Protecting Oregon's Fisheries and Streams Systems from Motorized Suction Dredge Mining Activities

Testimony in Support of Senate Bill 838

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Thank you very much for the opportunity to speak today. My name is Jack Williams and I am the Senior Scientist for Trout Unlimited, a national organization dedicated to the conservation of coldwater fishes, such as salmon and trout, and their habitats. I am here today representing both our national organization and our Oregon Council, including our local chapters and approximately 3,000 members in Oregon.

I believe that my background and experience provides me with some unique perspectives into why a temporary moratorium on the use of motorized mining equipment is critically needed at this time to protect Oregon's salmon and stream resources. My background includes a Ph.D. in Fisheries Science from Oregon State University. I have held numerous positions with federal natural resources agencies including National Fisheries Program Manager with the Bureau of Land Management, and Science Advisor to the Director of the BLM. I have authored or coauthored more than 150 scientific publications, including four books, on fisheries management and stream restoration. I also have served in management positions, including as Forest Supervisor for the Rogue River and Siskiyou National Forests, where I observed first-hand the impacts of legal and illegal suction dredge mining activities in southwestern Oregon.

Speaking both for myself and for Trout Unlimited, I strongly support SB 838. I believe the scientific evidence is abundant and clear that suction dredge mining is a direct threat to salmon and other fishes, and causes significant harm to water quality and stream channels. Some have claimed that motorized mining activity is

neutral or somehow even beneficial to fisheries. Based on my observations and on what the scientific literature demonstrates, this simply is not the case. Let me briefly describe what I believe to be the most significant threats from motorized mining activities. I include notes at the end of my written testimony that includes references to peer-reviewed scientific articles and I will gladly provide copies of these articles to members of this committee.

Significant Threats from Suction Dredge Operations

1. Suction dredge mining operations result in a loss of important in-stream structure, including boulders and large woody material.

In-stream structure provided by boulders, root wads, logs, and other woody material is vital to fish and stream systems for many reasons. These structures provide shade and cover for fish and facilitate the formation of pools as fast currents encounter these structures and the hydrologic forces dig into substrates. Woody material also is an important energy source for aquatic insects. Deep pools and large woody material are commonly considered to be critical components for healthy habitat of salmonid fishes such as trout and salmon.[1]

Dredge operators often remove boulders and large woody material to improve access to the center of the stream channel in order to operate their dredges. Even if boulders and large wood are not directly removed, their stability can be weakened by removal of surrounding sediments.[2] Removal of even small amounts of large woody material can have a significant impact on fisheries habitat because many streams already have a deficit of large wood as compared to their historical condition.

2. Mining activities can degrade necessary streamside riparian habitats.

Sufficient trees and shrubs are needed in streamside riparian areas to provide shade to stream systems, filter out sediments from upslope land uses, provide large woody material into stream systems, provide leaf litter and other nutrients directly into streams, and to protect banks from accelerated rates of erosion. I have seen numerous mining operators damage or remove riparian vegetation in order to access their claims. While the amount of vegetation removed by a single

miner can be small, the cumulative impact resulting from a series of claims along a salmon stream can be substantial.

In addition to vegetation loss, the streambanks themselves can be damaged by operators that work too closely to the edge of the stream. According to one California study, 4% of dredging operators were observed to damage and destabilize streambanks during mining operations.[3] In this case, the relative percentage of operators causing damage was small, but damage to individual spawning areas can be high.

3. Suction dredge activities increase sedimentation rates, which causes adverse impacts to fisheries.

Numerous studies have documented the detrimental impacts of increased sedimentation associated with suction dredge mining. A 2009 literature review of the impacts of suction dredge mining prepared for the California Department of Fish and Game described six separate studies that found substantial increases in sedimentation downstream of suction dredge operations.[4] Although the increase in sediments varies greatly depending on the type of substrates being dredged and stream discharge conditions, some studies documented as much as a 10 to 20 fold increase in fine sediments over background conditions. These increased sedimentation rates can negatively impacts salmon habitats by filling downstream pools, by decreasing habitat quality for aquatic insects, and by increasing embeddedness of spawning gravels. Embeddedness describes the degree that spawning gravels are covered by finer silt and clay particles. If there is too much fine material, eggs are smothered as dissolved oxygen is prevented from reaching into spawning redds.

4. Mining activities result in increased scouring of salmon redds on suction dredge tailings.

Unstable gravels deposited behind dredges may attract spawning salmon. As salmon dig redds and lay their eggs, it is important that substrates containing the eggs remain stable. Under natural conditions, stability occurs because a small amount of finer silt, sand and clay is distributed amongst the larger gravels and cobbles. Suction dredge machines cause an unnatural resorting of substrates

because the machine mobilizes all the sediments which then drop out of the water column depending on their size. Spawning-size gravel attracts spawning salmon but these dredging created gravels lack adequate fine material to maintain their integrity during higher flows during winter and spring. Increased scouring of fall Chinook salmon redds has been documented on dredge tailings found in Klamath River tributaries and has been observed in streams in southwest Oregon.[5]

5. Suction dredge mining can lead to losses of macroinvertebrates

Research comparing aquatic insect communities in streams affected by suction dredge mining to comparable areas not exposed to mining has demonstrated short-term losses in the aquatic insect communities in those streams where mining activities occur.[6] What has not been studied but is still of concern, are the longer-term consequences of the loss of large woody material and other in-stream structure that provide energy to aquatic insects but often are removed by instream mining activities.

6. Suction dredge mining causes direct mortality to fish eggs and juvenile fish.

In a 1998 review of the effects of suction dredging on stream and fishes, U.S. Forest Service scientists found that many eggs and fish larvae suffered high mortality when entrained by suction dredges.[7] They found that mortality ranged from 29-62% among cutthroat trout eggs, and up to 80% mortality of sac fry of rainbow trout. They believed that larvae of other fishes such as sculpins, suckers, and minnows also likely would be killed. Adults of all species were largely unaffected.

<u>Conclusions</u>

In conclusion, it is clear that the scientific literature strongly supports the contention that motorized mining significantly impacts stream channels, water quality, and fisheries. It also has been my experience and observation that suction dredge mining activities have been poorly regulated in Oregon. Habitats for the federally-listed Southern Oregon/Northern California Coho salmon are impacted by suction dredge operations in southwestern Oregon. To the best of my knowledge, impacts to populations and habitats of this threatened species are poorly monitored. Because of these impacts to fisheries and stream systems, the

lack of an adequate regulatory framework to prevent the impacts, and negative effects to a threatened species, I believe that a moratorium is warranted.

Having said that, it is important to note that not all mining operations or mining operators are equal in terms of their impacts on the aquatic environment. Some are better than others. Furthermore, regulations can play an important role in mitigating the adverse effects of mining impacts by controlling the timing or siting of operations. However, it has been my experience that regulatory and land management agencies have not done an adequate job of protecting our natural resources. In part this is because of inadequate regulations, but it also is because of inadequate capabilities within the agencies to manage widespread mining activities.

The largest and most thorough review of impacts of suction-dredge mining was prepared in 2009 for the California Department of Fish and Game.[8] More than 600 publications were analyzed. The review describes impacts ranging from water quality degradation to streambed alteration to direct fish mortality. Since then, California has suspended suction dredge activity, a move that was supported by the nation's largest organization of professional fisheries biologists.[9]

A moratorium is needed to halt the harm while we work to improve regulation of motorized mining activity. A moratorium would provide time to develop a list of streams where suction dredge mining would be prohibited, to strengthen existing regulations on streams where suction dredge mining would be allowed, and to increase monitoring and enforcement capabilities.

Thank you for this opportunity to speak today about the salmon and stream resources that so many of us in this state hold dear.

Endnotes

[1] The U.S. Forest Service and Bureau of Land Management commonly include pool frequency and volume of large woody debris among their management objectives for streams containing anadromous fishes in the Pacific Northwest. The report by Williams and Williams 1997 (An ecosystem-based approach to management of

salmon and steelhead habitat. Pages 541-556 in, D.J. Stouder et al., editors. Pacific salmon and their ecosystems: status and future options. Chapman and Hall, New York) describes the PACFISH strategy and Northwest Forest Plan, that includes these elements.

[2] Harvey and Lisle 1998 (Effects of suction dredging on streams: a review and an evaluation strategy. Fisheries 23(8):8-17) review the impacts of suction dredge activities on fisheries. On page 12, they describe the problems of dredge operators removing coarse woody debris in a section titled "Movement of large roughness elements."

[3] Hassler et al. 1986 (Impacts of suction dredge mining on anadromous fish, invertebrates and habitat in Canyon Cree, California. Report by Cooperative Fishery Research Unit, U.S. Fish and Wildlife Service, Humboldt State University, Cooperative Agreement No. 14-16-0009-1547) found that 4% of 68 surveyed dredging operations working in Canyon Creek, California, damaged streambanks. Dredging practices that result in erosion along streambanks were not permitted under regulations but this study shows that these prohibited practices occur nonetheless.

[4] Horizon Water and Environment. 2009. California Department of Fish and Game Suction Dredge Permitting Program: literature review on the impacts of suction dredge mining in California. Report prepared for the Department of Fish and Game, Redding.

[5] See Harvey and Lisle 1999 (Scour of Chinook salmon redds on suction dredge tailings. North American Journal of Fisheries Management 19:613-617) for data on reproductive failure in fall Chinook spawning in the Klamath River drainage because of instability of redds constructed on tailings during high winter flows. Small amounts of fine materials in sediment (about 5%) are critical, but if there is too little fine material, the gravels do not hold together as flows increase during winter and spring. On the other hand, if there is too much fine material (>10% clays and silt) there is not enough open space between the gravels for water and dissolved oxygen to flow.

[6] Harvey 1986 (Effects of suction gold dredging on fish and invertebrates in two California streams. North American Journal of Fisheries Management 6:401-409) reported that "significant differences between station at both North Fork American River and Butte Creek were directly related to substrate changes as a result of dredging" (quoted from page 403).

[7] Harvey and Lisle 1998 (Effects of suction dredging on streams: a review and an evaluation strategy. Fisheries 23(8):8-17) review the impacts of suction dredge activities on fisheries.

[8] Horizon Water and Environment. 2009. California Department of Fish and Game Suction Dredge Permitting Program: literature review on the impacts of suction dredge mining in California. Report prepared for the Department of Fish and Game, Redding.

[9] Letter sent from the Western Division of the American Fisheries Society to Senator Fran Pavley, Chair, Senate Natural Resources and Water, Sacramento, California (received March 31, 2011) in support of SB 670, which would suspend instream suction dredge mining in California pending a review of impacts and new regulations based on those impacts.

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