a motorbike on 0.5 mile of a narrow hiking trail. Gasoline fumes were noticeable on the hiking trail 200 ft above the creek. An open campfire had been recently used at the Elkhorn Mine campsite.

Figure 23. Miners used helicopters to place 55 gallon barrels of gasoline in the streambed of Silver Creek. Siskiyou National Forest. August 1998.

Figure 24. Miners using helicopters abandoned these leaking barrels of gasoline on a terrace above Silver Creek. August 1998.

Conclusion

Observations compiled in this study demonstrate that the Siskiyou National Forest has many remote stream reaches where mining is harming riparian reserves. Cumulative mining impacts over space and time retards recovery of the study streams to pre-mining conditions. Aquatic Conservation Strategy Objectives 3, 5, 8 and 9 cannot be met due to annual, mining- related impacts in riparian reserves (ROD: B-11). Effective monitoring and effective enforcement of mining prohibitions in riparian reserves is not likely to occur with current staffing levels of responsible state and federal agencies and the Forest Service policy to promote mining. In the short-term, the findings of this study can be used to develop more effective prevention or mitigation of annual mining activities that harm streams (for example, reduced streambank excavations, road reconstruction, and felling of riparian trees).

My observations and findings reported by others lead me to conclude that the only long-term solution for protection and recovery of riparian reserves is mineral withdrawal. Mineral withdrawal of the Smith River National Recreation Area on the Six Rivers National Forest and mineral withdrawal of the Steamboat Creek watershed on the Umpqua National Forest provides certainty that mining related impacts in riparian reserves will decrease over time and allow for effective restoration efforts. Much of the upper Chetco River watershed and lower Illinois River in the SNF was withdrawn from mineral entry with designation of the Kalmiopsis Wilderness (one miner on the Chetco River continues to use helicopters for access). Mineral withdrawal is long overdue for remaining Siskiyou National Forest streams threatened by mining.

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APPENDIX A

Table of 198 0bservations
3 Maps
120 Color Photos

Table 1. Observations of fish, wildlife, habitat, and human activities associated with mining in Riparian Reserves, Siskiyou National Forest, Oregon (Updated 5/14/03).

#	Creek	Date Observed	T. R. 1/4Sec	Map Locat	Roll Photo	Activity Animal use	Description
1	Soldier	16May01	37S09W 10SW	1-A	--	road	Wishing Well Claim. Road bulldozed down to creek. Stream scoured to bedrock. POC on banks and floodplain.
2	Soldier	16May01	37S09W 10NW	1-B	--	trail	Trail constructed down to creek on steep terrace. About 40ft x 3ft prone to erosion. Steps dug into soil. POC present.
3	Soldier	16May01	37S09W 10NW	1-B	1-14	terrace excavation	Edge of terrace dug out.
4	Soldier	16May01	37S09W 10NW	1-B	1-15	solid waste	4 ft^2 of particle board, wood with nails sticking out
5	Soldier	16May01	37S09W 10NW	1-C	1-16	solid waste	abandoned coleman propane tanks, plastic jugs, plywood table
6	Soldier	16May01	37S09W 10NW	1-C	1-17	streambank excavation	Edge of floodplain excavated (30x9x2ft)
7	Soldier	16May01	37S09W 10NW	1-D	--	terrace excavation	Redneck mine. terrace dug out but now vegetated
8	Soldier	16May01	37S09W 04SE	1-E	1-18 1-19	streambank excavation	McNuget I. West streambank excavated (20x10ft).
9	Soldier	16May01	37S09W 04SE	1-E	1-20	solid waste	abandoned sluice box near excavated bank
10	Soldier	16May01	37S09W 04SE	1-E	1-21	campsite	0.1 acre denuded, at least 4 sites ? along creek
11	Soldier	16May01	37S09W 04SE	1-E	1-22 1-23	fecal waste	open pit toilet on terrace 50 ft above creek
12	Soldier	16May01	37S09W 04SE	1-E	--	road	300 ft of dirt road on terrace
13	Briggs	16May01	37S09W 04SE	1-F	--	road	Maize of at least 1 mile of dirt roads (#152) on steep slopes and meadows in the vicinity of Soldier Cr. and Briggs Cr.
14	Briggs	16May01	37S09W 04SE	1-F	--	solid waste	aluminum box, carpeting
15	Soldier	16May01	37S09W 04SE	1-G	--	trail	4wd crossing of Soldier Creek trail #1132
16	Soldier	16May01	37S09W 04SE	1-G	--	terrace excavated	10x3x8ft pit about 15 ft below trail #1132
17	Soldier	16May01	37S09W 04SE	1-I	--	streambank excavated	5x4x3ft dug out about 100 ft below trail #1132
18	Briggs	24May01	37S09W 04SE	1-J	2-1	steelhead redd	2001 steelhead redd in side channel adjacent to mining camp"McNugget South" Steve Neuman located 6-14-2000
19	Briggs	24May01	37S09W 04SE	1-J	2-3	steelhead redd(s)	2001 steelhead redd in tailout of pool adjacent to mining camp"McNugget South"
20	Briggs	24May01	37S09W	1-J	2-5	mining camp	About 1/8 acre denuded of vegetation adjacent to Briggs Creek

#	Creek	Date Observed	T. R. 1/4Sec	Map Locat	Roll Photo	Activity Animal use	Description
			04SE				
21	Briggs	24May01	37S09W 04SE	1-J	2-6	Road	road excavated down to wetted perimeter of Briggs Cr. Vegetation destroyed, bare soil subject to erosion.
22	Briggs	24May01	37S09W 04SE	1-K	2-7	Road	About 0.5 miles of spur road 152 loops down onto meadows adjacent to Briggs Creek to access mining claims. 1 ft deep ruts in some areas (not shown in photo)
23	Briggs	24May01	37S09W 04SW	1-L	2-8	road 0.2 mi	Road 675 accesses mining claim (DTS #1 ORMC 154282) on Brushy Bar and crosses Briggs Creek. Gully erosion from this road surface goes directly into Briggs Creek. Sign reads: "Limited Maintenance Not Suitable for Low Clearance Vehicles"
24	Briggs	24May01	37S09W 04SW	1-L	2-10	Road 1.0 mi	Erosion from this 1 ft deep gully on Road 675 goes directly into Briggs Creek. Gully is actively headcutting uphill on 20 percent grade.
25	Briggs	24May01	37S09W 04SW	1-L	2-11	Road	Road crosses Briggs Creek. Riparian vegetation destroyed. Exposed soil subject to erosion directly into Briggs Creek.
26	Briggs	24May01	37S09W 04SW	1-M	2-14	Road 1.2 mi	Culverts under motorized trail 1132 have been altered to accommodate mining equipment which may increase risk of road failure.
27	Briggs	24May01	37S09W 03NW	1-Q	2-15	Road	Road crosses Briggs Creek to access mining claims
28	Briggs	16May01	37S09W 04SE	1-O	--	Road	300 ft of dirt road down to Mc Nugget 1 on low floodplain of Briggs Creek.
29	Briggs	16May01	37S09W 04SE	1-O	--	mining camp	20x20 ft tarp shelter on floodplain and about 1/4 acre denuded for parking.
30	Briggs	16May01	37S09W 04SE	1-O	--	Woody debris	About 1/4 cord of alder bucked up for firewood
31	Briggs	16May01	37S09W 04SE	1-O	--	yellow legged frog	
32	Briggs	16May01	37S09W 04SE	1-O 1-P	--	talus	1/2 acre of talus both sides of Briggs Creek, suitable for DelNorte Salamanders, survey & manage snails
33	Briggs	16May01	37S09W 04SE	1-P	--	western toad	hiding in talus
34	Briggs	16May01	37S09W 04SE	1-P	--	steelhead trout	five juvenile steelhead (3-5") in tailout
35	Red Dog	24May01	37S09W 03NW	1-Q	--	Port-Orford-Cedar	uninfected POC on banks of Red Dog Cr.
36	Red Dog	24May01	37S09W 03NW	1-R	--	excavation	Debris slide (est 444 yds^3) into Red Dog Creek from old mine on east slope
37	Red Dog	24May01	37S09W 03NW	1-R	--	Road	Road related debris slide into Red Dog Creek (est 44 yds^3).
38	Briggs	24May01	37S09W 03NW	1-Q	--	spawning gravel	2 small patches of spawning gravel below Red Dog Creek (est. 166yds^2 and 111yds^2)
39	Briggs	24May01	37S09W 03NW	1-S	2-16	solid waste	plastic barrels,motors, tarps,pipe

#	Creek	Date Observed	T. R. 1/4Sec	Map Locat	Roll Photo	Activity Animal use	Description
40	Briggs	24May01	37S09W 03NW	1-S	2-17	solid waste	abandoned mining equipment next to mining pit
41	Briggs	24May01	37S09W 03NW	1-S	2-18	solid waste	abandoned pipe leading to Briggs Creek
42	Briggs	24May01	37S09W 03NW	1-S	2-19	steelhead redds	steelhead redds located among mine tailings
43	Briggs	24May01	37S09W 03NW	1-S	2-20	trees cut	top of alder tree severed
44	Briggs	24May01	37S09W 03NW	1-V	2-21	steelhead redds	2 mid channel steelhead redds below mine tailings of cobble and boulders
45	Briggs	24May01	37S09W 03NW	1-V	2-23	talus 0.2 A steelhead redd	talus suitable for DelNorte Salamanders and survey/manage mollusks
46	Briggs	24May01	37S09W 03NW	1-U	2-24	Road	debris avalanche into Briggs Creek from motorized trail 1132
47	Briggs	14Jun01	36S08W 18NE	2-A	3-24	terrace excavation	About 0.5 yds^3 dug out from west streambank above high water mark
48	Briggs	14Jun01	36S08W 07SE	2-A	3-25	terrace excavation	About 40yds^3 excavated from east bank at edge of terrace.
49	Briggs	14Jun01	36S08W 07SE	2-B	4-3	petroleum hazard	Unoccupied mining camp with half filled milk jugs of oil left 100 ft from Briggs Cr. Oil jugs appear to have been left since summer 2000.
50	Briggs	14Jun01	36S08W 18NW	2-C	4-7	Road	Road 637 crosses Briggs Creek. Gravel suitable for spawning salmon
51	Briggs	14Jun01	36S08W 07SE	2-B	4-4 4-5	mining camp	Semi-permanent structures at unoccupied mining camp. Structures left in place since at least summer 2000.
52	Briggs	14Jun01	36S08W 18SW	2-D	4-8	streambank excavation	Estimated 20 yds^3 of streambank excavated during summer 2000. Mine tailings have created a 6 cubic yard midchannel bar which directs streamflow towards unvegetated bank excavated by miners.
53	Briggs	14Jun01	36S08W 18SW	2-D	4-14	streambank excavation	Estimated 27 yds^3 of streambank excavated as a trench perpendicular to stream. Probably done during summer 2000.
54	Briggs	14Jun01	36S08W 18SW	2-D	4-13	trees cut	Alder saplings cut from streambank
55	Briggs	14Jun01	36S08W 18SW	2-D	4-15	steelhead redd	Recent (spring 2001) steelhead redd located adjacent to mine tailings
56	Briggs	14Jun01	36S08W 18SW	2-D	--	Port-Orford-Cedar	Uninfected POC up to 30 inched DBH on streambanks
57	Briggs	14Jun01	36S08W 18SW	2-D	4-16	solid waste	abandoned plastic entangled in large wood on floodplain
58	Briggs	14Jun01	36S08W 18SW	2-E	4-17	streambank excavation	About 7 ft of streambank excavated
59	Briggs	14Jun01	36S08W 18SW	2-E	4-18	streambank excavation	Estimated 2.5 cubic yds excavated from streambank
60	Briggs	14Jun01	36S08W	2-F	4-19	streambank	Estimated 4 cubic yds excavated during summer 2000

#	Creek	Date Observed	T. R. 1/4Sec	Map Locat	Roll Photo	Activity Animal use	Description
			18SW			excavation	
61	Briggs	14Jun01	36S08W 18SW	2-F	4-23 5-1	large wood	fallen 24 inch diameter bigleaf maple bucked up on floodplain
62	Briggs	14Jun01	36S08W 18SW	2-G	4-25	streambank excavation	Estimated 3 cubic yds excavated prior to summer 2000
63	Briggs	14Jun01	36S08W 18SW	2-H	5-2	streambank excavation	Estimated 4 yds^3 excavated into streambank and active channel summer 2000
64	Briggs	14Jun01	36S08W 18SW	2-H	5-3	streambank excavation	Estimated 28 ft of streambank excavated back about 2 ft during summer 2000
65	Briggs	14Jun01	36S08W 18SW	2-H	5-4	streambank excavation	Estimated 9ft of streambank excavated back about 1 ft during summer 2000
66	Briggs	14Jun01	36S08W 18SW	2-I	5-5	terrace excavation	Estimated 9 cubic yards excavated from tributary channel/spring
67	Briggs	14Jun01	36S08W 18SW	2-J	--	Road	Unnumbered dirt road parallels Briggs Cr. for 0.3 miles below Brushy Creek. road is used to access claims where banks were excavated
68	Briggs	14Jun01	36S08W 18SW	2-K	--	Road	Estimated 0.6 miles of dirt road accesses in riparian reserve. Elkhorn mine and continues uphill in sec. 24. Crosses Secret Creek and Briggs Creek. Eroding road surface would enter both Secret Creek and Briggs Creek. POC present.
69	Briggs	14Jun01	36S08W 18SW	2-L	5-7	steelhead redd steelhead fry	1" steelhead fry observed next to redd below secret Creek. "golden dragon" mining claim 00-18124
70	Briggs	14Jun01	36S09W 24SE	2-M	5-8	Port-Orford-Cedar	Standing and fallen Port-Orford-Cedar adjacent to "Old Timer" mining claim
71	Briggs	14Jun01	36S09W 24SE	2-M	5-9	steelhead redds	Several steelhead redds below mining claims
72	Briggs	14Jun01	36S09W 24SE	2-N	5-10	streambank excavation	Estimated 9 yds^3 excavated about 70ft upstream of Elkhorn Creek.
73	Briggs	14Jun01	36S09W 24SE	2-N	--	Monadinium fidelis	common snail found among tailings excavated from streambank
74	Briggs	14Jun01	36S09W 24SE	2-P	5-11 5-13	active channel excavation	About 110 yds^2 of suitable spawning habitat excavated, alder tree felled, flow patterns altered by mid channel bar. heavy equipment use suspected
75	Briggs	14Jun01	36S09W 24SE	2-P	5-12	streambank excavation	About 25 ft of streambank excavated
76	Briggs	14Jun01	36S09W 24SE	2-P	5-14	trees cut	alder cut from streambank
77	Briggs	14Jun01	36S09W 24SE	2-P	5-17	steelhead redds	five steelhead redds adjacent to mid channel piles of mining tailings
78	Briggs	14Jun01	36S09W 24SW	2-R	5-18	streambed excavation	Excavation of about 2 cubic yards still visible from summer 2000 mining
79	Briggs	14Jun01	36S09W	2-R	5-21	streambed	during summer 2000 about 277 yds^2 of potentially suitable

#	Creek	Date Observed	T. R. 1/4Sec	Map Locat	Roll Photo	Activity Animal use	Description
			24SW			excavation	spawning gravel was excavated into a mid-channel bar now unsuitable for spawning.
80	Briggs	14Jun01	36S09W 24SW	2-R	5-20	streambank excavation	during summer 2000 about 5.7 yds^3 was excavated from streambank and tree roots severed
81	Briggs	14Jun01	36S09W 24SW	2-R	5-23	streambank excavation	during summer 2000 about 3.8 yds^3 was excavated from streambank
82	Briggs	14Jun01	36S09W 24SW	2-R	5-24	Streambed excavation	mid channel mine tailings from summer 2000 still visible
83	Briggs	14Jun01	36S09W 24SW	2-R	5-25	solid waste	6 inch flexible pipe
84	Left Fork Sucker	12Jun01	40S06W 27NW	3-A	3-3	solid waste	metal cart with cable winch, 6 inch flexible hose.
85	Left Fork Sucker	12Jun01	40S06W 27NW	3-A	3-4	Trail	ATV parked 1.2 miles up Left Fork Sucker Creek, uninfected POC along trail.
86	Left Fork Sucker	12Jun01	40S06W 27NW	3-A	3-5	trail	About 70 ft of new trail construction was excavated into steep slope during summer 2000
87	Left Fork Sucker	12Jun01	40S06W 27NW	3-B	3-9	mining camp	occupied camp established on high floodplain adjacent to creek
88	Left Fork Sucker	12Jun01	40S06W 27NW	3-B	3-12	petroleum hazard	1 quart plastic jug of 30 wt oil lying on ground within 25 ft of stream
89	Left Fork Sucker	12Jun01	40S06W 27NW	3-D	3-10	spawning gravel	gravel suitable for coho salmon or steelhead trout spawning
90	Left Fork Sucker	12Jun01	40S06W 27NW	3-B	3-11	Port Orford Cedar	live 36 inch DBH POC with ax embedded
91	Left Fork Sucker	12Jun01	40S06W 28NE	3-C	3-21	Trail reconstr.	during summer 2000 cement was poured on trail for a distance of about 22 ft
92	Briggs	16May01	37S09E 04SE	1-W	--	large wood	Fallen alder bucked into 6 ft pieces at mining camp on north bank of creek. 30" diameter tree has fallen into creek from south bank.
93	Briggs	16May01	37S09W 04SE	1-X	--	solid waste mining camp	plastic tarps,metal tanks, cooler,table, 100x40 ft area dug out. Lotsa Color II RMC 37400
94	Briggs	16May01	37S09W 04SE	1-Y	--	Road	0.3 mile dirt road accesses lotsa color claim. Gullies in 25% grade road.
95	Left Fork Sucker	12Jun01	40S06W 27NW	3-D	--	Juvenile steelhead	snorkeled nice pool and found 8 rainbow trout(offspring of steelhead) 4-8 inches but no recently emerged fry.
96	Left Fork Sucker	12Jun01	40S06W 27NW	3-E	--	Trail Reconstruc	During summer 2000, hiking trail was widened and cleared for 1.0 mile to accommodate ATVs.
97	Briggs	14Jun01	36S06W 24SW	2-S	--	Streambank excavation	About 40 ft of streambank recently excavated. Tailings adjacent to 6 inch dredge are from this spring, probably excavated during past week (7-14 June 01)
98	Left Fork Sucker	17Jul01	40S06W 28NW	3-E	6-1	Trail reconstr.	During summer 2000, hiking trail along Left Fork Sucker Creek was widened by excavating soil from hillslope to accommodate ATV's (same as obs.96).
99	Left Fork	17Jul01	40S06W	3-G	6-2	large wood	8ft of bole was cut from a fallen tree in a side channel of Left

#	Creek	Date Observed	T. R. 1/4Sec	Map Locat	Roll Photo	Activity Animal use	Description
	Sucker		28NW			tree cut	Fork Sucker Creek
100	Left Fork Sucker	17Jul01	40S06W 28NW	3-G	6-3	trail construct.	During summer 2000, about 100 ft of new trail was constructed to accommodate ATV's
101	Left Fork Sucker	17JUL01	40S06W 28NE	3-H	6-4	trail	During summer 2000, hiking trail 40 ft from Left Fork Sucker Cr. was widened here to accommodate ATVs.
102	Left Fork Sucker	17JUL01	40S06W 28NE	3-C	6-5	Trail Reconstruc	During summer 2000, about 100 ft of trail was widened to accommodate ATVs. Two bags of cement were used to harden about 22 ft of trail. (same as obs 91)
103	Left Fork Sucker	17JUL01	40S06W 27NW	3-B	6-6 6-7	Streambed Excavation	During June/July 2001 about 0.5 cubic yards excavated from stream channel, mostly fine sediment.
104	Left Fork Sucker	17JUL01	40S06W 27NW	3-F	--	Steelhead Fry	Observed four recently emerged 1 inch long steelhead fry. No fry were observed on 12Jun01.
105	Left Fork Sucker	17JUL01	40S06W 27NW	3-F	6-8 6-11	Streambank Excavation	During June/July 2001 about 2.0 cubic yards of streambank was excavated into stream. About 15 ft of streambank destabilized.
106	Left Fork Sucker	17JUL01	40S06W 27NW	3-F	6-12 6-13	Streambank Excavation	During June/July 2001 several 3 ft diameter boulders were winched from streambank to expose fine textured soil
107	Left Fork Sucker	17JUL01	40S06W 27NW	3-F	6-15	petroleum hazard	Two gallons of gasoline left 4 ft from water's edge
108	Left Fork Sucker	17JUL01	40S06W 27NW	3-F	6-9	petroleum hazard	Two gallons of gasoline left 8 ft from water's edge
109	Left Fork Sucker	17JUl01	40S06W 27NW	3-B	6-22	petroleum hazard	Two 2-gallon containers of gasoline left 30 ft from stream.
110	Left Fork Sucker	17JUl01	40S06W 27NW	3-F	6-16	Trail Construct	About 50 ft of new trail constructed on streambank adjacent to Port Orford Cedar.
111	Left Fork Sucker	17JUL01	40S06W 27NW	3-F	6-19	POC	Uninfected Port Orford Cedar growing from streambank at mining site.
112	Left Fork Sucker	17JUL01	40S06W 27NW	3-F	6-20	Sediment	About 60 percent of pool substrate is covered with fine sediment.
113	Left Fork Sucker	17JUL01	40S06W 27NW	3-F	6-18	hydrology altered	Boulders placed across tail out of pool may impede upstream fish movement.
114	Sucker	19JUL01	40S06W 4NW	3-I	6-23	fallen trees cut	Four fallen trees within the active channel cut. About 13 ft cut from one fallen tree.
115	Sucker	19JUL01	40S06W 4NW	3-I	6-24	fallen tree cut	One fallen tree spanning active channel cut.
116	Sucker	19JUL01	40S06W 4NW	3-I	6-25	tree felled	Alder tree cut from streambank
117	Sucker	19JUL01	40S06W 4NW	3-I	6-26	tree cut	two alder trees cut from streambank
118	Sucker	19JUL01	40S06W 4NW	3-J	6-27	Streambed Excavation	An estimated 23 cubic yds of boulders were removed from the streambed to floodplain. Removal occurred about 3-10 years ago.
119	Sucker	19JUl01	40S06W 4NW	3-J	--	Streambed Excavation	An estimated 33 cubic yds of boulders removed from streambed to floodplain. Removal occurred about 3-10 years ago.

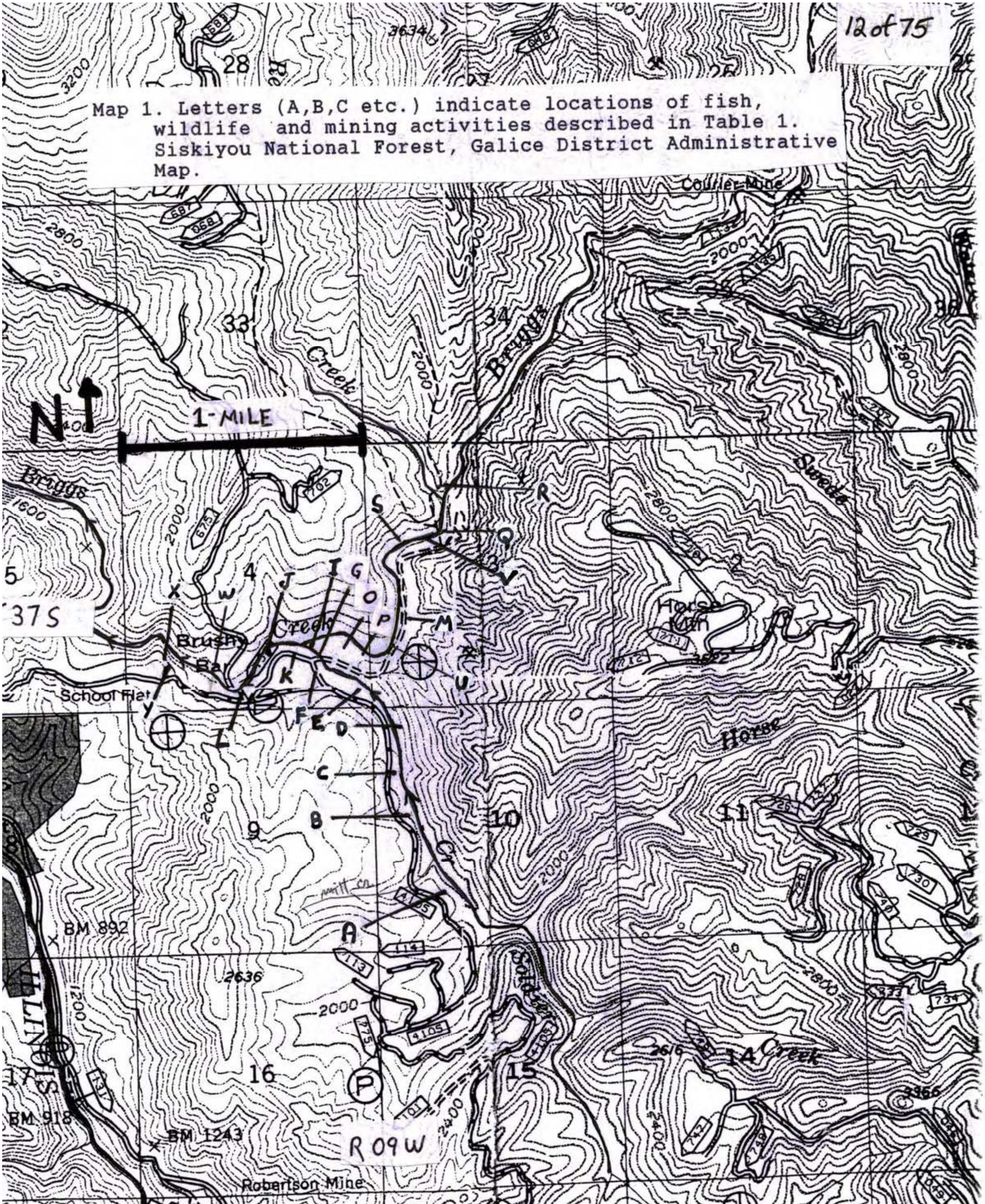
#	Creek	Date Observed	T. R. 1/4Sec	Map Locat	Roll Photo	Activity Animal use	Description
120	Sucker	19JUL01	40S06W 4NW	3-J	--	Streambed Excavation	An estimated 22 cubic yds of boulders removed from streambed to floodplain. Removal occurred about 3-10 years ago.
121	Sucker	19JUL01	40S06W 4NW	3-J	6-28	Streambed Excavation	An estimated 23 cubic yds of boulders removed from streambed to floodplain. Removal occurred about 3-10 years ago.
122	Sucker	19JUL01	40S06W 4NW	3-J	--	Solid Waste	55 gallon barrel, 20 ft wooden ladder
123	Sucker	19JUL01	40S06W 4NW	3-J	--	Streambed Excavation	An estimated 33 cubic yds of boulders removed from streambed to floodplain. Removal occurred about 3-10 years ago.
124	Sucker	19JUL01	40S06W 4NW	3-K	6-29	Solid Waste	Collapsed building with nails exposed. 17 ft of stove pipe
125	Sucker	19JUL01	40S06W 4NW	3-K	--	Streambed Excavation	Estimated 3,333 yds^3 of cobble/boulder removed from streambed >50 years ago.
126	Sucker	19JUL01	40S06W 4NW	3-K	--	Streambed Excavation	Estimated 1,481 yds^3 of cobble/boulder removed from streambed >50 years ago.
127	Sucker	19JUL01	40S06W 4NW	3-K	--	Streambed Excavation	Estimated 888 yds^3 of cobble/boulder removed from streambed >50 years ago.
128	Sucker	19JUL01	40S06W 4NW	3-L	--	Existing Trail	A trail follows Sucker Creek upstream from Forest Road 098 for about 0.3 miles.
129	Sucker	19JUL01	40S06W 4NW	3-L	--	Solid Waste	6 pieces of discarded sheet metal estimated 200 square ft.
130	Sucker	19JUL01	40S06W 4NW	3-L	6-32	Dredge	3 inch suction dredge
131	Sucker	19JUL01	40S06W 4NW	3-L	6-33	Road	Possible old mining road obliterated by side channel of Sucker Creek
132	Sucker	19JUL01	40S06W 5NE 32SE	3-M	6-34	stream diversion	Stream diverted into 4 inch pvc which feeds wooden trough
133	Sucker	19JUL01	40S06W 5NE 32SE	3-M	6-35	hydrology altered	Side channel dammed with 2 ft high 15 ft wide berm. overflow flow diverted into 8 inch PVC pipe.
134	Sucker	19JUL01	40S06W 5NE 32SE	3-M	6-36	petroleum hazard	One quart of 30 wt motor oil left 20 ft from stream.
135	Sucker	19JUL01	40S06W 5NE 32SE	3-M	7-6	hydrology altered	Streamflow directed through sluice box.
136	Sucker	19JUL01	40S06W 5NE 32SE	3-M	6-E 7-7	Streambed Excavation	Suction dredge adjacent to estimated 50 yds^2 of excavated streambed.
137	Sucker	19JUL01	40S06W 5NE 32SE	3-M	7-2 7-4	Streambank Excavation	An estimated 3 cubic yards of streambank was excavated from 30 ft of streambank.
138	Sucker	19JUL01	40S06W 5NE 32SE	3-M	7-3 7-5	Trees Cut	At least 5 alder trees removed from streambanks and at least 2 others damaged

#	Creek	Date Observed	T. R. 1/4Sec	Map Locat	Roll Photo	Activity Animal use	Description
139	Sucker	19JUL01	40S06W 5NE 32SE	3-M	7-8	Streambank Excavation	An estimated 2 cubic yards of streambank was excavated from 25 ft of streambank.
140	Sucker	19JUL01	40S06W 5NE 32SE	3-N	7-9	Suction Dredge	Suction dredge in Sucker Creek
141	Sucker	19JUL01	40S09W 4NW	3-L	7-10 7-11	Open Pit Toilets	Two outhouses located within 80 ft of Sucker Creek
142	Briggs	27AUG01	36S08W 18SW	2-E	8-3A 8-7A	Tree Felled	During summer 2001, a live 14 inch diameter Douglas-fir was felled into Briggs Creek.
143	Briggs	27AUG01	36S08W 18SW	2-E	8-24A	Streambank Excavation	During summer 2001, about 4 cubic yards of soil were removed from 15 ft of streambank adjacent to felled tree.
144	Briggs	27AUG01	36S08W 18SW	2-E	8-10A 8-17A	Tree Cut	During summer 2001, the roots of a 4 ft diameter, 20 ft high snag were severed and soil dug out from its base.
145	Briggs	27AUG01	36S08W 18SW	2-E	8-18A 8-15A	Streambank Excavation	During summer 2001, an estimated 2 cubic yards were excavated from 10 ft of streambank and from under snag. (see obs. 60 and 143)
146	Briggs	27AUG01	36S08W 18SW	2-E	8-19A 8-20A	Streambank Excavation	During summer 2001, an estimated 7 cubic yards of soil were excavated from 20 ft of streambank and 5 yds^3 placed directly into Briggs Creek.
147	Briggs	27AUG01	36S08W 18SW	2-E	8-12A	Large Wood Cut	During summer 2001, a fallen maple tree was further cut with a chain saw and removed from active channel. (see obs. 61)
148	Briggs	27AUG01	36S08W 18SW	2-E	8-4A	Streambank Excavation	During summer 2001, an estimated 0.3 yds^3 of soil was excavated from 3 ft of streambank.
149	Briggs	27AUG01	36S08W 18SW	2-E	8-5A	Tree Cut	During summer 2001, a 6 inch diameter tree was cut, uprooted from the streambank and discarded in the stream channel.
150	Briggs	27AUG01	36S08W 18SW	2-J	8-1A	Road	Unnumbered dirt road spur to road 017 parallels Briggs Cr. for 0.3 miles below Brushy Creek. No on Amin map but is on USGS quad. Road is used to access claims where banks were excavated and trees cut (same as obs. 67 but now supplemented with photograph).
151	Briggs	5SEP01	36S09W 24SW	2-N	9-24A	Mining Claim	Metal sign reads: Federal Mining Claim Elkhorn #1-#8 Robert & Lisa Barton ORMC 108238-108245
152	Briggs	3SEP01	36S09W 24SW	2-T	--	Motorbike Fire Hazard	An unlicensed motorbike was observed parked on the Briggs Creek Trail during extreme fire danger.
153	Briggs	3SEP01	36S09W 24SW	2-S	--	Suction Dredge	At 1206PDT two individuals were observed operating a suction dredge in Briggs Creek during extreme fire danger. Gasoline fumes were noticeable on the trail 200 ft above the creek.
154	Briggs	5SEP01	36S09W 24SW	2-T 2-S	9-23A	Trail Construct.	During summer 2000 or spring 2001 about 200 ft of trail was dug down to mineral soil.
155	Briggs	5SEP01	36S09W 24SW	2-S	9-12A 9-13A 9-16A	Streambank Excavation	During summer 2001 an estimated 21 yds^3 were excavated from 88 ft of streambank. Boulders and cobbles which once armored the bank were removed. See obs 97 and letters dated 15 June and 7 Sept to J. Williams.

#	Creek	Date Observed	T. R. 1/4Sec	Map Locat	Roll Photo	Activity Animal use	Description
156	Briggs	5SEP01	36S09W 24SW	2-S	9-14A	Hydrology Altered	Streambed sediment excavated from right bank (A) was deposited as a mid-channel bar (B) which now directs flows towards unprotected and undercut streambank.
157	Briggs	5SEP01	36S09W 24SW	2-S	9-7A	Port Orford Cedar	Suction dredge lashed to uninfected Port-Orford-Cedar sapling.
158	Briggs	5SEP01	36S09W 24SW	2-S	9-17A	Streambed Excavation	Approximately 370 yds^2 of streambed were disturbed making them unsuitable or unsafe for salmon spawning. An estimated 60 yds^3 were displaced into tailing piles.
159	Briggs	5SEP01	36S09W 24SW	2-S	9-3A	Trees Cut	At least five 1-2 inch diameter vine maples were cut from streambanks and piled within 30 ft of the dredge.
160	Sucker	9NOV01	40S06W 33NW	3-O	--	Road 0.3mi	Unnumbered road in Sec 32 beyond locked gate goes 0.3 miles down to Sucker Creek. 01mi in riparian reserve
161	Sucker	9NOV01	40S06W 33NW	3-P	11-4	Mining Camp	storage shed, picnic table, 0.1 acre denuded of vegetation. W.D. Bowen #149657 Coldwater 1-4
162	Sucker	9NOV01	40S06W 33NW	3-P	11-6	Outhouse	open pit toilet on terrace about 75ft from creek
163	Sucker	9NOV01	40S06W 33NW	3-P	11-7	Outhouse	open pit toilet on terrace about 200 ft from creek
164	Sucker	9NOV01	40S06W 33NW	3-P	11-10	Road 0.1mi	0.1 mile exclusive spur road from camp down to creek (see obs 160,161). 6 ft high eroding cut slopes.
165	Sucker	9NOV01	40S06W 33NW	3-P	11-10	Terrace Excavation	Estimated 1 cubic yard excavated from terrace.
166	Sucker	9NOV01	40S06W 33NW	3-P	11-11	Terrace Excavation	3x4x12ft pit (est. 5 yds^3) excavated from terrace about 50 ft from Sucker Creek.
167	Sucker	9NOV01	40S06W 33NW	3-P	11-13	Terrace Excavation	8x7x2ft pit (est. 4 yds) excavated from terrace and used as settling pond. Sediment laden water appears to have flowed over artificial embankment and into stream below.
168	Sucker	9NOV01	40S06W 33NW	3-P	11-14	Stream Diversion	About 500 ft of 1" PVC pipe used to divert Sucker Creek into settling pond.
169	Sucker	9NOV01	40S06W 33NW	3-Q	11-15	Tailings	Estimated 4,400 yds3 of cobble/boulder tailings 25 ft above creek. about 40-60 years old. channel is bedrock.
170	Sucker	9NOV01	40S06W 33NW	3-R	11-17	Mining Camp	Estimated 0.1 acre on high floodplain denuded of vegetation. picnic table, car battery, firewood cut from floodplain, sink, tables, tarps, 5 gal. bucket,stove
171	Sucker	9NOV01	40S06W 33NW	3-R	--	Outhouse	Open pit toilet on high floodplain about 200 ft from Sucker Creek.
172	Sucker	9NOV01	40S06W 33NW	3-R	11-18	Streambed Excavation	Unstable tailings (30x10x2) would be attractive to spawning salmon. There are very few suitable spawning locations for 1/2 mile.
173	Sucker	9NOV01	40S06W 33NW	3-R	--	Streambed Excavation	1 cubic yard excavated and about 8 ft of streambank disturbed and rendered unstable
174	Sucker	9NOV01	40S06W	3-S	11-20	Road	Exclusive mining road about 0.4 mile not on Forest Service

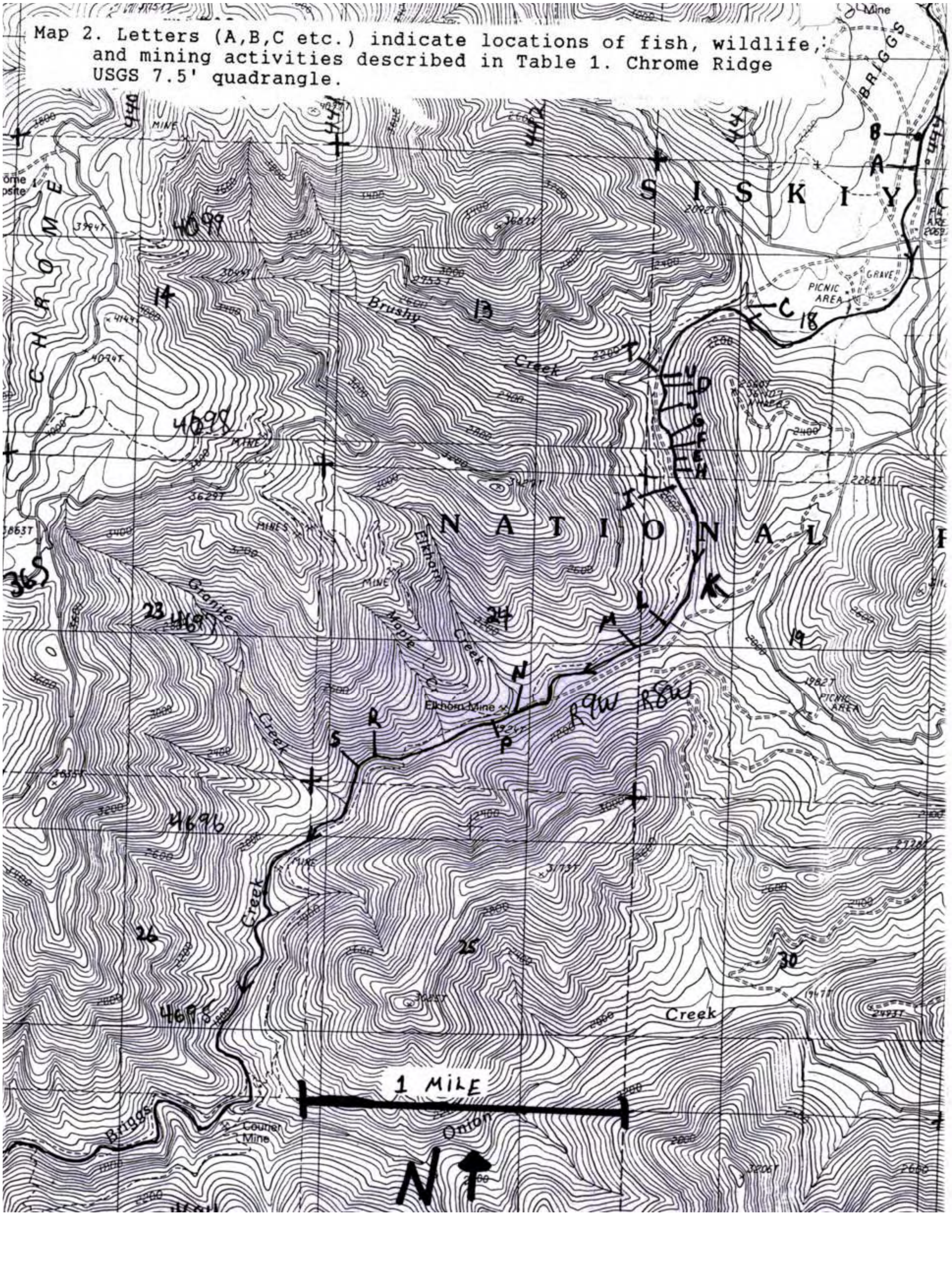
#	Creek	Date Observed	T. R. 1/4Sec	Map Locat	Roll Photo	Activity Animal use	Description
			33NW				maps. road bulldozed into very steep slopes about 130 ft above Sucker Creek. estimated 10-30 yrs old.
175	Sucker	9NOV01	40S06W 33NW	3-R	--	Tailings	100x70x8ft tailings pile adjacent to camp (obs 170). Tailings suitable for survey and manage species (DelNorte salamander and rare snails)
176	Sucker	9NOV01	40S06W 33NW	3-T	--	Mining Camp	About 0.05 acre denuded, 12x8 ft cabin G&M Discovery Group. Daniel Monson Et al. ORMC 148143
177	Sucker	9NOV01	40S06W 33NW	3-T	--	Out House	Open pit toilet on terrace 250 ft from Sucker Creek.
178	Sucker	9NOV01	40S06W 33NW	3-T	11-20	Road	350 ft of exclusive mining road accessing mining camp (obs 176). road not on FS maps
179	Sucker	9NOV01	40S06W 33NW	3-T	11-21 11-22	Streambed Excavation	partially eroded summer 2000 tailings pile (20X20x2) has altered configuration of tailout creating 30x40ft patch of unstable spawning gravel attractive to salmon.
180	Sucker	9NOV01	40S06W 33NW	3-T	11-24 11-23	Streambed Excavation	Summer 2001 excavation of pit in streambed (8x6x4ft). 8 cubic yds. 15x10 pile of unstable sand and gravel deposited in tailout of pool. north boundary of claim
181	Sucker	9NOV01	40S06W 33NW	3-T	11-E	Streambank Excavation	13x4x3 (6yds^3) excavated from bank and placed in active channel as unstable gravel
182	Sucker	9NOV01	40S06W 33NW	3-T	--	Streambank Excavation	10x3x1ft (1 yd^3) excavated from bank and placed in active channel
183	Sucker	9NOV01	40S06W 33NW	3-T	--	Streambank Excavation	5x3x1ft (0.5 yd^3) excavated from bank and placed in active channel
184	Sucker	9NOV01	40S06W 33NW	3-T	--	Streambed Excavation	30x3x8ft (26 yd^3) summer 2000. 26 yds of spawning gravel disturbed
185	Sucker	9NOV01	40S06W 33NW	3-T	--	Streambank Excavation	30x3x5ft (17 yd^3) excavated from bank and placed in stream, creating attractive, but unstable spawning gravel between boulders
186	Sucker	9NOV01	40S06W 33NW	3-T	--	Streambed Excavation	30x8x5ft (44 yd^3) of spawning gravel disturbed. summer 2000
187	Sucker	9NOV01	40S06W 33NW	3-T	--	Streambed Excavation	20x5x3ft (11 yd^3) of spawning gravel disturbed. summer 2000
188	Briggs	29NOV01	36S08W 18SW	3-T	--	Mining Camp	0.3 acres denuded and compacted soil
189	Briggs	29NOV01	36S08W 18SW	3-T	--	Road	60 ft steep pitched 4 wheel drive tracks from RD 2512 into mining camp (obs 188).
190	Briggs	31MAY02	36S09W 24SW	2-S	12-17,18	Streambed Excavation	Est. 10 yds excavated before mining season
191	Briggs	31MAY02	36S09W 24SW	2-S	12-18	Dredge	Dredge with 5'nozzle
192	Briggs	31MAY02	36S09W 24SW	2-S	12-19,2022, 23	Dam	2.5'x50' dam constructed before mining season. 12-19 best photo
193	Briggs	31MAY02	36S09W	2-S	12-21	gasoline	5 gallon and 1 gallon containers left about 13 ft above stream

#	Creek	Date Observed	T. R. 1/4Sec	Map Locat	Roll Photo	Activity Animal use	Description
			24SW			containers	
194	Briggs	25SEP02	36S08W 18SW	2-U	13-1A	streambank excavation	Estimated 4 cubic yds excavated. verified by forest service personnel
195	Briggs	25SEP02	36S08W 18SW	2-U	13-2A	streambank excavation	Estimated 1 cubic yd excavated verified by forest service personnel
196	Briggs	25SEP02	36S08W 18SW	2-U	13-3A	dam	small berm of cobble about 8 inches high
197	Brushy	25SEP02	36S08W 18SW	2-U	13-4A,5A	streambank excavation	Estimated 4 cubic yds excavated verified by forest service personnel
198	Briggs	25SEP02	36S08W 18SW	2-U	13-6A	streambed excavation	Estimated 1-3 yds excavated.



Map 1. Letters (A,B,C etc.) indicate locations of fish, wildlife and mining activities described in Table 1. Siskiyou National Forest, Galice District Administrative Map.

Map 2. Letters (A,B,C etc.) indicate locations of fish, wildlife, and mining activities described in Table 1. Chrome Ridge USGS 7.5' quadrangle.



Map 3. Letters (A,B,C etc.) indicate locations of fish, wildlife, and mining activities described in Table 1. Siskiyou National Forest, Illinois Valley District Administrative Map.

From: Rich Nawa
To: dfgsuctiondredge@dfg.ca.gov;
Subject: California Suction Dredge Program Subs. Env. Imp. Reprt. (SEIR)
Date: Tuesday, May 10, 2011 10:59:19 AM
Attachments: Nawa_and_Frissell_1993pdf.pdf

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attached publication used as reference in may 9 comment letter submitted by R. Nawa, Siskiyou Project

North American Journal of Fisheries Management 13:634–639, 1993

Measuring Scour and Fill of Gravel Streambeds with Scour Chains and Sliding-Bead Monitors

RICHARD K. NAWA

Siskiyou Regional Education Project
Post Office Box 220, Cave Junction, Oregon 97523, USA

CHRISTOPHER A. FRISSELL[1]

Oak Creek Laboratory of Biology, Department of Fisheries and Wildlife
104 Nash Hall, Oregon State University, Corvallis, Oregon 97331, USA

Abstract.—In the Pacific Northwest, scour and fill of streambed sediments is an often-overlooked cause of mortality of incubating salmonid eggs and developing alevins. Natural levels of scour and fill can be exacerbated by changes in watershed and channel stability caused by human disturbance. We evaluated the use of scour chains and a new device, the sliding-bead monitor, to measure scour and fill that occurs during peak flow periods. During 1987–1991, we designed and implanted 95 scour chains and 44 sliding-bead monitors in streams of western Oregon. Recovery rates of scour chains and sliding-bead monitors were 87 and 88%, respectively. Both kinds of scour devices allowed accurate, direct measurement of maximum scour depth and subsequent deposition, information that cannot be obtained from cross-sectional surveys or other conventional methods for monitoring stream habitat.

The dynamic nature of streambeds in the Pacific Northwest causes a high risk of mortality to incubating salmonid eggs and posses a challenge to scientists attempting to measure mortality factors associated with unstable streambeds. Research indicates that logging and road building can reduce stream channel stability through large inputs of sediment (Lyons and Beschta 1983; Tripp and Poulin 1986; Platts et al. 1989), but few studies have directly measured scour and fill of streambeds. We describe methods we have successfully used to quantify scour and fill of spawning and incubation habitats in highly dynamic streams of western Oregon.

Mortality during early life history stages of salmonids may be caused by infiltration of fine sediment into the spawning substrate, which reduces intragravel water flow, oxygen delivery, and waste removal; accumulations of sediment, which entomb emerging fry by forming a cap over the redd; and scour of the streambed during high stream flows, which causes premature removal and transport of developing embryos and alevins. Investigators have measured various aspects of egg-to-fry survival (Chapman 1988), but direct studies of mortality are difficult, costly, and not always successful. Therefore, physical measurements have been used to indirectly assess sediment effects on salmonid eggs and developing alevins. These methods are of three general types: (1) measurement or monitoring of spawning substrate texture; (2) measurement of suspended sediment; and (3) measurement of local streambed scour and fill related to bed-load movement. To date, most studies have focused on the quantification of fine sediment deposition. However, where scour and fill is the major cause of mortality, the measurement of fine sediment, gravel texture, or embeddedness will not give an accurate index of egg-to-fry survival and could result in an invalid assessment of habitat quality for spawning. Several authors (Gangmark and Bakkala 1960; Holtby and Healey 1986; Everest et al. 1987; Hall et al. 1987; Lisle 1989; Wesche et al. 1989) have indicated that measurement of streambed scour and fill is necessary to improve understanding of the dynamics of spawning and incubation habitat.

Scour chains are steel chains implanted in streambeds to measure scour and fill of sediments over a period of time (Figure 1). Scour chains can measure physical impacts on intragravel or hyporheic habitats of salmonid eggs and alevins during peak flow periods when most bed-load transport occurs and the streambed may be reshaped. The technique is based on the concept that bed-load movement in streams occurs as discrete scour and fill events along the stream channel (Jackson and Beschta 1982). Channel cross sections measured during floods support this concept (Leopold et al. 1964). During high flows, the streambed is scoured and the exposed portion of the scour chain lays over to the depth of scour (Figure 1a, b). If deep enough, this scouring can dislodge salmonid

[1] Present address: Flathead Lake Biological Station, University of Montana, Bio Station Lane, Polson, Montana, USA.

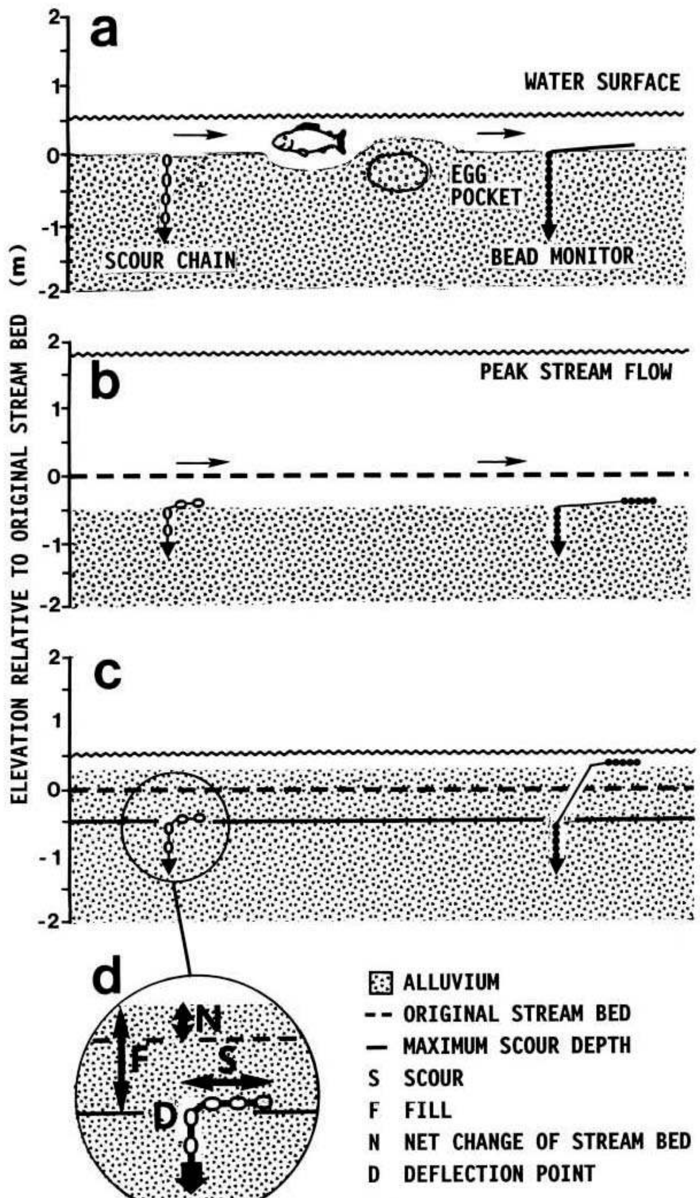

FIGURE 1.—Scour and fill of a salmon redd measured with a scour chain and bead monitor. (a) Side view before peak flow. (Scour devices in our study were actually placed to the side of a redd, rather than in front and rear as shown). (b) Maximum streambed scour at peak flow during a large storm. All salmon eggs are washed downstream, and the streambed is scoured down 50 cm. Scour chain that is exposed lays over and exposed plastic beads slide to the end of wire cable. (c) Sediment deposition immediately after (or during) a storm buries scour chain in deflected position. Streambed in this case has aggraded from prestorm condition. Inset (d) illustrates measurement of scour and fill recorded by a scour chain.

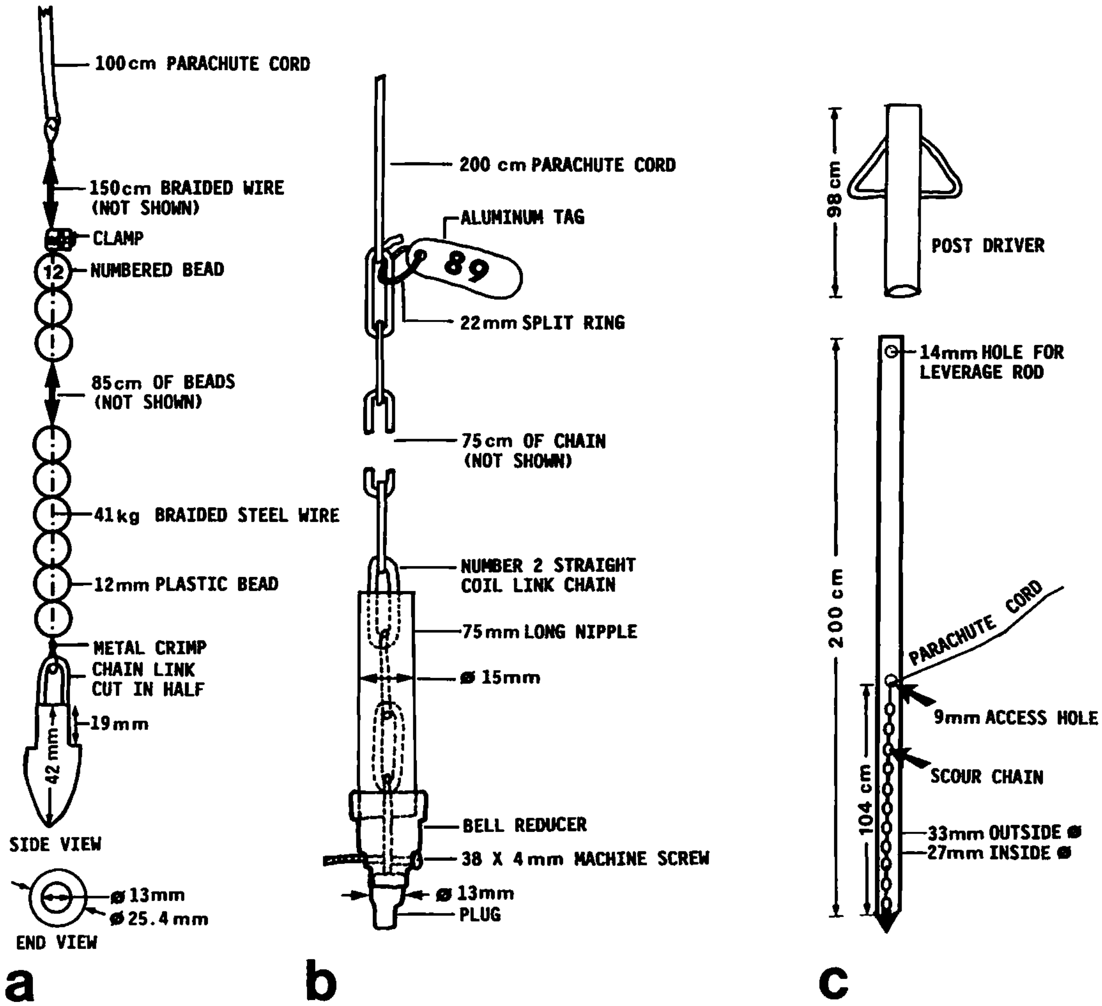

FIGURE 2.—(a) Sliding-bead monitor with machined steel point. (b) Scour chain with point constructed from galvanized pipe fittings. (c) Galvanized steel driving pipe loaded with 1-m long scour chain and point made from galvanized pipe fittings.

eggs and developing alevins (Figure 1b). As peak flows recede, deposition occurs, and the scour chain is buried (Figure 1c). The portion of the chain now parallel to the streambed records the depth of the scour (Figure 1d).

Leopold et al. (1964) used scour chains to study scour and fill in Arroyo de los Fujoles near Santa Fe, New Mexico. Since then other geomorphic and biological studies have used scour chains (Madej 1984; Tripp and Poulin 1986; Lisle 1989; Hassan 1990). Platts et al. (1983) briefly described the use of a notched driving rod and anchor ring to install scour chains. Lisle and Eads (1991) described a two-step method to install scour chains with a probe constructed of pipes and pipe fittings.

Several other kinds of devices have been used to measure scour and fill but none have been widely adopted. A steel rod and sliding rebar device described by Duncan and Ward (1985) is prone to malfunctions because debris accumulations around the rod induce scour. The concept for the sliding-bead monitor described in this paper (Figure 2a) originated from a method that used buried ping-pong balls (Moring and Lantz 1975). Sliding-bead monitors permit measurement of scour without excavation, and the beads' small diameter results in only minor disturbance of the spawning substrate during installation. Peak flows scour the streambed and expose the plastic beads to flow turbulence and moving bed load, which slide the beads to the end of the cable (Figure 1b, c). The length of beads excavated by peak flows records the depth of scour.

During 1987–1991 we installed 95 scour chains and 44 sliding bead monitors at 29 transects along coastal streams and rivers in southwestern and northwestern Oregon. The devices were placed along surveyed transect lines perpendicular to the stream channel. We selected sites based on their suitability for spawning (water velocity, depth, gravel size), presence of spawning salmonids, or presence of redds. Benchmarks were established on each side of the stream by driving a nail through a numbered aluminum tag and into a tree or a wooden surveyor's stake. A polyethylene-clad kevlar rope chain with 0.5-m increments was strung between the benchmarks. The horizontal distance from the true left benchmark (when facing downstream) was recorded for each scour device's location. Depending on the width of the active channel, we implanted three to seven devices 2–10 m apart along the transect line in the active channel (adjacent to individual redd sites, if redds were present). A steel pipe and post hole pounder were used to implant scour chains and sliding-bead monitors (Figure 2c). With the aid of a lead weight, a 2-m piece of 18-kg-test, braided dacron was fed down the driving pipe through an access hole. The braided dacron was then tied to the scour chain's parachute cord tail and pulled up through the pipe and out through the access hole. We placed the driving pipe, now loaded with the scour chain held vertically (Figure 2c), in the desired location and pounded it down approximately 1 m with a post driver. The smaller machined steel point shown in Figure 2a allowed the use of narrower diameter titanium driving pipe (21-mm outside diameter, 13-mm inside diameter) that was easier to drive into coarse-textured streambeds. An assistant held the parachute cord tail taut while the scour chain was driven into the streambed. Removal of the driving pipe usually required the use of a steel leverage rod to twist and pull the pipe free. Gloves and earplugs were used as safety measures.

Sliding-bead monitors were installed in a similar manner. To prevent beads from sliding up the cable wire during installation, a tiny screw clamp or a knotted rubber band was attached to the wire just above the beads (we used a number 12 copper entrance connector obtained from an electrical supply store and modified by cutting a slot through one side as a clamp). The clamp or rubber band was removed after installation.

The last task during installation was to survey the transect line with a hand level or self-leveling, tripod-mounted level and rod (we used a 5-power hand level). To ensure recovery of scour devices, the survey was sufficiently accurate to relocate the buried scour device to within 25 cm. An experienced two-person crew could install eight devices at two transects in 1 d. Materials for each kind of scour device cost about US$7.00 in 1990 and took approximately 20 min to construct.

We relocated scour chains the following summer by stringing the polyethylene-clad rope chain to its original installation distances at each benchmark. The transect was resurveyed with a hand level and rod before excavations began along the transect. Hand tools (e.g., pick, shovel, spade, and geology hammer) were used to dig down 40–60 cm, depending on water depth and substrate texture. Once the parachute cord was found, the excavation was continued upstream to where the scour chain deflected at nearly a right angle down into the streambed (Figure 1d). Excavation of the chain past the deflection point was avoided because doing so can result in overestimation of scour and fill. If the chain was installed flush with the original streambed, then the length of chain lying horizontal to the streambed was equivalent to the amount of scour. Fill was the distance from the deflection point up to the existing stream bed surface (Figure 1d). Net change in bed elevation was calculated by subtracting scour from fill.

Sliding-bead monitors were remeasured two or three times during the winter after large storms to determine if scour had occurred. The number of previously buried beads that moved to the end of the braided wire recorded the maximum depth of scour below the original streambed. In some instances, the formerly exposed bead monitor wire cable was partially or totally buried, making excavation necessary. Net change in bed elevation was determined by subtracting the initial length of exposed wire above the stream bed (immediately following installation) from the wire length exposed after the peak flow period. To prevent an overestimate of fill, excavation of some of the wire was necessary to ensure that the wire was vertically oriented above the original buried portion. Deposition, or fill, was calculated by adding the change in bed elevation (a positive or negative number) to the amount of scour (expressed as a positive number).

We established a protocol for sites where scour devices could not be found and were presumed buried beyond the depth of excavation. The site was excavated a minimum of 40 cm. If we were

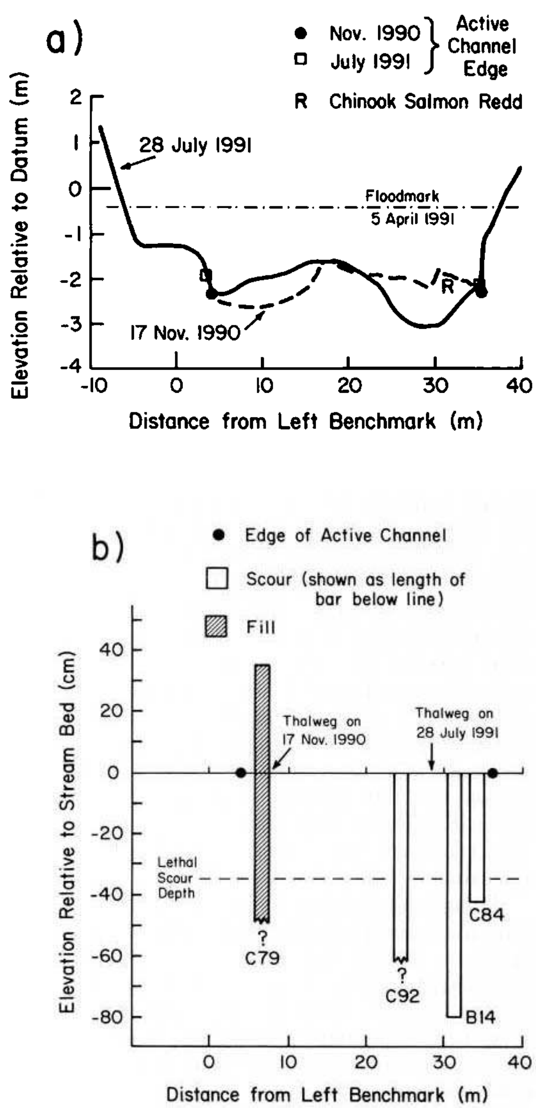

FIGURE 3.—Scour, fill, and streambed profile changes at a site in the Salmonberry River, northwestern Oregon, following a flood with peak magnitude of about 10-year recurrence interval. **(a)** Surveyed cross section before and after the flood season. Major streambed changes were accompanied by a thalweg shift of 20 m. **(b)** Scour and fill measured at scour chains (C79, C92, C89) and a bead monitor (B14). Horizontal reference line is the original streambed elevation on 17 November. Question mark indicates chain was not recovered and the minimum scour was established by maximum excavation depth. A chinook salmon redd located 32 m from the left benchmark was scoured below the probable depth of egg burial (dashed line shows probable lethal scour depth for redds).

certain the transect line was accurately positioned, the amount of fill was assumed to be at least as great as the depth of excavation (chain C79; Figure 3). An approximate estimate of scour can be calculated by subtracting the net change in streambed elevation (obtained from successive cross-sectional surveys) from fill. We discarded data for scour devices that we suspected had been tampered with or removed by humans.

Cross-sectional surveys conducted with hand levels were adequate to relocate 87% of the scour chains and 88% of the sliding-bead monitors. Scour chains were more durable than the bead monitors and easier to install, but field measurements of scour chains were practical only during the summer low flow period. Bead monitors could be used to measure the effects of separate storm events during the winter and reset between storms if scour and fill was minor. Both devices could be reset during the summer to measure bed movement during the following winter storm season. Typical results of our field studies are presented in Figure 3. Stream and floodplain cross sectional surveys provide information at a relatively coarse scale that gives a context for interpreting the more site-specific and precise measurements of microhabitats by scour devices. Cross-sectional surveys alone cannot detect maximum scour when it is masked by subsequent filling of the streambed immediately after (during) a major storm (chain C79; Figure 3).

Spawning activity by salmon and steelhead *Oncorhynchus mykiss* near scour chains can cause erroneous measurements. The scour and fill actually caused by redd digging could be mistakenly attributed to storms. We placed scour chains and sliding-bead monitors in the stream just after the peak of the spawning run, reducing the likelihood of confounding effects caused by scour and fill with those caused by spawning adults digging redds. Transects should be visited periodically to note scour and fill caused by salmon and steelhead digging redds that could perturb chains or bead monitors.

The design and placement of scour-measuring devices could be modified for other study objectives. Meter-long devices were appropriate for monitoring scour and fill at spawning sites of chinook salmon *O. tshawytscha* in main-stem rivers and major tributaries of western Oregon. Shorter devices may be appropriate in smaller tributary streams, hydrologically stable systems, or in studies of smaller fish species that dig shallower redds.

Acknowledgments

This research was funded by a grant from the Federal Aid in Sport Fish Restoration program through the Oregon Department of Fish and Wildlife. Additional support was provided by Oregon State University and the Siskiyou Regional Education Project. This is technical paper 9800 of the Oregon State University Agricultural Experiment Station, Corvallis, Oregon. Fred Everest, Curt Bambush, John Wilson, and Glenn Burket provided valuable advice or technical assistance. We thank assistants Eric Leitzinger, Earl Hubbard, Dan Shively, Eric Hooker, Chris Allen, Rodney Garland, and Joe Ebersole, who helped "get the bugs out" during arduous field trials. We thank M. K. Young, T. E. Lisle, and T. E. Nickelson for reviewing a draft of this paper.

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SUCTION DREDGE PERMITTING PROGRAM
Draft Subsequent Environmental Impact Report (DSEIR)
Comment Form

Name: JohN NUZUM

Mailing Address: 6558 MAGNUM DR.

ANDERSON, CAlif 96007

Telephone No. (optional):

Email (optional):

Comments/Issues:

Dear Sir:

We do not need a book or a specific page number for you to understand that all of your proposed restrictions on Dredging is wrong and unconstitutional.

When are you going to start acting like americans, Life liberty and the persuit of Happyness.

John Nuzum

Please use additional sheets if necessary.

SUBMIT WRITTEN COMMENTS (POSTMARKED BY 05/10/11) TO:

Mail: Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

Email: dfgsuctiondredge@dfg.ca.gov

Fax: (530) 225-2391

Questions? Please call us at (530) 225-2275 • More information: www.dfg.ca.gov/suctiondredge

California Department of Fish and Game
ATTN: Mark Stopher
Suction Dredge Program Draft DSEIR Comments
601 Locust St.
Redding, CA 96001

Mr. Stopher,

Please accept the following comments for the Suction Dredge Program Draft DSIER. As a member of the CA DFG-PAC Committee, I was able to see that suction dredge miners are being regulated by an agency that has no idea what Suction Dredge mining is about. The Draft regulations reflect a lack of knowledge by the agency about how this business operates.

All I can read from this proposal is the attempt to put miners out of business with arbitrary and capricious regulations.

The DSEIR is totally lacking in the legal relationship of your proposed regulations and the "Property Rights" that individuals have under the Mining Act of 1866, the Mining Act of 1870, and the Mining Act of 1872. Under the proposed regulations, you are proposing to eliminate my ability to mine on my properties on Horse Creek, Siskiyou County by changing the creek to a Class-A waters (no dredging anytime). This is an arbitrary and capricious attempt to materially interfere with my Federally protected mineral rights, and constitutes an unconstitutional taking of my private property without just compensation. I demand that you reconsider this proposed "mineral withdrawal" as it is beyond DFG's legal ability to implement.

The following restrictions should be eliminated from the proposed regulations:

- 1602 Permits for Winching or Oversized Dredge – There is no discussion in the DSEIR as to how miners will be treated under this process. Why wasn't this discussed at any of the PAC meetings? I find this will arbitrarily interfere and restrict an individual's ability to mine. Winching is an integral part of the process of Suction Dredging. The 1994 regulations on winching are reasonable and should be left as is.
- Downsizing to 4" Dredge – A 4" dredge is not suitable for commercial mineral extraction. This proposal is totally unreasonable! The 4" dredge size limitation is arbitrary and capricious. The 4" limitation will make most properties commercially unviable. The size limitations under the 1994 regulations have worked and should be left as is.
- Changes to Season of Operations – The 1994 regulations have us limited to a small window of activity to protect the environment. Any more taking from the short season that we have is unreasonable, nor is it supported by scientific studies.
- No Person May Suction Dredge within 3 Feet of the Lateral Edge of the Current Water Level – This will be nothing more than a De-Facto "taking" of essentially every small stream. This proposed change arbitrarily interferes and restricts the mining of every small stream. The 1994 regulations should be used instead of this proposed change.

- Returning Site to Pre-Mining Grade – How does DFG propose that we do this? DFG is worried that we move the gravel once but now you want us to move it again! The natural cycle of winter flooding already erases all signs of Suction Dredging from year to year, which makes this proposal an impossibility.
- 3/32 Screen on Pumps – It is not practical to run a screen of this size when Suction Dredging. Does DFG require screens of this size on Jet boats used by tribal and sports fishermen? This is just selective enforcement against miners with no basis in scientific or environmental need.
- Suction Dredge Permit Numbers Must Be Affixed in 3" High Letters – This is an unreasonable regulation that invites further regulation and enforcement abuses based on subjective judgments by DFG personnel. Miners are already required to produce permits when asked to prove their compliance with previous regulations.
- Timing of Activity to Half-Hour After Sunrise to Sunset – The DFG has no authority to tell miners or other users what time they can work or fish or raft or hunt. This is an extreme example of how arbitrary and capricious these proposed regulations really are. If there are local ordinances that apply, let the county or city governments enforce them.
- Reasonable Care Shall Be Used to Avoid Dredging Silt and Clay – As with all unworked ground buried under the river, there is no way to ascertain ahead of time whether it will contain either silt or clay material. Even the DFG is unable to predict what types of material will be encountered by miners when Suction Dredging. This regulation is capricious in that there is no fixed scale or range against which to measure the amount of silt or clay in any area so the determination is entirely subjective and open to interpretation.
- List of All Equipment to be Used Under Permit – Proposed regulations would require miners to register all nozzle sizes, constrictor rings, engine manufacturer and model numbers, etc. for all equipment used under any permit. This will place an incredible burden on miners as well as on the DFG to keep track of all this equipment, something that is not required of any other industry or of other users of the National Forest such as hunters, fishermen, and rafters. A proposed regulation of this type must be applied to all users or it cannot legally be applied to any user.

In closing, The DFG has not produced any new science or studies to prove that Suction Dredging is deleterious to fish. The proposed regulations do nothing to improve the viability of the fish population. Instead, they are designed to put Suction Dredge mining out of business and take private property without just compensation. The proposed regulations are based on subjective evaluations that are legally indefensible and that will impose unreasonable burdens not only on miners but on the DFG, which will be charged with enforcing these regulations and defending the lawsuits that will arise from such arbitrary regulations.

Ken Oliver
521 Roxbury Drive
Horse Creek, CA 96050
530-496-3129
senchoo@sisqtel.net

Subject: suction dredging
Date: Tuesday, May 10, 2011 1:44:22 PM PT
From: Pat Ommen
To: dfgsuctiondredge@dfg.ca.gov

Please restore our ability to use suction dredging. When dredging in a small stream we always cognicent of our impact on the environment. Gold dredging is a very good hobby, with virtually no impact on the surroundings environment. Restoring our ability to dredge for gold is such a major part of our success. Today's economy allows some of us, to augment our income by dredging for gold. Thank you for your consideration

051011_Ore

(33)

SUCTION DREDGE PERMITTING PROGRAM
Draft Subsequent Environmental Impact Report (DSEIR)
Comment Form

Name:
John Orr

Mailing Address:
20230 Eastview Drive
Tuolumne Ca 95379

Telephone No. (optional):
209 613 7773

Email (optional):
Notgus 1 @ Yahoo Com

Comments/Issues:

This has adversely affected my financial income — now my sole income is SSI. Also, I no longer can afford to buy many of the needed and almost any other items that would be good to have. I like to eat beans, but I don't like a steady diet of them —

John Orr
Delta Gold Diggers Club
GPPA

Please use additional sheets if necessary.

SUBMIT WRITTEN COMMENTS (POSTMARKED BY 05/10/11) TO:

Mail: Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

Email: dfgsuctiondredge@dfg.ca.gov

Fax: (530) 225-2391

Questions? Please call us at (530) 225-2275 • More information: www.dfg.ca.gov/suctiondredge

SUCTION DREDGE PERMITTING PROGRAM
Draft Subsequent Environmental Impact Report (DSEIR) Comment Form

Name: Everett Mervyn Pate
Mailing Address: 813 Brandywine
Manteca CA 95336
Telephone No. (optional):
Email (optional): MadPate@verizon.Net

Comments/Issues:

Area I vacation in most bussiness have now closed due to this program. also reduced my income and life style

Everett M Pate

Please use additional sheets if necessary.

SUBMIT WRITTEN COMMENTS (POSTMARKED BY 05/10/11) TO:

Mail: Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

Email: dfgsuctiondredge@dfg.ca.gov

Fax: (530) 225-2391

Questions? Please call us at (530) 225-2275 • More information: www.dfg.ca.gov/suctiondredge

Subject: Comment on Suction Dredge Mining DSEIR
Date: Tuesday, May 10, 2011 1:22:56 PM PT
From: Dave Payne
To: mstopher@dfg.ca.gov

Dear Mark,

I would like to applaud the Dept of Fish and Game for removing Elk Creek and Indian Creek and other creeks from waters open for suction dredging. I do wonder why Dillon Creek, which has been closed to mining was "opened up". I believe this is a tragic mistake.

Dillon Creek is inaccessable except near the Forest Service campground near the confluence with the Klamath River. This campground would be ruined if miners were allowed to operate suction dredges in the crystal clear swimming holes. This campground is famous for these world class swimming holes and the isolated quiet of this remote location. The noise, clutter, and occupancy associated with suction dredging would dramatically change this family campground into a mining camp. This is simply not acceptable for the residents of western Siskiyou County.

I have concerns about the suction dredge community bringing in aquatic invasive species such as Quagga/zebra mussels with their dredging equipment. Local mining clubs on the Klamath River attract people from all over the United States, many of whom reside in areas infected with quagga/zebra muscles. Please address this issue when you finalize your suction dredge program on California rivers.

The following comments are a "canned response" that I have varying amounts of agreement with.

Suction dredge mining has no place in the 21st century. Historic gold mining has left a legacy of toxic waste in our watersheds that has yet to be cleaned up. Present day suction dredge mining, while different from the old ways, carries many of the same dangers, while presenting new problems.

This destructive practice threatens water quality across much of the state, especially in rivers and streams that provide essential habitat for fish and wildlife, and drinking water for thousands of people. Therefore, I urge you to adopt the No Action alternative.

Expert hydrologists and fish and wildlife biologists have consistently testified that suction dredge mining destroys the clear, cold water that many species depend on, including threatened and endangered salmon and steelhead. Furthermore, suction dredging mobilizes toxic mercury, creating a health risk, not only for fish and wildlife, but for people too.

Suction dredge mining should be forever banned. Unfortunately, the department has taken an ill-advised approach that could allow this destructive practice to continue. At a minimum, any final regulations must prohibit suction dredge mining in all waters that harbor sensitive fish or wildlife and future recovery areas for these species. All waterways that are listed as impaired for any reason should also be closed to suction dredging.

Suction dredge mining destroys our water quality and harms fish and wildlife. Again, I urge you to adopt the No Action alternative.

Please keep Dillon Creek closed to suction dredging.

Thanks for getting the dredges out of Elk Creek (my drinking water supply) and Indian Creek. Please do the right thing for the aquatic creatures that share our water systems. Thanks.

Thank you for considering my concerns.

Dave Payne
box 1093
Happy Camp, CA 96039

 5-10-11

To Whom it may concenn

Please read this responce last. Due to a family medical emergency I apologize for this crude copy. an easier to read copy will be brought to you next week.

Thak You
S.E. Petersen
S.E. Petersen
Ph.530-624-5996
Mail P.O. Box 218
Chester CA. 96020

Topic	1994 Provisions	Draft Updated Provisions	Comments
Permit Requirement	Every suction dredge operator or assistant operator must have a permit issued by CDFG	No change	
Permit Application	No requirements specified	Requires valid identification and contact information; list of up to six locations planned for dredging activities, including locational information and approximate dates; list of all dredge equipment which will be used under the permit	New provision
Number of Permits	No limit	Maximum of 4,000 permits issued each year	New provision
Special Suction Dredge Permits	Requires submittal of a written plan and approval by CDFG	Removed	
Special Approval for Suction Dredging in Lakes and Reservoirs	Written approval from the lake operating agency, Regional Water Quality Control Board, and CDFG required	Requires a valid permit, an on-site inspection, and compliance with the provisions of Fish and Game Code section 1602, subdivision(a)	
Equipment Requirements	Nozzle Restriction: - Inside diameter up to six inches (special areas allowed up to eight inches) Hose Restriction: - Inside diameter of the intake hose less than four inches larger than the permitted nozzle size	Nozzle Restriction: - Inside diameter four inches or less - If authorized in writing by CDFG and compliance with the provisions of Fish and Game Code section 1602, subdivision(a) is demonstrated, inside diameter of up to six inches would be allowed -Up to an 8 inch intake nozzle would be permitted at CDFG's discretion in the locations identified in Cal. Code Regs., tit. 14, § 228, subd. (h)(1)(c) Hose Restriction: - Inside diameter of intake hose not more than two inches larger than the permitted nozzle size	Reduced nozzle and hose size, unless authorized by CDFG. New requirement for pump intake screening.

TABLE ES-1: COMPARISON OF 1994 AND DRAFT UPDATED PROVISIONS

Topic	1994 Provisions	Draft Updated Provisions	Comments
		Pump Intake Screening: - woven wire or perforated plant screen openings less than 3/32 inches - profile wire screen openings less than 0.0689 inches with a minimum 27% open area	
	Not included	Only the nozzle size(s), constrictor ring(s) and engine model numbers identified in the permits may be used.	New provision
	Not included	The suction dredge operator's permit number must be affixed to all permitted dredges at all times, in a manner such that the number is clearly visible from the streambank or shoreline. The number must be maintained in such a condition as to be clearly legible.	New provision
Restrictions on Methods of Operation	Winching is permitted if: - materials are only moved within the existing water line - no embedded material from stream or river banks is winched - no deflection of water into the bank occurs as a result of winched material - no power-winch activated shovels, buckets, or rakes are used - no woody streamside vegetation is removed or damaged	Winching is permitted if: - materials are not removed from within the existing water line -no winching of embedded material on stream or river banks is conducted - winching does not cause water to deflect onto the bank -no streamside vegetation is removed or damaged Motorized winches and use of other motorized equipment to move boulders, logs, or other objects from within the stream may be authorized following an on-site inspection and compliance with Fish and Game Code section 1602.	Additional Fish and Game Code section 1602 process for motorized winching
	No dredging into the bank of any stream, lake or river	No dredging within 3 feet of the lateral edge of the current water level, including at the edge of instream gravel bars or under any overhanging banks.	Added specificity

TABLE ES-1: COMPARISON OF 1994 AND DRAFT UPDATED PROVISIONS

Topic	1994 Provisions	Draft Updated Provisions	Comments
	No removal or damage to woody riparian vegetation during dredging operations	No removal or damage to streamside vegetation during suction dredging operations	Expanded provision to include greater protection
	No diversion of a stream or river into the bank	No change to this provision	
Restrictions on Methods of Operation, cont'd	No creation of dams or structures that otherwise obstruct fish passage in a stream, river or lake	No construction of a dam or weir, or concentrating flow in a way that reduced the total wetted area of a river or stream or obstruct fish passage unless authorized following an on-site inspection and compliance with Fish and Game Code section 1602 subdivision(a).	Additional Fish and Game Code section 1602 process
	No import of any earthen material into a stream, river, or lake	No change to this provision	
	Not included	Fueling and servicing of dredging equipment must not result in leaks, spills, or release into waters of the state	Reasonable New provision
	Not included	No fuel, lubricants, or chemicals may be stored within 100 feet of the current water level. If infeasible, a containment system must be used.	New provision
	Boulders and other material may only be moved within the existing water line. No boulders or other material shall be moved outside the water line.	Stream substrate, including gravel, cobble, boulders, and other materials may only be moved within the current water line.	Stream bed Expanded provision Bad not water line
	Winching of any material embedded in banks of streams or rivers is prohibited.	Displacement of any material embedded on the banks of streams or rivers is prohibited	Expanded provision Reasonable
Fair ←	No person shall cut, move, or destabilize instream any anchored, exposed woody debris such as root wads, stumps or logs	Cutting, removal, or disturbance of any type of instream woody debris is prohibited	Vague general Expanded provision and excessive

TABLE ES-1: COMPARISON OF 1994 AND DRAFT UPDATED PROVISIONS

Topic	1994 Provisions	Draft Updated Provisions	Comments
Restrictions on Methods of Operation, cont'd	Not included	Reasonable care shall be used to avoid dredging silt and clay materials, the disturbance of which would significantly increase in turbidity.	New provision
	Not included	The tailing piles shall be leveled and returned to the pre-mining grade to the extent possible prior to finishing use of the excavation site, or leaving to work another site.	New provision
	Not included	No disturbance of mussel beds. Dredging shall not occur within 30 yards upstream of a mussel bed or within 10 yards laterally or downstream.	New provision
	Not included	No disturbance of actively spawning fish, fish redds, amphibian egg masses, or tadpoles. If these are encountered, dredging operations must cease and relocate	New provision
	Not included	Willful entrainment of finfish, mollusks, or amphibians is prohibited	New provision
	Not included	Use of wheeled or tracked equipment instream for suction dredging is prohibited	New provision
	Not included	All equipment shall be cleaned of mud, oil, grease, debris, and plant and animal material before accessing riparian areas or use in streams or lakes. See Appendix M on Invasive Species. (Zebra, Quagga, and NZ Mud-Snails).	New provision
State Wildlife Areas and Ecological Reserves	Not included	Dredging not permitted in State Wildlife Areas and Ecological Reserves	New provision

TABLE ES-1: COMPARISON OF 1994 AND DRAFT UPDATED PROVISIONS

Topic	1994 Provisions	Draft Updated Provisions	Comments
Compliance with Other Laws	Nothing in any permit issued pursuant to these regulations authorizes the permittee to trespass on any land or property, or relieves the permittee of the responsibility of complying with applicable federal, State, or local laws or ordinances	No change to this provision	Overstated
Emergency Closure	CDFG may initiate emergency regulatory action pursuant to Government Code Section 13346.1 to closer any water to suction dredging	No change to this provision not knee jerk or political if wrong / accountability	
Location of Activity	See Suction Dredge Use Classifications and Special Regulations (Cal. Code Regs., tit. 14, § 228.5)	See draft regulations (Chapter 2 and Appendix L).	Updated provisions
Timing of Activity	Not included	Active dredging to be conducted only between one half hour after sunrise to sunset. unless very singular	24-7 place New provision

More than adiquate

Have list of people in agreement with issues - questions & responses by CDFG in regards to why or why not on each (in depth) issue raised by S.E. Peterson and responce documents will be copied and sent to each and every signee, why the short time given for public input considering the years CDFG had to correct original CDFG mistake and do current study, to stop dredging was wrong

(o) Location of Suction Dredge Operations. No person shall suction dredge in locations other than those identified in the permit application pursuant to subdivision (c).

(p) Timing of Activity. Active suction dredging operations may only be conducted between one half hour after sunrise to sunset.

§ 228.5. Suction Dredge Use Classifications and Special Regulations.

(a) Suction Dredge Use Classifications. For purposes of these regulations, the following classes of suction dredge use restrictions apply in California's lakes, reservoirs, streams and rivers as specified:

(1) Class A: No dredging permitted at anytime.

(2) Class B: Open to dredging from July 1 through August 31.

(3) Class C: Open to dredging from June 1 ~~the fourth Saturday in May~~ through September 30 ~~October 15~~.

(4) Class D: Open to dredging from July 1 through January 31 ~~September 15~~.

(5) Class E: Open to dredging from September 1 ~~July 1~~ through January 31 ~~September 30~~.

(6) Class F: Open to dredging from July 1 ~~December 1~~ through September 30 ~~June 30~~.

(7) Class G: Open to dredging from September 1 ~~the fourth Saturday in May~~ through September 30.

(8) Class H: Open to dredging throughout the year.

seems arbitrary without valid reasons or justification

(b) Suction Dredge Special Regulations. The Suction Dredge Use Classifications (Section (a), above) apply for each of the rivers or streams in each of the counties listed below. Lakes and reservoirs statewide are Class H.

Total watersheds compared to total effect of dredging to same, also fish, flora and fauna appears negligible.

Subject: SEIR Proposed dredging regulations
Date: Tuesday, May 10, 2011 7:47:44 PM PT
From: Bill
To: dfgsuctiondredge@dfg.ca.gov

Mark,
This is science, what you folks have collected for this SEIR is conjecture, opinion, inuendo, falsehoods, and flat out lies! Why do you not use a dredge to collect your data? The 1994 EIR has proven to be a good document, something that addresses all concerns and implements mitigation measures that realistic and enforceable! I HAVE NEVER KILLED A FISH DREDGING FOR GOLD! NO ONE I KNOW HAS EITHER! STAY WITH THE 1994 REGULATIONS!
Respectfully,
Barbara Pettigrew
Box 771
Gualala, CA 95445 707 882-2645

Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001 dfgsuctiondredge@dfg.ca.gov
28 April 2011

RE: Comments regarding SEIR and Proposed Regulations for suction dredge mining in California in Favor of Maintaining Current 1994

Dear Sir:

Thank you for allowing us the opportunity to comment on the California Department of Fish & Game's (DFG) Suction Dredge Permitting Program Subsequent Environmental Impact Report (SEIR) and Proposed Regulations.

I, Claudia Wise, and Joseph Greene are retired U.S. EPA Scientists and invited members of the CDFG SEIR Public Advisory Committee. During the PAC meetings we presented two science based PowerPoint presentations to the committee "Selenium Antagonism to Mercury, Does Methylmercury Cause Significant Harm to Fish or Human Health?" and "Turbidity and the Effect of Scale".

Claudia Wise is a retired Physical Scientist previously employed at the U. S. Environmental Protection Agency, Corvallis Environmental Research Laboratory, Corvallis, OR. I have 29 years experience in chemical and biological instrumentation methods. I spent 8 years with the Western Fish Toxicology Station coauthoring journal articles dealing with bioaccumulation in Invertebrates and Fish exposed to chemical toxiciants. I have contributed to many projects and coauthored numerous journal articles for the Watershed Ecology, Terrestrial, Ecotoxicology and Freshwater Branches where I researched toxicity in soil and the effects of toxicants on plant growth. At the time of my retirement, I was with the Watershed Ecology Stable Isotope Research Facility. I am a recipient of the United States Environmental Protection Agency Bronze

Medal for Commendable Service.

Joseph Greene has over 30 years of national and international professional experience including consulting, research, and teaching for industry and government regulatory agencies. Activities included project management, contract administration, experimental design, preparation of research reports and technical documents, laboratory supervision, statistical analysis of data, computer simulation, development and application of biological methods, and performance of algal growth potential and aquatic and terrestrial toxicity tests.

Consulting experience included assessment of nutrient pollution in freshwater canals and rivers, assessment of heavy metals toxicity from mining activities and paint stripping, investigation of toxicity and bioaccumulation in soils at military facilities, evaluation of water soluble and soil toxicants at Superfund sites, and assessment of algal toxicity from textile dyes.

Research activities included establishment of an ecotoxicology laboratory, development of a biological-chemical-physical protocol for measuring potential toxicity of construction materials, development of internationally standardized test methods (aquatic algae, aquatic macroinvertebrate, terrestrial plant and terrestrial invertebrate), chairman of testing committees for ASTM and Standard Methods, platform chairman of several international symposiums, workshops, and congresses, and invited speaker to numerous national and international professional scientific meetings.

Teaching experience included a number of short courses and workshops on performance of algal growth potential and interpretation of results across the nation, a workshop on environmental analysis techniques in Europe, a workshop on complex problems with point and non-point sources of water contamination for the US Department of the Interior, and an environmental engineering graduate seminar on toxicity testing for environmental engineering applications.

Government agencies experience included project management, experimental design, hands-on research, data analysis, and report writing.

Since retirement both of us have participated, as a team, to defend the rights of small scale suction dredging using science to establish the "Less Than Significant effects of the practice. Joseph Greene primarily investigated biological effects and Claudia Wise investigated water quality effects. Post USEPA experience includes a Preliminary Klamath River Water Quality Survey examining surface water temperatures.

According to the DFG Suction Dredge Permitting Program SEIR NOA (SCH #2005-09-2070) regarding the Notice of Availability of a DSEIR for Suction Dredge Permitting Program (SCH#2009112005), "The Draft SEIR evaluates the potential environmental impacts of the proposed program and four alternatives:

No Program alternative….;

1994 Regulations alternative…;

Water Quality alternative (which would include additional program restrictions for water bodies listed as impaired pursuant to the Clean Water Act (CWA) section 303(d) for sediment and mercury); and,

Reduced intensity alternative (which would include greater restrictions on permit issuance and methods of operation to reduce the intensity of environmental effects).

It should be noted that the directive of the court was to identify any suction dredge issues that were detrimental to fish yet the CADFG paid the contractors to spend an inordinate amount of time evaluating situations that were never a part of the court order. If any of these additional findings were to be enforced they could keep small scale suction dredgers from plying their trade and earning income.

During the court proceedings, which ordered the development of this SEIR, the attorneys for the CDFG told the court that they had scientific information that small-scale suction dredging might be harmful to fish. It should be noted that during discovery by the agents of the miners the CDFG attorneys refused to provide the scientific evidence they claimed was in their possession. Therefore, under court order, CDFG is spending a large amount of tax dollars to find scientific data that dredging harmed fish….data the State claimed to have in its possession prior to the court ordering the SEIR study be performed. And yet, the contents of the SEIR illustrate that the effects of suction dredging on fish, in every instance, is "Less than Significant". The SEIR results also illustrate that the State never possessed any additional scientific evidence they claimed would prove small-scale suction dredging was detrimental, in any way, to fish or wildlife beyond the data already analyzed in the 1994 EIR. The public's money could certainly have been used more productively, in a cash strapped State, than having it used to try and destroy an economic sector of a State already in financial trouble. The basis for the entire SEIR process was founded upon a lie presented by the State's attorneys.

The conclusions for the effects of suction dredging on fish are as follows and are the same as those found in the 1994 EIR and support the positions that the miners have always argued:

Impact BIO-FISH-1: Direct Effects on Spawning Fish and their Habitat (Less than Significant)
Impact BIO-FISH-2: Direct Entrainment, Displacement or Burial of Eggs, Larvae and Mollusks (Less than Significant)
Impact BIO-FISH-3: Effects on Early Life Stage Development (Less than Significant)
Impact BIO-FISH-4: Direct Entrainment of Juvenile or Adult Fish in a Suction Dredge (Less than Significant)
Impact BIO-FISH-5: Behavioral Effects on Juvenile or Adults (Less than Significant)
Impact BIO-FISH-6: Effects on Movement/Migration (Less than Significant)
Impact BIO-FISH-7: Effects on the Benthic Community/Prey Base (Less than Significant)
Impact BIO-FISH-8: Creation and Alteration of Pools and other Thermal Refugia (Less

than Significant)
It is generally accepted that most of the pools made by small scale suction dredges last only until the following winter high water flows arrive. In the meantime they serve the fish as resting areas and safe locations from predation. The pools may or may not intersect cold ground water or hyporheic subsurface flows. This fact does not negate or makes the pools less beneficial to the survival of salmonids. The pools still serve as resting and protective locations between thermal refugia, that are generally located at the mouths of confluent streams that could be located some miles away.

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).

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 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. 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 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.

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 then 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.

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 from 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.

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.

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.

Ralston's research (2005) supports Peterson's (2009) 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,

Claudia J, Wise

Physical Scientist, U.S. Environmental Protection Agency [RETIRED]

and

Joseph C, Greene

Research Biologist, U.S. Environmental Protection Agency [RETIRED]

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PUBLIC INTEREST COALITION

May 10, 2011

[sent via email and fax]

Attn: Mark Stopher
CA Department of Fish and Game
601 Locust St
Redding, CA 96001

Dear Mr. Stopher:

RE: Suction Dredge Program Draft SEIR Comments

In an era of climate uncertainty, increasing population growth, and exponentially greater need for assurances of water quality and supply, any activity that will negatively impact water in any way, must not be allowed to occur. With the significant and devastating impacts that suction dredging can and will create on water quality, noise, stream alteration, cultural resources, and fisheries, the No Program Alternative (continuation of the existing moratorium) is the only responsible and sustainable course of action.

With water quality degradation a constant concern, suction dredging has no place in our sensitive and vital watersheds—both in higher and lower elevations. Please analyze each of the following significant impacts:

~Impacts to water quality and fisheries due to appalling sediment disturbance from suction dredging, especially with the permitting of up to 8" nozzles in some areas are significant. How can 4" diameter nozzles be justified? How can 8" nozzles be justified and what will be the impacts?

~Issuance of one permit may be to a "club" or "organization" with an <u>unlimited</u> number of members. Multiple suction dredging operations and activities could occur—all within the legal parameters of one permit. The DFG's proposed limit of 4,000 permits would be meaningless, unregulated, and create many suction dredging operations within a relatively small area and/or in environmentally sensitive areas. How will the impacts of unlimited suction dredges be dealt with? How can the impacts be mitigated when the Department of Fish and Game (DFG) will not be able to control (or even know how many) members in a "club" are utilizing suction dredges?

~Gas and oil from various sizes of engines can and will find their way into our creeks if suction dredging is allowed as proposed. How can DFG regulate every creek and tributary for these toxins in our creeks?

~Suction dredging advocates may fallaciously claim that mercury disturbances are either unknown or are exacerbated by natural conditions, and therefore, suction dredging will have relatively no impact on mercury risks. This argument is akin to saying, "We're going to have heavy metal pollution anyway, so our cumulative impact should not be considered a factor." Any harmful consequences with regard to mercury disturbances, potential or actual, are too serious and critical to dismiss.

How will DFG monitor all mercury disturbances, especially with existing budgetary constraints? What will be the impacts be to both humans, wildlife, and fish when exposed to methylmercury which suction dredging operations create?

We urge DFG to not allow any suction dredging in any of our watersheds, creeks or tributaries. Because childhood illness such as asthma and autism are increasing at alarming rates, with causes as yet unknown, toxins and pollution must be considered highly suspect. Because water quality may be the critical link. it behooves us to take the most cautionary steps possible, especially with water and air. Suction dredging operations cannot be allowed to occur in any of our waterways due to its destructive impacts to mammals and fish.

Please keep our organization informed of any further action.

Marilyn Jasper

Marilyn Jasper, Chair

Subject: Proposed dredging regulation
Date: Tuesday, May 10, 2011 2:41:35 PM PT
From: Roger Plata
To: dfgsuctiondredge@dfg.ca.gov, jerhobbs2@verizon.net, edwardhanson@comcast.net

Attention: Mark Stopher
Environmental Program Manager
California Department of Fish and Game
601 Locust Street
Redding, Ca. 96001

From: Roger Plata
PO Box 44167
Lemon Cove, Ca. 93244

Subject: Suction Dredge Program Draft SEIR Comments

In response to the Fish and Game's DSEIR

1. The three foot rule – This is a clear violation of the rights granted to the citizens of the United States under the 1866 and 1872 mining laws. It prevents and hinders your ability to work your claim or any other mineral lands in a cost effective manner. There are many small creeks that cannot be worked if these proposed rules go into effect. The best remedy is to stay with the 1994 regulations.

2. The Class F dredge season will limit dredging to 3 months. There are a lot of problems with many rivers and streams being reclassified to this new season. One major problem is that there will be no water available during this shorter season, which will be replacing the Class H (open to dredging throughout the year) that I have personally enjoyed on: A. Tributaries of the North Fork of the Kaweah River, on my mining claims and elsewhere in the same general area. B. Tributaries of the Kern River on my claim and elsewhere in the same general area. C. Tributaries of the San Joaquin River, on my claims and other claims there that I have access to, which lie in Fresno and Madera counties. D. My claims in Mariposa County on Halls Gulch and Good Gulch and elsewhere in the same general area.

I can see no reason for this major restriction, from a 12 month season, to a 3 month season. It couldn't be the trout – these are small tributaries that are bone dry most of the year and I don't believe that there are any yellow legged frogs at this low elevation. The class F restriction should be returned to Class H.

3. The proposed 4 inch restriction should not go into effect. The proposed DFG remedy to this is to apply for a special use permit. If the past is any indication of the future, in the past, under the 1994 regulations, the special use permit for 8 inch, or 10 inch (or larger) dredges was canceled soon after the new program went into effect. There is no proof that the same will not happen this time also, in fact, the indications lean heavily in the other direction.

In addition, your claim can be worked much more effectively with the larger dredge and with less impact to the surrounding area because of less time being spent there.

4. The proposed onsite inspection needed by the DFG to approve the winching of boulders, etc., will be costly and near impossible for DFG to accomplish. Many of my claims are remote and without any means of easy access. I hike, boat, kayak and canoe, for the most part, to get to these claims. If the DFG is not prepared, they will either not make it, or may need to be rescued. The DFG may decide to come in by helicopter, but this would not only be costly and almost impossible, but also dangerous because of cliffs, trees, winds, etc. The wait for the onsite inspection could be costly and take excessive time, by then the dredging season could be over for the year.

What, if anything, could the DFG do to remedy this, other than return to the 1994 regulations.

5. The restrictions by the DFG proposed new regulations of all rivers and streams in Fresno, Kern, Madera and Tulare counties (which affect me personally), as well as possible other counties of the state, from Class C (which allowed dredging for approximate 5 months) to Class A (no dredging), because they are above 4000 feet, is without merit and should be returned to the 1994 regulations.

As far as I can figure, it all has to do with the yellow legged frog. The jury is still out on this matter, but as I have already addressed it in my verbal comments, it's the DFG that is the primary cause of the decline, from the planting of trout. There is little if any evidence that dredging has any significant impact to the yellow legged frog's decline.

6. The DFG has relied heavily on the Horizon Water Agency's slanted "evidence". At no time have I seen any peer review that will support Horizon Water's opinions that dredging has any negative impact to fish and aquatic life, or the environment.

Roger Plata

cc:
Edward Hansen

Subject: Gold Mining Regulations
Date: Tuesday, May 10, 2011 11:31:41 AM PT
From: Catherine Poloynis
To: dfgsuctiondredge@dfg.ca.gov

Dear Sirs:

I am a descendent of an original '49er and my ancestors had the Good Hope Quartz Mine in Randsburg when they were still digging with picks and shovels. I am against increasing regulations on individuals mining for gold for two reasons.

First of all, I believe there should be more 'public' in public lands. Californians have too many restrictions on access to public areas already. 'Public' lands are less accessible to us than they should be. We are already encumbered with restrictions as to times and seasons that we can enjoy the state parks, and pay fees to enjoy them, as though they were a privately owned amusement park or campground. Government restrictions on citizens trying to enjoy public land must be curtailed.

Secondly, corporations are allowed to abuse our lands, waterways and air in spite of the negative impact on the public. Industry is allowed to drill for oil, divert streams, pollute the air by overhead spraying of fungicide and pesticide and make farmlands unsuitable for plant growth by unrestricted fertilizer buildup. Why is it the citizen who is considered the danger with his minimal individual impact? I strongly object to this disparate treatment of the public as opposed to the leeway given to corporations.

I hope that you will remember that the heritage of California was built on gold when you consider the 'little guy's' access to public land. Thank you for your attention.

Very Truly Yours,
Catherine <Wilson> Poloynis
532 Calistoga Road
Santa Rosa, CA 95409

Subject: Suction Dredge Program Draft SEIR Comments
Date: Tuesday, May 10, 2011 4:37:48 PM PT
From: Susan Prince
To: dfgsuctiondredge@dfg.ca.gov

May 4, 2011

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

Subject: Suction Dredge Program Draft SEIR Comments

Dear Mr. Stopher:

I write to urge you to revise the proposed dredging regulations to protect California's wild and scenic rivers from major damage to threatened and endangered fish and wildlife. In particular, I write to ask you to help protect the North Fork American River.

Mining is an historic industry in California, both recreational and commercial. In fact, I live in Dutch Flat, an old mining town, and I grew up in the area. In the 1950s and 1960s, I knew miners who worked the Bear River and North Fork American River with pans, and made a living. I'm not opposed either to recreational or commercial mining, as long as it's done responsibly.

Suction dredge mining disturbs the river environment and damages wildlife and fish downstream by creating silt. It also disturbs pollutants like mercury, deposited by earlier mining efforts, putting fish and those who eat the fish at risk. While it may be appropriate on some California rivers, it should not be permitted on wild and scenic rivers.

I have hiked extensively in the North Fork American River, and surrounding areas. In addition to the destruction to the rivers themselves, I've seen what some miners leave behind, the trash and equipment and human waste. As I'm sure you know, state and federal agencies don't have the staff to police and prevent these abuses of our public lands. You can prevent this.

Please protect California's wild and scenic rivers from suction dredge mining.

Thank you for considering my remarks.

Sincerely,

Susan Prince
33377 Main Street
Dutch Flat, CA 95714
530-389-8344
Mailing address:
P.O. Box 536
Alta, CA 95701

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Susan Prince
sdprince@stanfordalumni.org

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SUCTION DREDGE PERMITTING PROGRAM
Draft Subsequent Environmental Impact Report (DSEIR)
Comment Form

Name: PAT PUTMAN
Mailing Address: 3233 TIMBERLANE DR.
STOCKTON, CA. 95209
Telephone No. (optional):
Email (optional): pat6put6man@yahoo.com

Comments/Issues:

My concerns are many but I have a particular concern about 1 of my mining claims EAGLE CREEK in Tuolumne County at elevation approx. 1800'. The proposed Rules set a season that begins July 1 and end on January 31. This stream has no water flow from approx. June 21 through Dec 31 (unless it rains early). In 14 years of working I have NEVER SEEN 1 FISH, FROG, or TADPOLE. Besides the stream is rarely 6' wide so I would have a problem staying 3' from the bank. I don't see any deliterious effect from dredging, because there is not enough water to dredge during the old season. The new season will effectively shut down this stream to dredging all together.

Please use additional sheets if necessary.

SUBMIT WRITTEN COMMENTS (POSTMARKED BY 05/10/11) TO:

Mail: Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

Email: dfgsuctiondredge@dfg.ca.gov

Fax: (530) 225-2391

Questions? Please call us at (530) 225-2275 • More information: www.dfg.ca.gov/suctiondredge

051011_PutmanP

SUCTION DREDGE PERMITTING PROGRAM
Draft Subsequent Environmental Impact Report (DSEIR)
Comment Form

Name: PAT PUTMAN

Mailing Address: 3233 TIMBERLANE DR.
STOCKTON, CA. 95209

Telephone No. (optional): 209-957-8594

Email (optional):

Comments/Issues:

I SUBMITTED MY CONCERNS IN DETAIL AT THE DFG MEETING IN SACRAMENTO.

Please use additional sheets if necessary.

SUBMIT WRITTEN COMMENTS (POSTMARKED BY 05/10/11) TO:

Mail: Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

Email: dfgsuctiondredge@dfg.ca.gov

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Questions? Please call us at (530) 225-2275 • More information: www.dfg.ca.gov/suctiondredge

SUCTION DREDGE PERMITTING PROGRAM
Draft Subsequent Environmental Impact Report (DSEIR)
Comment Form

Name:	Rose Putman
Mailing Address:	3733 Timberlane Dr.
	Stockton Ca 95209
Telephone No. (optional):	
Email (optional):	Goldigrrr2@yahoo.com

Comments/Issues:

Please let us dredge: to get this country's wealth out of rivers & creeks on our expense, it helps clean waterways out of junk besides gold, it might be hard ~~work~~ work for ~~us~~ us to do it but, we can use extra money from the gold that we find.

Rose Putman

Please use additional sheets if necessary.

SUBMIT WRITTEN COMMENTS (POSTMARKED BY 05/10/11) TO:

Mail: Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

Email: dfgsuctiondredge@dfg.ca.gov

Fax: (530) 225-2391

Questions? Please call us at (530) 225-2275 • More information: www.dfg.ca.gov/suctiondredge

Subject: dredge
Date: Tuesday, May 10, 2011 4:46:51 PM PT
From: Jennifer Berry
To: dfgsuctiondredge@dfg.ca.gov

Dear Mr. Mark Stopher,

Hi, my name is Jason Reisner, and I am a resident along the east fork of the San Gabriel River. I am also an avid hiker, gold prospector and environmentalist. As a person who deeply appreciates the environment, I would not advocate something that I believe would disrupt nature. I believe if people were more informed about dredging, they would come to realize that this hobby inflicts no more environmental harm than someone who is just going on a hike. In fact, I have seen that this hobby can be beneficial to the environment by replenishing the food supply for fish and other aquatic life and creating spawning grounds where fish can safely hide their eggs from predators. Prospectors have been unfairly targeted and I believe we should be allowed to go back to the 1994 regulations.

Thank you for your time and consideration,

Jason Reisner
24210 E East Fork Rd Spc 36
Azusa, CA 91702

Subject: Dredge Proposal for Regs
Date: Tuesday, May 10, 2011 12:38:33 PM PT
From: Steven Riggs
To: dfgsuctiondredge@dfg.ca.gov

Dear Mr. Stopher:

I am writing to **oppose** the new California dredge rules because they are too severe and would have a negative impact on the family and hobby style of recreational prospecting.
Previous studies done in California by California itself do not lead anyone to believe that recreational dredging and prospecting is detrimental.

The new regulation would be too strict and extreme because it would stop families from going to their current claims already approved. I believe the drafter of the regulation may not have enough experience about recreational prospecting because the way it is written makes it problematic for waterways of 6 feet or less even though it is listed as an approved location by DFG.

If you are looking to make restrictions on hobby prospecting, then limit the size of the dredge itself to 6 inches. For waterways less than 6 feet wide, make the restriction on the maximum dredge size 4 inches.

California's history and success with gold prospecting is not something it should turn its back on at this time considering the economic consequences for doing so.

Steven Riggs, AAI
Accredited Advisor of Insurance

2000 Envoy Circle
Louisville, KY 40224.
502-736-7000
Please check out our website: **www.nelsoninsurancegroup.com**

Subject: Opposed to new suction dredge rules
Date: Tuesday, May 10, 2011 1:09:05 PM PT
From: STEVEN R & JENNY L RIGGS
To: dfgsuctiondredge@dfg.ca.gov

As a taxpayer in California due to my visits there, let me register my opposition to the new dredge rules which are too extreme in nature. It is my understanding the people writing the regulation did not properly meet with experts in gold prospecting who could help draft a regulation that took both sides into consideration. Because of this, the regulation is flawed. Please go back to the table and consider the viewpoints expressed by those who want to freedom to prospect as a hobby and recreation.

Virginia Riggs

May 10, 2011

As a Californian whose family came in 1850, as an educator, writer, and environmentalist, I highly oppose suction dredging on our State's streams. The mining can harm our threatened fish, spawning habitat, and delicate ecology. Having grown up near the American River, I have witnessed the destruction by such operations.

Sincerely,
Kenneth S Roe

Kenneth S. Roe
3325 Saint Moritz Court
Redding, CA 96002

May 10, 2011

California Department of Fish and Game
601 Locust Street
Redding, CA 96001
Sent via email: dfgsuctiondredge@dfg.ca.gov

RE: Suction Dredge Program Draft SEIR Comments

Dear California Department of Fish and Game,

Thank you for accepting these comments on behalf of Rogue Riverkeeper. Rogue Riverkeeper is a program of the Klamath-Siskiyou Wildlands Center (KS Wild) and is committed to protecting and restoring water quality and native fish populations in the Rogue Basin.

KS Wild is a non-profit organization whose mission is to advocate for the forests, waters and wildlife of the Rogue and Klamath River Basins of southwest Oregon and northwest California. We have more than 1,800 members. KS Wild and our members use and enjoy the Rogue and Klamath Rivers, their tributaries and other coastal watersheds.

These comments supplement but do not replace our comments submitted on May 9, 2011 by Craig Tucker on behalf of the Karuk Tribe, et. al.

The approximately 3.3 million-acre Rogue Basin is largely in Oregon, with small portions of the Upper Applegate and Upper East Fork Illinois tributaries in California. The Rogue River is the largest coastal basin in Oregon and the second largest producer of salmon in the state next to the Columbia. Yet, salmon returns have been in decline for decades.

Due to valuable salmon habitat, an inability to enforce California regulations in these portions of the Rogue Basin, and toxic contamination from a proposed Superfund site, we ask that CDFG change the Upper Illinois and Upper Applegate Rivers to "Class A: No dredging permitted at any time."

Upper East Fork Illinois River

Currently, the proposed program classifies all streams within Del Norte County, unless otherwise noted, as "Class F," open to dredging July 1-September 30. This includes various streams in the Upper East Fork Illinois watershed, which flow north into Oregon.

The East Fork of the Illinois River watershed is a 57,774 acre fifth field watershed (HUC #1710031101) with a portion draining from California north into Oregon. The East Fork of the Illinois River is a major tributary and contributor to the water quality and anadromous and resident fisheries of the main stem of the Illinois River.

Within the Rogue River Basin, the Illinois River and its tributaries are important spawning and rearing habitats for both anadromous and resident salmonids. The Illinois River constitutes a significant portion of the remnant native wild fish population/habitat within the Rogue River Basin. Thus, the Illinois River watershed is believed to be the stronghold for wild anadromous fish populations in the Rogue Basin. That portion of East Fork Illinois River watershed that is within California is a Tier 1 Key Watershed per the Northwest Forest Plan (NFP) designation.[1] Tier 1 Key watersheds are designated because they contribute directly to conservation of protected, endangered, threatened, and sensitive fish species.

Anadromous salmonids present within the watershed are: fall chinook (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), and winter steelhead (*O. mykiss*). These anadromous species represent important fish populations in the ESUs (Evolutionarily Significant Units) of the region. Coho salmon within East Fork Illinois River watershed are part of the Southern Oregon/Northern California Coho ESU, which was federally listed as threatened on May 6, 1997. Habitat designated by the National Marine Fisheries Service as critical to the recovery of Southern Oregon/Northern California coho encompasses accessible reaches of all rivers (including tributaries) between the Mattole River in California and Elk River in Oregon, inclusive.

Degraded habitat, extended drought conditions, and water withdrawals continue as key factors limiting production of anadromous salmonids within the East Fork Illinois River watershed. Public lands in the watershed play an important role in the survival of salmonids as they provide cool water and large woody material to fish habitat lower in the system and provide refugia during summer months when water temperatures are lethal in the valley segments.

There are more than 350 miles of perennial and intermittent streams in the East Fork Illinois watershed and more than 16,250 acres of riparian reserves (44% of the land area). Past mining included placer and lode mining for gold, platinum, copper, and chromium. Pit mines were common and their effects included removal or stockpiling of surface materials and the loss of vegetative cover. They were, and continue to be, sources for sediment delivery to the streams.

Upper Applegate River

The proposed program classifies the Applegate River and all of its tributaries as "Class C," which is open to dredging June 1-September 30.

[1] East Fork Illinois River Watershed Analysis, USFS and BLM, July 2000

The Upper Applegate was extensively mined in the 19^{th} and 20^{th} centuries and as a result, legacy toxics remain a problem today. Toxic heavy metals including arsenic and mercury are often contained in mine talus and could adversely affect fisheries and humans.[2]

In March 2011, the U.S. EPA proposed to add the abandoned Blue Ledge mine to the Superfund National Priorities List because it discharges toxic pollutants to Joe Creek, which flows into Elliot Creek, then the Applegate River before reaching the Applegate reservoir.[3] While Blue Ledge is in California, access is via Oregon and the contaminated water flows into the Applegate and Rogue Basin. 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.[4]

May 2, 2011 test results from Apex Labs to Engineering/Remediation Resource Group, Inc., which is a contractor for the U.S. Forest Service at Blue Ledge, shows water samples in Joe Creek and Elliot Creek (both Upper Applegate tributaries in California, and accessible via Oregon) with elevated levels of cadmium, copper, magnesium and zinc.[5] Suction dredging in these streams has the dangerous potential to further release toxic sediments.

There is a small community at Joe Bar and residents are rightfully concerned about contaminants in the surface water and groundwater from the abandoned Blue Ledge mine.

Furthermore, Oregon Department of Fish and Wildlife is proposing to reintroduce steelhead, and possibly Coho salmon, to the Upper Applegate above the reservoir. The DEIR does not analyze the impacts of suction dredging on this fish restoration effort.[6]

Conclusion

It is well known that there is anemic funding for enforcement of suction dredge regulations in Oregon. Oregon law enforcement has a difficult time as it is regulating suction dredge activities in Oregon. The Upper East Fork Illinois and Upper Applegate Rivers in California are not accessible for California law enforcement, rather they are accessible via Oregon. It is not possible for Oregon law enforcement to regulate miners in the portions of these streams in California and it is unrealistic to think that California law enforcement would travel the circuitous distance to enforce these regulations in the headwaters of the Rogue Basin.

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[2] Applegate River Watershed Assessment, USFS June 1995.
[3] See attachment #1: "EPA Blue Ledge Superfund"
[4] http://www.fs.fed.us/r6/rogue-siskiyou/projects/mines/index.shtml
[5] See attachment #2: "Blue Ledge Joe-Elliott surface water APEX results May 2011.pdf"
[6] See Medford Mail Tribune, "Hydro plant would restore steelhead spawning areas," May 5, 2009

The current proposed dates for dredging in the Applegate and East Fork Illinois do not match the dates for Oregon's in-water period, demonstrating the inability to effectively manage streams across a state line.

Due to the exceptional fishery values of the Upper East Fork Illinois and the dangerous toxic contamination in the Upper Applegate, coupled with the inability to enforce California regulations in this portion of the Rogue watershed, we ask that CDFG change the Upper Illinois and Upper Applegate Rivers to "Class A: No dredging permitted at any time."

I look forward to your response.

Thank you.

Lesley Adams, Program Director
Rogue Riverkeeper
P.O. Box 102
Ashland, Oregon 97520
Lesley@rogueriverkeeper.org

NATIONAL PRIORITIES LIST (NPL)

****Proposed Site****

March 2011

BLUE LEDGE MINE | **Rogue River – Siskiyou National Forest, California**
Siskiyou County

Site Location:

The site is an abandoned copper, zinc, gold and silver mine located in Siskiyou County on private land within the Rogue River - Siskiyou National Forest, approximately 3 miles south of the Oregon-California border.

Site History:

The site operated as a mine from approximately 1904 to 1930. More than 2 miles of underground excavations were developed about 800 vertical feet above Joe Creek. Acid mine drainage (AMD) discharging from adits flows directly through 60,000 tons of waste rock. The waste rock is in direct contact with Joe Creek.

Site Contamination/Contaminants:

Hazardous substances from the mine wastes at the site are transported via Joe Creek to Elliott Creek and possibly further downstream to the Applegate River and ultimately Applegate Reservoir. Copper levels in Joe Creek downstream from the site are above background and exceed the criterion continuous concentration (CCC) for copper in surface water according to EPA's National Recommended Water Quality Criteria. The CCC is national guidance and is an estimate of the highest concentration of copper in surface water to which an aquatic community can be exposed indefinitely without resulting in an unacceptable effect.

Potential Impacts on Surrounding Community/Environment:

Fish and amphibian surveys conducted in the area by the U.S. Forest Service (USFS) document that the water quality of Joe Creek is severely impacted below the site. Fish survey data confirmed there are no fish in Joe Creek. Elliott Creek, the Applegate River, and the Applegate Reservoir are considered recreational fisheries. Sensitive, threatened and endangered species have been identified in the vicinity of the site including the northern goshawk, the Siskiyou Mountains salamander, and the northern spotted owl.

Response Activities (to date):

In May 2006, EPA conducted an initial removal action. Removal efforts included stabilizing waste rock to prevent further erosion into water courses; providing soil cover to reduce the likelihood of direct human contact with contaminants from the waste rock; and creating a system of barriers and drainage systems to reduce the localized AMD and heavy metal impacts on Joe Creek. In 2010, the USFS received $9.738 million in American Reinvestment and Recovery Act (ARRA) funds plus an additional $1.325 million from the ASARCO Environmental Trust for work on the site that began during the summer of 2010. USFS work includes removal of two of the four waste rock piles at the site to a constructed repository, and reclamation through erosion control measures, topsoil replacement, and restoration of native vegetation.

Need for NPL Listing:

Despite the previous actions undertaken by both EPA and the USFS, there remain areas of contamination that still need to be addressed to ensure there are no further negative environmental or possible human health risks associated with the site. USFS work will not address contaminated sediment in the surface water down gradient from the site, discharge from mine adits, nor long-term operation and maintenance. Other federal and state cleanup programs are not viable at this time.

[The description of the site (release) is based on information available at the time the site was evaluated with the HRS. The description may change as additional information is gathered on the sources and extent of contamination.]

For more information about the hazardous substances identified in this narrative summary, including general information regarding the effects of exposure to these substances on human health, please see the Agency for Toxic Substances and Disease Registry (ATSDR) ToxFAQs. ATSDR ToxFAQs can be found on the Internet at http://www.atsdr.cdc.gov/toxfaq.html or by telephone at 1-888-42-ATSDR or 1-888-422-8737.

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

Monday, May 2, 2011

Kim Jones
Engineering/Remediation Resource Group, Inc
4585 Pacheco Blvd, Suite 200 (Corporate address)
Martinez, CA 94553

RE: Blue Ledge Mine / 2010-084

Enclosed are the results of analyses for work order A11C296, which was received by the laboratory on 3/22/2011 at 8:56:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: dthomas@apex-labs.com, or by phone at 503-718-2323.

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

Engineering/Remediation Resource Group, Inc	Project:	**Blue Ledge Mine**		
4585 Pacheco Blvd, Suite 200 (Corporate address)	Project Number:	2010-084		**Reported:**
Martinez, CA 94553	Project Manager:	Kim Jones		05/02/11 16:51

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BL-RW-BJT-03112011	A11C296-01	Water	03/11/11 12:00	03/22/11 08:56
BL-RW-JBC-03112011	A11C296-02	Water	03/11/11 12:15	03/22/11 08:56
BL-RW-ECB-03112011	A11C296-03	Water	03/11/11 12:15	03/22/11 08:56

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

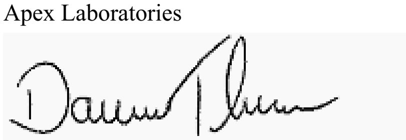
Engineering/Remediation Resource Group, Inc	Project: **Blue Ledge Mine**	
4585 Pacheco Blvd, Suite 200 (Corporate address)	Project Number: 2010-084	**Reported:**
Martinez, CA 94553	Project Manager: Kim Jones	05/02/11 16:51

ANALYTICAL SAMPLE RESULTS

Anions by EPA 300.0/9056A (Ion Chromatography)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
BL-RW-BJT-03112011 (A11C296-01)			**Matrix: Water**		**Batch: 1103392**			
Sulfate	**13.4**	---	1.00	mg/L	1	03/24/11 11:23	300.0/9056A	
BL-RW-JBC-03112011 (A11C296-02)			**Matrix: Water**		**Batch: 1103392**			
Sulfate	**8.32**	---	1.00	mg/L	1	03/24/11 12:24	300.0/9056A	
BL-RW-ECB-03112011 (A11C296-03)			**Matrix: Water**		**Batch: 1103392**			
Sulfate	**5.79**	---	1.00	mg/L	1	03/24/11 12:44	300.0/9056A	

Apex Laboratories



Darwin Thomas, Business Development Director

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

Engineering/Remediation Resource Group, Inc	Project:	**Blue Ledge Mine**	
4585 Pacheco Blvd, Suite 200 (Corporate address)	Project Number:	2010-084	**Reported:**
Martinez, CA 94553	Project Manager:	Kim Jones	05/02/11 16:51

ANALYTICAL SAMPLE RESULTS

Dissolved Metals by EPA 6020 (ICPMS)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
BL-RW-BJT-03112011 (A11C296-01)			**Matrix: Water**		**Batch: [CALC]**			
Hardness (Calc by 6020) - Dissolved	**29.4**	---	0.456	mg CaCO3/L	1	03/25/11 17:10	6020 Calc	
Arsenic	ND	---	0.00200	mg/L	"	"	EPA 6020 (Diss)	FILT
Cadmium	**0.00242**	---	0.000100	"	"	"	"	FILT
Calcium	**9.34**	---	0.100	"	"	"	"	FILT
Copper	**0.199**	---	0.00400	"	"	"	"	FILT
Lead	ND	---	0.00100	"	"	"	"	FILT
Magnesium	**1.47**	---	0.0500	"	"	"	"	FILT
Zinc	**0.385**	---	0.00400	"	"	"	"	FILT
BL-RW-JBC-03112011 (A11C296-02)			**Matrix: Water**		**Batch: [CALC]**			
Hardness (Calc by 6020) - Dissolved	**50.4**	---	1.45	mg CaCO3/L	5	03/25/11 20:33	6020 Calc	
Arsenic	ND	---	0.00200	mg/L	1	03/25/11 17:13	EPA 6020 (Diss)	FILT
Cadmium	**0.000978**	---	0.000100	"	"	"	"	FILT
Calcium	**15.1**	---	0.500	"	5	03/25/11 20:33	"	FILT
Copper	**0.0576**	---	0.00400	"	1	03/25/11 17:13	"	FILT
Lead	ND	---	0.00100	"	"	"	"	FILT
Magnesium	**3.09**	---	0.0500	"	"	"	"	FILT
Zinc	**0.141**	---	0.00400	"	"	"	"	FILT
BL-RW-ECB-03112011 (A11C296-03)			**Matrix: Water**		**Batch: [CALC]**			
Hardness (Calc by 6020) - Dissolved	**52.5**	---	1.45	mg CaCO3/L	5	03/28/11 14:40	6020 Calc	
Arsenic	ND	---	0.00200	mg/L	1	03/25/11 17:25	EPA 6020 (Diss)	FILT
Cadmium	**0.000222**	---	0.000100	"	"	"	"	FILT
Calcium	**13.6**	---	0.500	"	5	03/28/11 14:40	"	
Copper	**0.0183**	---	0.00400	"	1	03/25/11 17:25	"	FILT
Lead	ND	---	0.00100	"	"	"	"	FILT
Magnesium	**4.49**	---	0.0500	"	"	"	"	FILT
Zinc	**0.0289**	---	0.00400	"	"	"	"	FILT

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

Engineering/Remediation Resource Group, Inc	Project: **Blue Ledge Mine**	
4585 Pacheco Blvd, Suite 200 (Corporate address)	Project Number: 2010-084	**Reported:**
Martinez, CA 94553	Project Manager: Kim Jones	05/02/11 16:51

ANALYTICAL SAMPLE RESULTS

Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
BL-RW-BJT-03112011 (A11C296-01)			**Matrix: Water**		**Batch: 1103361**			
Total Suspended Solids	ND	---	5.00	mg/L	1	03/23/11 16:25	SM 2540 D	H-06
Total Dissolved Solids	**37.0**	---	10.0	"	"	03/24/11 12:35	SM 2540 C	H-06
Total Alkalinity	ND	---	20.0	mg CaCO3/L	"	03/23/11 15:27	SM 2320 B	
Bicarbonate Alkalinity	ND	---	20.0	"	"	"	"	
Carbonate Alkalinity	ND	---	20.0	"	"	"	"	
Hydroxide Alkalinity	ND	---	20.0	"	"	"	"	
BL-RW-JBC-03112011 (A11C296-02)			**Matrix: Water**		**Batch: 1103361**			
Total Suspended Solids	ND	---	5.00	mg/L	1	03/23/11 16:25	SM 2540 D	H-06
Total Dissolved Solids	**64.0**	---	10.0	"	"	03/24/11 12:35	SM 2540 C	H-06
Total Alkalinity	**49.1**	---	20.0	mg CaCO3/L	"	03/23/11 15:27	SM 2320 B	
Bicarbonate Alkalinity	**49.1**	---	20.0	"	"	"	"	
Carbonate Alkalinity	ND	---	20.0	"	"	"	"	
Hydroxide Alkalinity	ND	---	20.0	"	"	"	"	
BL-RW-ECB-03112011 (A11C296-03)			**Matrix: Water**		**Batch: 1103361**			
Total Suspended Solids	ND	---	5.00	mg/L	1	03/23/11 16:25	SM 2540 D	H-06
Total Dissolved Solids	**62.0**	---	10.0	"	"	03/24/11 12:35	SM 2540 C	H-06
Total Alkalinity	**54.2**	---	20.0	mg CaCO3/L	"	03/23/11 15:27	SM 2320 B	
Bicarbonate Alkalinity	**54.2**	---	20.0	"	"	"	"	
Carbonate Alkalinity	ND	---	20.0	"	"	"	"	
Hydroxide Alkalinity	ND	---	20.0	"	"	"	"	

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The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Darwin Thomas, Business Development Director

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

Engineering/Remediation Resource Group, Inc	Project: **Blue Ledge Mine**	
4585 Pacheco Blvd, Suite 200 (Corporate address)	Project Number: 2010-084	**Reported:**
Martinez, CA 94553	Project Manager: Kim Jones	05/02/11 16:51

QUALITY CONTROL (QC) SAMPLE RESULTS

Anions by EPA 300.0/9056A (Ion Chromatography)

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1103392 - Method Prep: Aq							**Water**					
Blank (1103392-BLK1)						Prepared: 03/24/11 08:21	Analyzed: 03/24/11 10:42					
300.0/9056A												
Sulfate	ND	---	1.00	mg/L	1	---	---	---	---	---	---	
LCS (1103392-BS1)						Prepared: 03/24/11 08:21	Analyzed: 03/24/11 11:02					
300.0/9056A												
Sulfate	3.88	---	1.00	mg/L	1	4.00	---	97	90-110%	---	---	
Duplicate (1103392-DUP1)						Prepared: 03/24/11 08:21	Analyzed: 03/24/11 11:43					
QC Source Sample: BL-RW-BJT-03112011 (A11C296-01)												
300.0/9056A												
Sulfate	**13.4**	---	1.00	mg/L	1	---	13.4	---	---	0.2	15%	
Matrix Spike (1103392-MS1)						Prepared: 03/24/11 08:21	Analyzed: 03/24/11 12:03					
QC Source Sample: BL-RW-BJT-03112011 (A11C296-01)												
300.0/9056A												
Sulfate	17.8	---	1.11	mg/L	1	4.44	13.4	98	80-120%	---	---	

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Darwin Thomas, Business Development Director

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Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

Engineering/Remediation Resource Group, Inc	Project: **Blue Ledge Mine**	
4585 Pacheco Blvd, Suite 200 (Corporate address)	Project Number: 2010-084	**Reported:**
Martinez, CA 94553	Project Manager: Kim Jones	05/02/11 16:51

QUALITY CONTROL (QC) SAMPLE RESULTS

Dissolved Metals by EPA 6020 (ICPMS)

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1103375 - EPA 3015A - Dissolved							**Water**					
Blank (1103375-BLK1)						Prepared: 03/24/11 10:15	Analyzed: 03/25/11 19:48					
EPA 6020 (Diss)												
Arsenic	ND	---	0.00200	mg/L	1	---	---	---	---	---	---	A-01
Cadmium	ND	---	0.000100	"	"	---	---	---	---	---	---	A-01
Calcium	ND	---	0.100	"	"	---	---	---	---	---	---	A-01
Copper	ND	---	0.00400	"	"	---	---	---	---	---	---	A-01
Lead	ND	---	0.00100	"	"	---	---	---	---	---	---	A-01
Magnesium	ND	---	0.0500	"	"	---	---	---	---	---	---	A-01
Zinc	ND	---	0.00400	"	"	---	---	---	---	---	---	A-01
Blank (1103375-BLK2)						Prepared: 03/24/11 10:15	Analyzed: 03/25/11 15:48					
EPA 6020 (Diss)												
Arsenic	ND	---	0.00200	mg/L	1	---	---	---	---	---	---	A-02
Cadmium	ND	---	0.000100	"	"	---	---	---	---	---	---	A-02
Calcium	ND	---	0.100	"	"	---	---	---	---	---	---	A-02
Copper	ND	---	0.00400	"	"	---	---	---	---	---	---	A-02
Lead	ND	---	0.00100	"	"	---	---	---	---	---	---	A-02
Magnesium	ND	---	0.0500	"	"	---	---	---	---	---	---	A-02
Zinc	ND	---	0.00400	"	"	---	---	---	---	---	---	A-02
Blank (1103375-BLK3)						Prepared: 03/24/11 10:15	Analyzed: 03/25/11 16:06					
EPA 6020 (Diss)												
Arsenic	ND	---	0.00200	mg/L	1	---	---	---	---	---	---	A-03
Cadmium	ND	---	0.000100	"	"	---	---	---	---	---	---	A-03
Calcium	ND	---	0.100	"	"	---	---	---	---	---	---	A-03
Copper	ND	---	0.00400	"	"	---	---	---	---	---	---	A-03
Lead	ND	---	0.00100	"	"	---	---	---	---	---	---	A-03
Magnesium	ND	---	0.0500	"	"	---	---	---	---	---	---	A-03
Zinc	ND	---	0.00400	"	"	---	---	---	---	---	---	A-03
LCS (1103375-BS1)						Prepared: 03/24/11 10:15	Analyzed: 03/25/11 16:09					
EPA 6020 (Diss)												
Arsenic	0.0551	---	0.00200	mg/L	1	0.0556	---	99	80-120%	---	---	
Cadmium	0.0562	---	0.000100	"	"	"	---	101	"	---	---	
Calcium	5.98	---	0.100	"	"	5.56	---	108	"	---	---	
Copper	0.0559	---	0.00400	"	"	0.0556	---	101	"	---	---	
Lead	0.0562	---	0.00100	"	"	"	---	101	"	---	---	

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503-718-2323 Phone
503-718-0333 Fax

Engineering/Remediation Resource Group, Inc	Project: **Blue Ledge Mine**	
4585 Pacheco Blvd, Suite 200 (Corporate address)	Project Number: 2010-084	**Reported:**
Martinez, CA 94553	Project Manager: Kim Jones	05/02/11 16:51

QUALITY CONTROL (QC) SAMPLE RESULTS

Dissolved Metals by EPA 6020 (ICPMS)

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1103375 - EPA 3015A - Dissolved							**Water**					
LCS (1103375-BS1)					Prepared: 03/24/11 10:15		Analyzed: 03/25/11 16:09					
Magnesium	5.79	---	0.0500	mg/L	"	5.56	---	104	"	---	---	
Zinc	0.0569	---	0.00400	"	"	0.0556	---	102	"	---	---	
Duplicate (1103375-DUP1)					Prepared: 03/24/11 10:15		Analyzed: 03/25/11 16:53					
QC Source Sample: Other (A11C277-02)												
EPA 6020 (Diss)												
Arsenic	ND	---	0.00200	mg/L	1	---	ND	---	---	---	20%	
Cadmium	ND	---	0.000100	"	"	---	ND	---	---	---	20%	
Calcium	**2.46**	---	0.100	"	"	---	2.43	---	---	1	20%	
Copper	ND	---	0.00400	"	"	---	0.000900	---	---	***	20%	
Lead	ND	---	0.00100	"	"	---	ND	---	---	---	20%	
Zinc	ND	---	0.00400	"	"	---	0.00230	---	---	***	20%	
Duplicate (1103375-DUP2)					Prepared: 03/24/11 10:15		Analyzed: 03/25/11 20:27					
QC Source Sample: Other (A11C277-02)												
EPA 6020 (Diss)												
Magnesium	**13.3**	---	0.250	mg/L	5	---	13.0	---	---	2	20%	Q-16
Matrix Spike (1103375-MS1)					Prepared: 03/24/11 10:15		Analyzed: 03/25/11 16:56					
QC Source Sample: Other (A11C277-02)												
EPA 6020 (Diss)												
Arsenic	0.0564	---	0.00200	mg/L	1	0.0556	ND	102	75-125%	---	---	
Cadmium	0.0567	---	0.000100	"	"	"	ND	102	"	---	---	
Calcium	8.39	---	0.100	"	"	5.56	2.43	107	"	---	---	
Copper	0.0558	---	0.00400	"	"	0.0556	0.000900	99	"	---	---	
Lead	0.0560	---	0.00100	"	"	"	ND	101	"	---	---	
Zinc	0.0572	---	0.00400	"	"	"	0.00230	99	"	---	---	
Matrix Spike (1103375-MS2)					Prepared: 03/24/11 10:15		Analyzed: 03/25/11 17:40					
QC Source Sample: Other (A11C322-04)												
EPA 6020 (Diss)												
Arsenic	0.0573	---	0.00200	mg/L	1	0.0556	0.00232	99	75-125%	---	---	
Cadmium	0.0574	---	0.000100	"	"	"	ND	103	"	---	---	
Copper	0.0547	---	0.00400	"	"	"	0.000722	97	"	---	---	
Lead	0.0547	---	0.00100	"	"	"	ND	98	"	---	---	

Engineering/Remediation Resource Group, Inc	Project: **Blue Ledge Mine**	
4585 Pacheco Blvd, Suite 200 (Corporate address)	Project Number: 2010-084	**Reported:**
Martinez, CA 94553	Project Manager: Kim Jones	05/02/11 16:51

QUALITY CONTROL (QC) SAMPLE RESULTS

Dissolved Metals by EPA 6020 (ICPMS)

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1103375 - EPA 3015A - Dissolved							**Water**					
Matrix Spike (1103375-MS2)						Prepared: 03/24/11 10:15	Analyzed: 03/25/11 17:40					
QC Source Sample: Other (A11C322-04)												
Zinc	0.0577	---	0.00400	mg/L	"	"	0.00170	101	"	---	---	
Matrix Spike (1103375-MS3)						Prepared: 03/24/11 10:15	Analyzed: 03/25/11 20:30					
QC Source Sample: Other (A11C277-02)												
EPA 6020 (Diss)												
Magnesium	18.4	---	0.250	mg/L	5	5.56	13.0	96	75-125%	---	---	Q-16
Matrix Spike (1103375-MS4)						Prepared: 03/24/11 10:15	Analyzed: 03/25/11 20:38					
QC Source Sample: Other (A11C322-04)												
EPA 6020 (Diss)												
Calcium	45.1	---	0.500	mg/L	5	5.56	40.3	88	75-125%	---	---	
Magnesium	24.5	---	0.250	"	"	"	19.2	95	"	---	---	

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Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

Engineering/Remediation Resource Group, Inc	Project: **Blue Ledge Mine**	
4585 Pacheco Blvd, Suite 200 (Corporate address)	Project Number: 2010-084	**Reported:**
Martinez, CA 94553	Project Manager: Kim Jones	05/02/11 16:51

QUALITY CONTROL (QC) SAMPLE RESULTS

Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1103361 - Total Suspended Solids							**Water**					
Blank (1103361-BLK1)						Prepared: 03/23/11 12:25	Analyzed: 03/23/11 14:25					
SM 2540 D												
Total Suspended Solids	ND	---	5.00	mg/L	1	---	---	---	---	---	---	
Duplicate (1103361-DUP1)						Prepared: 03/23/11 12:25	Analyzed: 03/23/11 16:25					
QC Source Sample: Other (A11C288-01)												
SM 2540 D												
Total Suspended Solids	ND	---	5.00	mg/L	1	---	ND	---	---	---	20%	
Reference (1103361-SRM1)						Prepared: 03/23/11 12:25	Analyzed: 03/23/11 16:25					
SM 2540 D												
Total Suspended Solids	92.5	---		mg/L	1	96.6		96	90-110%	---	---	

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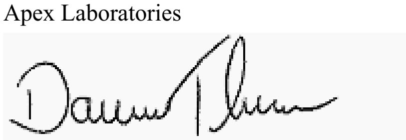

Darwin Thomas, Business Development Director

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

Engineering/Remediation Resource Group, Inc	Project: **Blue Ledge Mine**	
4585 Pacheco Blvd, Suite 200 (Corporate address)	Project Number: 2010-084	**Reported:**
Martinez, CA 94553	Project Manager: Kim Jones	05/02/11 16:51

QUALITY CONTROL (QC) SAMPLE RESULTS

Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1103362 - Total Dissolved Solids							**Water**					
Blank (1103362-BLK1)						Prepared: 03/23/11 10:20	Analyzed: 03/24/11 10:45					
SM 2540 C												
Total Dissolved Solids	ND	---	10.0	mg/L	1	---	---	---	---	---	---	
Duplicate (1103362-DUP1)						Prepared: 03/23/11 10:20	Analyzed: 03/24/11 12:35					
QC Source Sample: BL-RW-BJT-03112011 (A11C296-01)												
SM 2540 C												
Total Dissolved Solids	**68.0**	---	10.0	mg/L	1	---	37.0	---	---	59	20%	H-06, Q-01
Reference (1103362-SRM1)						Prepared: 03/23/11 10:20	Analyzed: 03/24/11 12:35					
SM 2540 C												
Total Dissolved Solids	976	---		mg/L	1	970		101	90-110%	---	---	

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Engineering/Remediation Resource Group, Inc	Project: **Blue Ledge Mine**	
4585 Pacheco Blvd, Suite 200 (Corporate address)	Project Number: 2010-084	**Reported:**
Martinez, CA 94553	Project Manager: Kim Jones	05/02/11 16:51

QUALITY CONTROL (QC) SAMPLE RESULTS

Conventional Chemistry Parameters

Batch 1103373 - Method Prep: Aq — **Water**

Blank (1103373-BLK1) Prepared: 03/23/11 13:36 Analyzed: 03/23/11 15:27

SM 2320 B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Alkalinity	ND	---	20.0	mg CaCO3/L	1	---	---	---	---	---	---	
Bicarbonate Alkalinity	ND	---	20.0	"	"	---	---	---	---	---	---	
Carbonate Alkalinity	ND	---	20.0	"	"	---	---	---	---	---	---	
Hydroxide Alkalinity	ND	---	20.0	"	"	---	---	---	---	---	---	

LCS (1103373-BS1) Prepared: 03/23/11 13:36 Analyzed: 03/23/11 15:27

SM 2320 B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Alkalinity	188	---	20.0	mg CaCO3/L	1	189	---	99	85-115%	---	---	
Bicarbonate Alkalinity	ND	---	20.0	"	"	0.000100	---		0-200%	---	---	
Carbonate Alkalinity	180	---	20.0	"	"	189	---	95	"	---	---	
Hydroxide Alkalinity	ND	---	20.0	"	"	0.000100	---		"	---	---	

Duplicate (1103373-DUP1) Prepared: 03/23/11 13:36 Analyzed: 03/23/11 15:27

QC Source Sample: BL-RW-BJT-03112011 (A11C296-01)

SM 2320 B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Alkalinity	ND	---	20.0	mg CaCO3/L	1	---	ND	---	---	---	20%	
Bicarbonate Alkalinity	ND	---	20.0	"	"	---	ND	---	---	---	20%	
Carbonate Alkalinity	ND	---	20.0	"	"	---	ND	---	---	---	20%	
Hydroxide Alkalinity	ND	---	20.0	"	"	---	ND	---	---	---	20%	

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4585 Pacheco Blvd, Suite 200 (Corporate address)	Project Number:	2010-084	Reported:
Martinez, CA 94553	Project Manager:	Kim Jones	05/02/11 16:51

SAMPLE PREPARATION INFORMATION

Anions by EPA 300.0/9056A (Ion Chromatography)

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1103392							
A11C296-01	Water	300.0/9056A	03/11/11 12:00	03/24/11 08:21	10mL/10mL	10mL/10mL	1.00
A11C296-02	Water	300.0/9056A	03/11/11 12:15	03/24/11 08:21	10mL/10mL	10mL/10mL	1.00
A11C296-03	Water	300.0/9056A	03/11/11 12:15	03/24/11 08:21	10mL/10mL	10mL/10mL	1.00

Dissolved Metals by EPA 6020 (ICPMS)

Prep: EPA 3015A - Dissolved

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1103375							
A11C296-01	Water	EPA 6020 (Diss)	03/11/11 12:00	03/24/11 10:15	45mL/50mL	45mL/50mL	1.00
A11C296-02	Water	EPA 6020 (Diss)	03/11/11 12:15	03/24/11 10:15	45mL/50mL	45mL/50mL	1.00
A11C296-03	Water	EPA 6020 (Diss)	03/11/11 12:15	03/24/11 10:15	45mL/50mL	45mL/50mL	1.00

Conventional Chemistry Parameters

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1103373							
A11C296-01	Water	SM 2320 B	03/11/11 12:00	03/23/11 13:36	50mL/50mL	50mL/50mL	NA
A11C296-02	Water	SM 2320 B	03/11/11 12:15	03/23/11 13:36	50mL/50mL	50mL/50mL	NA
A11C296-03	Water	SM 2320 B	03/11/11 12:15	03/23/11 13:36	50mL/50mL	50mL/50mL	NA

Prep: Total Dissolved Solids

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1103362							
A11C296-01	Water	SM 2540 C	03/11/11 12:00	03/23/11 10:20	1N/A/1N/A	1N/A/1mL	NA
A11C296-02	Water	SM 2540 C	03/11/11 12:15	03/23/11 10:20	1N/A/1N/A	1N/A/1mL	NA
A11C296-03	Water	SM 2540 C	03/11/11 12:15	03/23/11 10:20	1N/A/1N/A	1N/A/1mL	NA

Prep: Total Suspended Solids

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1103361							
A11C296-01	Water	SM 2540 D	03/11/11 12:00	03/23/11 12:25	1N/A/1N/A	1N/A/1mL	NA
A11C296-02	Water	SM 2540 D	03/11/11 12:15	03/23/11 12:25	1N/A/1N/A	1N/A/1mL	NA
A11C296-03	Water	SM 2540 D	03/11/11 12:15	03/23/11 12:25	1N/A/1N/A	1N/A/1mL	NA

Lab Filtration

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503-718-0333 Fax

Engineering/Remediation Resource Group, Inc	Project: **Blue Ledge Mine**	
4585 Pacheco Blvd, Suite 200 (Corporate address)	Project Number: 2010-084	**Reported:**
Martinez, CA 94553	Project Manager: Kim Jones	05/02/11 16:51

SAMPLE PREPARATION INFORMATION

Lab Filtration

Prep: Lab Filtration

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1103348							
A11C296-01	Water	NA	03/11/11 12:00	03/22/11 16:35	150mL/150mL		NA
A11C296-02	Water	NA	03/11/11 12:15	03/22/11 16:40	150mL/150mL		NA
A11C296-03	Water	NA	03/11/11 12:15	03/22/11 16:44	150mL/150mL		NA

Notes and Definitions

Qualifiers:

A-01	Non-filtered method blank
A-02	Filtration blank from lab filter batch 1103348
A-03	Filtration blank from lab filter batch 1103380
FILT	Sample was lab filtered and acid preserved prior to analysis. See sample preparation section of report for date and time of filtration.
H-06	This sample was received, or the analysis requested, outside the EPA recommended holding time.
Q-01	Percent recovery and/or RPD is outside acceptance limits.
Q-16	Reanalysis of an original Batch QC sample.

Notes and Conventions:

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry'designation are not dry weight corrected.
RPD	Relative Percent Difference
MDL	If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
WMSC	Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
Batch QC	In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
Blank Policy	Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses. For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor. Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
---	QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
***	Used to indicate a possible discrepency with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

12232 S.W. Garden Place
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Engineering/Remediation Resource Group, Inc	Project:	**Blue Ledge Mine**	
4585 Pacheco Blvd, Suite 200 (Corporate address)	Project Number:	2010-084	**Reported:**
Martinez, CA 94553	Project Manager:	Kim Jones	05/02/11 16:51

APEX LABS — **CHAIN OF CUSTODY**

Updated CoC A1C0286 — Lab # ______ COC 1 of 1

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: ERRG — Project Mgr: Matthew Dwyer — Project Name: Blue Ledge Mine Project — Project #: 2010-084

Address: 4585 Pacheco Blvd, Suite 200 — Phone: (925) 969-0750 — Fax: (925) 969-0751 — Email: matthew.dwyer@errg.com

Sampled by: Jason Knight

Site Location: OR WA Other: CA

ANALYSIS REQUEST

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs	8270 SIM PAHs	8082 PCBs	8081 Chlor. Pest	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn Dissolved Metals	TCLP Metals (8)	1300-COLS	1300-Z	SM 2340B Hardness	SM 2320B Alkalinity	SM 2540C TDS	SM 2540D TSS	EPA 300.0 Sulfate
BL-RW-BJT-03112011				W	1													X				X	X	X	X	X
BL-RW-JCB-03112011				W	1													X				X	X	X	X	X
BL-RW-ECB-03112011				W	1													X				X	X	X	X	X

Normal Turn Around Time (TAT) = 7-10 Business Days YES NO

TAT Requested (circle): 24 HR 48 HR 72 HR 4 DAY (5 DAY) Other: ______

SAMPLES ARE HELD FOR 30 DAYS

SPECIAL INSTRUCTIONS:
Dissolved Metals [As, Cd, Cu, Pb, Zn] using EPA 6010/6020 Cd-LL
Please send sample receipt confirmation + electronic deliverables to matthew.dwyer@errg.com + kim.jones@errg.com

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature] Date: 3/21/11	Signature: [signature] Date: 3-22-11	Signature: Date:	Signature: Date:
Printed Name: Kim Jones Time: 1400	Printed Name: Josh Time: 0850	Printed Name: Time:	Printed Name: Time:
Company: ERRG Shipped via FedEx	Company: Apex	Company:	Company:

Apex Labs

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Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

Engineering/Remediation Resource Group, Inc	Project: **Blue Ledge Mine**	
4585 Pacheco Blvd, Suite 200 (Corporate address)	Project Number: 2010-084	**Reported:**
Martinez, CA 94553	Project Manager: Kim Jones	05/02/11 16:51

APEX LABS — 12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

CHAIN OF CUSTODY

Updated COC
Lab # A1C0296 COC 1 of 1

Company: ERRG
Project Mgr: Matthew Dwyer
Project Name: Blue Ledge Mine Project
Project #: 2010-084
Address: 4585 Pacheco Blvd, Suite 200
Phone: (925) 969-0750 Fax: (925) 969-0751 Email: matthew.dwyer@errg.com
Sampled by: Jason Knight
Site Location: OR WA Other: CA

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	Dissolved Metals	SM 2340B Hardness	SM 2320B Alkalinity	SM 2540C TDS	SM 2540D TSS	EPA 300.0 Sulfate
BL-RW-BJT-03112011				W	1	X	X	X	X	X	X
BL-RW-JCB-03112011				W	1	X	X	X	X	X	X
BL-RW-ECB-03112011				W	1	X	X	X	X	X	X

SPECIAL INSTRUCTIONS: Dissolved Metals [As, Cd, Cu, Pb, Zn] using EPA 6010/6020 Cd-LL
Please send sample receipt confirmation + electronic deliverables to matthew.dwyer@errg.com + kim.jones@errg.com

TAT Requested (circle): 24 HR 48 HR 72 HR 4 DAY (5 DAY) Other:
SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: Printed Name: Kim Jones Company: ERRG Date: 3/11/11 Time: 1400 Shipped via FedEx
RECEIVED BY: Printed Name: Jason Date: 3/22/11 Time: 0830 Company: Apex

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Darwin Thomas, Business Development Director