

# Recreational Placer Mining In The Oregon Scenic Waterways System

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**Institute for Natural Resources**

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**O R E G O N S T A T E**  
U n i v e r s i t y

**RECREATIONAL PLACER MINING  
IN THE OREGON SCENIC WATERWAYS SYSTEM**

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**AN ASSESSMENT FOR  
THE OREGON PARKS AND RECREATION DEPARTMENT**

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**OREGON STATE**  
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## EXECUTIVE SUMMARY

Throughout the state of Oregon over the past several decades, people have visited certain rivers and streams to engage in recreational placer mining – a practice which generally entails looking for gold deposits. Some of these people use a motorized suction dredge to search for gold, and there are currently several hundred people who have obtained permits from the state to use a suction dredge. This practice, however, has been and continues to be controversial, especially in designated Oregon Scenic Waterways. These waterways, comprising approximately 1000 river miles, are specially designated in order to maintain free flowing waters in their natural state, protect water quality and quantity at a level that is necessary for recreation, fish and wildlife uses, and to preserve scenic and esthetic qualities from the river perspective. Approximately 125 people currently hold permits to utilize a motorized suction dredge in Oregon Scenic Waterways, and the state has agreed to decide whether or not the practice should continue to be allowed in Scenic Waterways.

The statute authorizing the Oregon Scenic Waterways System in 1970 prohibited placer mining, and made no distinction between large-scale commercial operations and small recreational activities. However, recreational placer mining was an existing use that was tacitly tolerated. In 1982, the Oregon Attorney General's office ruled that the statute was intended to curb large commercial activities and therefore recreational mining could continue. In 1994 the Attorney General's office revisited the issue and came to the opposite conclusion.

Recreational placer mining in Scenic Waterways was halted for only a short time. The State Legislature amended the Oregon code in 1995 to allow the practice to continue, but only for two years, after which it would be "sunsetting" and no longer allowed. The December 31, 1997 sunset date was subsequently extended by two-year increments for a total of eight years. The current sunset date for recreational placer mining in Oregon Scenic Waterways is December 31, 2003 unless the Oregon State Legislature decides otherwise before that time.

### *Purpose of Report and Principal Questions*

The Oregon State Legislature has requested that the Oregon Parks and Recreation Department (OPRD) provide information to assist the Legislature in deciding whether to permanently allow or ban recreational placer mining in Oregon Scenic Waterways when the issue is addressed in 2003. To meet that request, this report provides information to answer the following questions, as requested by OPRD:

- What are the biological, recreational, and social effects of recreational placer mining?

- What are the views of stakeholders, state and federal agencies, and scientific researchers with respect to these effects?
- What are the impacts of banning or allowing recreational placer mining in Oregon Scenic Waterways?

By providing this information on the effects and views of recreational placer mining, this report will assist the Legislature in answering the following questions:

- Is recreational placer mining an appropriate activity in Scenic Waterways?
- Is the activity consistent with the goals and objectives of the Scenic Waterways Program?
- Does recreational placer mining have unacceptable environmental impacts?

These questions encompass both social and ecological concerns. To address them, this report makes use of information obtained from researchers and scientific literature, miners and mining groups, sportfishing and boating clubs, environmental organizations, retail businesses, and representatives of state, local and federal agencies to assess the impacts and appropriateness of recreational placer mining in Oregon Scenic Waterways. The scientific literature provided information on potential environmental impacts, while individuals and stakeholder groups expressed a wide range of viewpoints on recreational suction dredge mining.

#### *Arguments IN FAVOR of Suction Dredging in Oregon Scenic Waterways*

Those in favor of continuing to allow recreational suction dredge mining in Oregon Scenic Waterways generally make their case by arguing that:

- The waterways were designated partly for recreation, and miners are another type of recreationist.
- Miners enjoy the activity; they don't do it to make a living.
- Waterways were meant to support multiple uses, and recreational miners have as much a right to the waterways as other river users.
- Recreational placer mining on Scenic Waterways occurs at limited times in limited areas by very few people. Oregon Scenic Waterways comprise only 1% of all river miles in the state, and only a few of these rivers contain gold bearing sites (there are a few dozen sites that are subject to most of the suction dredging). Because it occurs on such a small level, and at so few sites, the activity does not harm resources or interfere with other river recreation.
- Scientists have not proven that recreational suction dredging significantly impacts fish.

- Recreational suction dredging is well regulated and most miners follow the regulations, so it has minimal impact on the environment.
- Winter high flows erase all evidence of suction dredging.
- Suction dredging can improve waterways by removing lead and mercury, and by loosening compacted gravel, making such areas more suitable for fish spawning.

In addition, miners feel discriminated against for their choice of recreational activity. They believe the public misunderstands what recreational suction dredging actually entails, and argue that despite considerable research, fish biologists have not proven a linkage between their dredging activities and impacts on fish. They believe mining in general has been stigmatized and that people unfamiliar with the activity simply equate recreational placer mining with commercial-scale operations.

#### *Arguments AGAINST Suction Dredging in Oregon Scenic Waterways*

Those against continuing to allow recreational suction dredging in Oregon Scenic Waterways generally make their case by arguing that:

- The waterways were designated specifically for their high quality fish, wildlife and esthetic values, and appropriate kinds of recreation. Dredging is inappropriate recreation because it degrades these ecological and social values – the reasons waterways were protected.
- Calling suction dredging “recreational” doesn’t make it appropriate – motorized extractive activities are routinely prohibited in areas to protect natural qualities.
- Suction dredging has a high risk of harming waterway ecosystems and especially fish. These risks are not completely proven, but are obvious and well established.
- Suction dredge motors are noisy and impact other visitors, and risk polluting rivers and adjacent areas with fuel spills.
- Miners sometimes threaten and frequently displace other visitors, and their camps are sometimes messy and unsanitary.
- Monitoring of compliance with regulations is inadequate and little is known about cumulative effects, so regulators cannot support their claim that there are no significant impacts.
- It makes no sense to spend significant time, money and effort restoring fish runs and then allow an activity as potentially damaging as suction dredging.

Opponents of recreational placer mining say that it is inconsistent with social values embodied in the goals and objectives of protecting the state’s most precious

waterways. Suction dredge mining disrupts the natural life cycle of fish species, damages riparian areas, degrades ecological complexity, and impacts other visitors. These impacts are both short and long-term, and occur even if miners follow all regulations scrupulously. In addition it is well established that plenty of regulatory violations occur.

### *State and Federal Treatment of Suction Dredging*

Several government agencies – both state and federal – regulate recreational mining and manage the lands where Scenic Waterways are located. Since the practice is currently permitted by law, it is considered to be a legitimate activity and treated as such. State agencies require special permits to operate a dredge. Limitations intended to minimize or mitigate impacts to natural resources are placed on recreational miners by state and federal agencies. These agencies generally concur that environmental impacts can be kept to an acceptable level if all regulations to protect fish and fish eggs, riparian and riverbed habitat, and water quality are carefully followed by all who use a suction dredge.

### *Scientific Literature on Suction Dredging Impacts*

Research specifically addressing the effects of suction dredging is limited, and no study has addressed long-term and cumulative impacts. Work completed to date indicates that significant environmental damage can occur, affecting fish life cycles, fish habitat, riparian areas, and water quality, taking years to be remedied. However these impacts can usually be significantly reduced so that they are localized and temporary if miners follow certain “best management practices.” The recommended practices have already been adopted by the state of Oregon and federal agencies in their regulations. However, questions were frequently raised about whether current monitoring is sufficient to be sure these practices are consistently followed.

### *Analysis of the Issues*

Our analysis of stakeholder views, the regulatory structure, and scientific literature suggests that recreational placer mining has potential to be both compatible and incompatible with the goals and objectives of the Scenic Waterways System, depending upon context, miner behaviors, and physical conditions of an area.

With respect to the social and recreational impacts, conflict – defined as both interference with one’s goals and outdoor experiences or a social values conflict over the appropriateness of certain activities – can be quite common, especially as river use increases. Most visitors to Scenic Waterways are non-motorized boaters, day visitors and campers, many of whom reported that miners interfere with their goals to enjoy natural ecological and esthetic conditions. These relatively common but non-violent conflicts also result from differing social values about appropriate recreational activities, but rarely result in complaints to managers. Although recreational mining has apparently been static or declining in recent years, non-motorized boating is increasing rapidly,

suggesting that conflict of this nature may rise in frequency. It is important that land managers balance freedom of action for river users while mitigating factors that lead to conflict and crowding.

With respect to environmental impacts on fish, wildlife, habitat, and water quality, it is essential that recreational miners carefully follow all applicable regulations and act as good stewards of the land and water when they are in Oregon waterways. The result of not adopting all “best management practices,” even by only a handful of recreational miners, can cause serious long-term damage to the ecological health of a particular stretch of river. Criticisms were consistently voiced that while fairly comprehensive regulations are in place, these are not likely to be effective without continual educational efforts and enforcement through consistent on-the-ground monitoring. If it is uncertain whether state and federal agencies and the miners themselves can effectively ensure that regulations are adhered to, then the case for a ban is strengthened.

### *Management Options*

Unless the Legislature chooses to grant another two-year extension for recreational placer mining in Scenic Waterways, it has the option of either banning or allowing the practice. It may also continue to allow the practice while modifying its management. Under any of these options, it is unlikely that the state can reach a decision that is equally acceptable to all interests.

Recreational miners and others sympathetic to their interests and goals would naturally oppose a ban. It would mostly impact the relatively small group of miners, as they would be forced to seek other sites not affected by a ban in order to pursue their recreational activities. On the other hand, it is reasonable to assume that risks to fish and ecological conditions in the waterways would be reduced, as would impacts on non-motorized recreationists.

Continuing to permit the activity will also have impacts. It would be opposed by a much larger number of individuals and organizations whose preference is for natural resource protection and non-motorized outdoor recreation. Ongoing strains to river ecosystems would continue, though these strains would vary depending on stream conditions and the behavior of individual recreational miners. It would also continue to impact experience quality for recreationists who encounter suction dredge mining in Oregon Scenic Waterways.

Recreational mining may be more problematic in some waterways than others, so possibilities exist for refining a situation-specific approach to permitting already embodied by in-water work period regulations. Use of a decision tree that considers relevant parameters such as stream size, value as fish habitat, mining use levels, cumulative impacts, and demand from other recreationists might help river managers to decide where recreational mining is likely to entail relatively higher or lower risks of

ecological and social impacts. Such an approach could serve to reduce these risks short of an outright ban on recreational mining.

Expanding the parameters of situation and watershed-specific management of recreational placer mining, and more rigorous enforcement of regulations would require additional agency resources and thus might not be economically viable given the small number of currently active miners. In addition, regulations more specific to conditions in each waterway would probably not be well received by miners, who have often called for a simpler, more consistent permitting and regulatory structure.

## INTRODUCTION

Throughout the state of Oregon a number of people search for gold deposits in rivers and streams, a practice referred to as placer mining. Many of these people engage in small-scale types of mining for recreational purposes, defined as such because they mine primarily for personal enjoyment and make little or no money off of their findings. Some miners use only gold pans, some use a sluice box, while others make use of a motorized suction dredge to pull larger quantities of gravel from the riverbed. The latter practice has been and continues to be a source of controversy. Consequently, the state has agreed to decide whether or not recreational suction dredge mining should continue to be allowed in Oregon waterways that are part of the Scenic Waterways System.

This overall goal of this report was to assist the state in making a final determination by summarizing three sources of information:

- The state of scientific knowledge regarding impacts associated with recreational suction dredge mining
- The views of stakeholders regarding the appropriateness of recreational suction dredge mining in Oregon Scenic Waterways
- The responsibilities and views of regulatory and land management agencies with respect to possible impacts and conflicts associated with recreational suction dredge mining

To meet this goal, existing literature pertaining to recreational suction dredging was reviewed and summarized, and scientific experts were interviewed. Information was acquired through contacts with stakeholder groups that represent miners, sportfishers and boaters who utilize scenic waterways for recreation, state and federal agency personnel and non-governmental organizations with a potential interest in the issue.

## BACKGROUND

Oregon voters established the Oregon Scenic Waterways System through a citizens' initiative petition in 1970. The system originally contained all or part of six rivers, and over the next several years, additional rivers or segments of rivers were added through designation by the governor or the state legislature. In 1988, a second citizens' initiative resulted in further expansion of the system, nearly doubling the number of river miles designated as Scenic Waterways. Since that time, there have been no additional designations. The system currently includes approximately 1,150 miles on 19 rivers, as well as Waldo Lake.\* This amounts to approximately 1% of all Oregon river miles. A number of these sites are also designated as federally protected "Wild and Scenic Rivers."

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\* A list of all Oregon Scenic Waterways can be found in Appendix A.

The Scenic Waterways program was established in response to dam construction in the state, and also in response to increasing pressures on Oregon rivers resulting from rising population, greater development, and burgeoning recreational use. With a goal of protecting these “special” waterways, the program has sought to promote the wise use of these rivers and adjacent lands extending one-quarter mile inland on either side of the river. To that end, the statute that established the system specified the goal of protecting designated waterways and adjacent lands that possess “outstanding scenic, fish, wildlife, geological, botanical, historical, archaeological, and outdoor recreation values of present and future benefit to the public.”

The statute went on to declare that “the highest and best uses of the waters within scenic waterways are recreation, fish and wildlife uses,” and to state that the goal of establishing the system would be to “preserve Waldo Lake and selected rivers...in a free-flowing condition and protect and preserve the natural setting and water quality of the lake and such rivers and fulfill other conservation purposes.” Consequently, the state has sought to maintain free flowing waters in their natural state, protect water quality and quantity at a level that is necessary for recreation, fish and wildlife uses, and to preserve scenic and esthetic qualities from the river perspective.

The law charged the Oregon Parks and Recreation Department (OPRD) with overall administrative responsibility for Scenic Waterways. The Division of State Lands (DSL), Department of Environmental Quality (DEQ), Oregon Department of Fish and Wildlife (ODFW) and Water Resources Department (WRD) all maintain responsibility for a variety of activities that affect Scenic Waterways: administering removal and fill activities, water quality, fish and wildlife resources, and water rights, respectively. Several other agencies have a role in the Scenic Waterways System, and OPRD is required to consult and coordinate with them as needed.

In order to promote the goals and objectives of the program, the law places limitations on the types of activities that can be undertaken in Scenic Waterways. First, the Scenic Waterways System complements the federal Wild and Scenic Rivers Act by extending protections to adjacent non-federal lands. Second, the state law protects designated waterways from construction of dams, reservoirs and impoundment facilities, dredging, and mining, including commercial placer mining. The statute also places limitations on landowners with respect to cutting trees and constructing buildings, roads, or any other structures within one-quarter mile of a designated Scenic Waterway that could disrupt scenic qualities along the waterway. Finally, the state requires permits for all activities on Scenic Waterways that affect water quality, or that involve removal or movement of materials from the riverbed.

#### *Legal History of Recreational Placer Mining in Oregon Scenic Waterways*

Among the activities prohibited on Scenic Waterways, the original 1970 statute specifically referenced a ban on placer mining. Placer mining involves the extraction of gold or other materials from mineral deposits found (most often) in the beds and banks of

waterways. In Oregon today it is most often a recreational activity accomplished using a gold pan, a sluice box, or a motorized suction dredge. Placer mining is concentrated in areas where gold deposits are found. The most commonly mined areas in Oregon Scenic Waterways are on the Rogue, North Fork John Day, Grande Ronde, Illinois, and Little North Fork of the Santiam rivers.

The 1970 law stated that “the submerged and submersible lands under and along such waterways shall not be modified by placering, dredging or by any other means.” Amendments to the Act in 1973 modified this language to more clearly state that placer mining was not permitted on Scenic Waterways. In neither of these formulations was there a specific reference to small scale, or recreational placer mining, either in the form of a ban or an exemption. After the establishment of the Scenic Waterways System, large-scale commercial mining activities were banned in these waters, but recreational placer mining continued to occur, and it continues to this day.

The issue of whether or not small scale placer mining should be allowed has been a source of contention since the 1970’s, despite a number of attempts to resolve the issue by clearly delineating what types of activities shall be permitted. Two (conflicting) opinions by the Oregon Attorney General’s office, several statutes passed by the Oregon State legislature, and a number of actions by state agencies attempted to resolve the issue. These efforts, however, have not led to a final resolution.

In 1982, the Attorney General’s office issued a formal opinion (number 8088), which stated that the prohibition on placer mining, as set forth in the statute, was not intended to cover recreational placer mining. Rather, the ban was targeted at commercial placering. Therefore, recreational placer mining could continue. The opinion went on to conclude that the Department of Water Resources had the authority to define recreational placer mining so that the activity could be carried out in such a way that it would be compatible with other goals and values of the Scenic Waterways System.

Following the Attorney General’s opinion, the Water Resources Department adopted a definition of recreational placer mining and permit requirements for placer miners. As specified in the administrative rules of the Water Resources Department,

“Placer mining...means the process of extracting minerals from a placer utilizing mechanized or hydraulic equipment, except a motorized surface dredge with a suction hose intake four inches or less in diameter.”

In addition to this definition, the DSL and DEQ have developed regulations requiring miners to follow certain practices, including obtaining permits from both agencies. Moreover, motorized dredges must meet particular specifications regarding size and horsepower in order to be considered recreational in Oregon law. These provisions, consistent with the Attorney General’s opinion, (though modified from time to time over the years) excluded prohibitions on recreational placer mining, while providing for a continued ban on any larger scale, commercial placering. For the next

several years, small-scale placer mining was carried out in Scenic Waterways without any significant legal changes affecting the practice.

In 1994, the Oregon Attorney General's office reviewed the issue of recreational placer mining again in response to queries from the DSL. This ruling (number 8282) reversed the opinion issued in 1982, stating that,

“Neither text nor context of the scenic waterway statute allows for any exception to a complete ban on placer mining.”

This ban remained in place for only a short time. In the 1995 legislative session, House Bill 2721 became law, reversing the 1994 Attorney General's opinion. The bill eliminated the outright ban on placer mining, and instead made recreational placer mining permissible in Scenic Waterways. Two types of activities were allowed. The first was “gold panning,” which is defined as a non-motorized activity that would not require a permit. The second was defined as recreational placer mining. This included gold panning, but also included activities using a motorized suction dredge having an intake hose four inches or less in diameter and a motor no larger than 10 horsepower. All placer mining involving a motorized dredge required a permit from DSL and DEQ. House Bill 2721 put a sunset date of December 31, 1997 on any permits for recreational placer mining, so that only non-motorized gold panning could continue after that date.

In 1997 the state legislature took up the issue again. It passed House Bill 2409, which did three things: it replaced the term “gold panning” with “recreational prospecting,” but retained the same definition; it extended the sunset date on recreational placer mining for another two years; and it called for OPRD to conduct a review of the Scenic Waterways System and present a report to the legislature during the next legislative session. The bill stated that if OPRD did not produce a report within the time frame specified, the December 1999 sunset date for placer mining would not apply, but would be extended for another two years to December 2001. OPRD's report, entitled, “A Vision for Scenic Waterways,” was provided in May 1999 to the sponsors of House Bill 2409, but it was not presented to the full Legislative Assembly. Thus, the sunset date on placer mining was extended for another two years.

Again in 2001, the state legislature took up the issue, and passed Senate Bill 606. This bill was similar to what had passed four years earlier. It extended the sunset date for two years, to December 2003, and called for a review of the Scenic Waterways System, including a review of the studies pertaining to the effects of recreational placer mining within Scenic Waterways. The report is to be submitted to the legislature in 2003, and if it is not, the sunset date will be extended by another two years. The report contained herein is being presented to fulfill the provisions of Senate Bill 606.

### *Current Regulatory Structure for Recreational Suction Dredging*

The DSL and DEQ require all suction dredgers to obtain permits prior to any mining activity. Permit applications must state the waterway(s) to be mined and what sections will be visited. At the end of the year, miners are also required to submit a report to DSL specifying where they actually did go. State regulations specify the practices, or “best management practices” (BMPs) to be followed by miners. DSL requires that suction dredge engines can be no larger than 16 horsepower (the 10 horsepower limit was amended in recent years) and that a miner may move no more than 25 cubic yards of material in a given year from any single site. DSL and DEQ require that intake nozzles and hoses for taking in gravel can be no larger than four inches in diameter.

The mining season, called the “in-water work period,” is set by DSL on the recommendations of ODFW and usually lasts no longer than a few months each year. Mining is prohibited at those times when fish are spawning so that mining does not destroy the clusters of eggs situated in spawning gravels, which are known as “redds.” Numerous other stipulations also apply to recreational placer mining. Miners may not cut vegetation out of riparian areas or suction dredge outside the wet perimeter of the waterway. They cannot move large boulders or logs that are in the stream, nor may they dam or divert the waters, or cause any obstruction to fish passages. They must also level their tailings piles and fill the holes they create once they are done in an area, a procedure referred to as backfilling. All of these regulations and several others, arrived at through a cooperative effort involving state agencies and stakeholders, are meant to ensure that impacts are kept to a minimum.

#### **AT ISSUE**

Current law has left undecided the future of recreational placer mining with a motorized suction dredge on Oregon Scenic Waterways. The law provides that non-motorized activities (recreational prospecting, e.g. gold panning) are allowed without a permit, and the future permissibility of this activity is not being challenged. What remains at issue is recreational placer mining that makes use of motorized dredges, and the extent to which the continuation of such activity is consistent with the goals, priorities and objectives of the Scenic Waterways System. Therefore, this assessment addresses the following questions:

- What are the biological, recreational, and social effects of recreational placer mining?
- What are the views of stakeholders, state and federal agencies, and scientific researchers with respect to these effects?
- What are the impacts of banning or allowing recreational placer mining in Oregon Scenic Waterways?

With this information, the State Legislature will be able to better decide if recreational placer mining is 1) an appropriate activity on waterways protected for scenic, recreation, fish and wildlife values; 2) consistent with the goals and objective of the Scenic Waterways Program; and 3) causing unacceptable environmental or recreational/social impacts.

### *Suction Dredging Can Have Social/Recreational and Biological Effects*

Recreational suction dredging for gold in river channels is a small-scale operation in which gravel from the riverbed is sucked through a hose, and passed over a sluice box to sort out the gold. The remaining materials are then discarded back in to the river or onto riverbanks as tailings. Suction dredges, which consist of a gas powered motor, a hose and a sluice box sitting on a floatation device, are available commercially or assembled by miners themselves (see photo in Appendix E). Motorized recreational suction dredging remains at issue because there are often conflicting opinions and conflicting or ambiguous data about two categories of impacts resulting from the activity: social/recreational impacts and biological/ecological impacts.

The first of these concerns conflicts that may arise among various recreational users of the state's scenic rivers. Oregon waterways support multiple uses such as fishing, hiking, camping, boating and mining, among others. Recreational mining does not seem to be growing, and may in fact have diminished over the past several years, but several other types of outdoor recreation associated partially or exclusively with rivers continue to grow, especially non-commercial river floating in kayaks, rafts and canoes. As visitation rises on a finite land base, so does the potential for conflict between user groups.

Conflict between motorized and non-motorized recreationists is a pervasive issue on public lands, and non-motorized visitors are usually impacted by motorized uses more than the reverse. Different users may hold divergent values about the proper uses of a resource, or less frequently, they may physically interfere with one another's activities. In any case, some level of recreation conflict results when river users interfere with one another's enjoyment of recreation settings, and can often lead to disagreement about who and what activities should have priority on a given waterway.

The second point of contention over recreational mining involves the biological and ecological health of living organisms and habitat in, and adjacent to Scenic Waterways. The most important and notable of these in Oregon is, of course, fish, which are both an important part of the ecological health of Oregon waterways, and a significant exploitable resource that plays a major role in the economy of the state. For these reasons, the impacts of various activities on fish health and populations have been a major focus of many scientific studies. However, as will be discussed later in this report, studies that specifically treat recreational suction dredge mining are quite limited, and there is sometimes disagreement about the impacts of various activities, especially recreational placer mining, on fish.

### *Climate of Conflict*

Compounding these areas of disagreement is the often polarized political debate over this issue and other issues surrounding the practice of mining. Those who engage in small scale or recreational mining are a self-described independent group, who maintain an interest in using public lands with as little regulation or interference from authorities as possible. Most often challenging this group are others who hold that preservation of the environment in its natural state is the highest value, and that mining with motorized equipment, even on a small scale, disrupts this natural state and should therefore not be permitted on public lands. These two “camps” often tend to question the legitimacy of the other’s assumptions, desires, and concerns, which makes simultaneous accommodation of both groups unlikely, if not impossible.

This debate over the proper use of public lands is rooted in two very different understandings of what “public” actually means, and who is meant to benefit from public property. One view, which would be supported by those wishing to engage in recreational mining, places the highest priority on direct values from actually utilizing physical resources of the land. All members of the public possess the potential to use the land. Though only some do actually use it, these people are not taking anything away from others who do not, because all have an equal right to access it – to boat, fish, camp, hike...or look for gold. In sum, this expresses the goal that the land be able to benefit the greatest number of people who happen visit and use the land. It is less concerned with values that result from non-extractive use, and suggests that denying such uses of the land is actually withholding it from the public, since most people were not going to use the land for such purposes anyway.

A second view, which would generally be supported by those who wish to end suction dredging on Scenic Waterways, places the highest priority on values that result from the existence of public lands, whether these values result from use, use that is specifically consumptive, or no use at all. (Some consumptive uses are also often referred to as productive uses by those using the natural resources for economic gain, e.g., agriculture, forestry, and mining.) This view suggests that placing a value only (or primarily) on consumptive uses sets aside public lands for only those who use them for these purposes, which is inherently exclusive. The rest of the population gets nothing out of them if they are not preserved. Since most people are unlikely to visit a particular area, a policy that does not value non-consumptive use results in a privileged position for only a few out of the many. This position of privilege for a few is thought to marginalize concerns for certain nonuse values that maintain a good deal of support – biodiversity, wilderness, and the ability to pass along unspoiled lands to future generations.

In addition, this view is more fearful that once certain practices take place – building a road, clearcutting a forested area – they cause irreversible losses, changes or damages. This view holds that limiting development and certain uses on public lands presents a more equitable way of allocating this land to the public. Therefore, only by

taking measures to preserve land in a natural state (or as close to that state as possible), can “public” lands really be reserved for the public. This view is not usually applicable to all public lands in a given region, but certainly to those deemed special for their natural qualities. It is argued that these areas should be managed so as to minimize the “ecological footprint” of human activities on them. These would be non-consumptive, “light on the land” activities, which are deemed to be more appropriate because they are more consistent with the preservation of existence values.

The result of this divide is likely to be that it is not possible to satisfy all stakeholders, even partially, in reaching a decision about the permissibility of suction dredge mining in Oregon Scenic Waterways.

## **METHODS**

Data collection for this assessment was conducted in two ways. First was a review of the appropriate literature regarding the impacts of suction dredging, including both environmental and social considerations. The literature review included both peer-reviewed academic articles and independent or government-sponsored reports. The second method of obtaining information was by means of semi-structured in-depth interviews with stakeholders who, either individually or through their various government agencies or non-governmental organizations, have an interest in or responsibility for the Scenic Waterway System. Interviews were carried out both in person and over the telephone. Preselected topics guided the interviews but enough flexibility remained to provide for open-ended responses. The objective was to accurately represent the views and positions of different stakeholder organizations and individuals, capturing the diversity of viewpoints as opposed to focusing on the frequency of particular responses.\*

The responses were acquired by means of a referral sampling technique (also known as “snowball” sampling). The researchers began the interview process with “key informants” in OPRD and other state and federal agencies whose work involves Scenic Waterways. With this group we identified an initial set of potential interviewees with knowledge of, or interest in the Oregon Scenic Waterways program and the issue of recreational placer mining. As these people were interviewed they were asked to provide the names of additional persons who they thought could also provide relevant information. We conducted more than 150 interviews, continuing the process until two goals had been met. The first was that the information gathered became repetitive. Once this began to occur on an increasing basis, we could be confident the number of people interviewed was sufficient to be certain that the major issues had been identified and the major viewpoints had been represented – similar issues, positions, beliefs, and

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\* A general survey of a population selected at random was considered to be inappropriate for this assessment. Most Oregonians are unlikely to be familiar with the Scenic Waterways program or to be informed about the issues surrounding suction dredge mining. Even among some agencies and stakeholder groups, there was often great ignorance regarding the Scenic Waterways Program. A list of the topics covered can be found in Appendix D.

experiences were being expressed. The second goal to be met involved sufficient inclusion of interested individuals, agencies, and organizations. Care was taken to include interviewees from the entire geographic scope of the Oregon Scenic Waterways program and a broad variety of interest groups to minimize the chance of missing significant issues. Just as important to this effort was to be certain that all sectors and types of interest groups had an opportunity to have their voices heard and their concerns and suggestions articulated so they could be presented to the state.

This study also made use of the grounded theory of qualitative data collection and analysis (Glaser 1992). Grounded theory is used to develop an explanation for a situation or issues as they exist on the ground. Rather than being confirmed or disproved using a preconceived theory (hypothesis testing), the explanation for the situation emerges as research is conducted. Grounded theory is iterative rather than linear, in that relevant literature or other data continue to be acquired as research progresses rather than prior to analysis only. As explanatory factors emerge, care is taken to compare new information to the developing theory or explanation of what is going on, in order to determine if the explanation is still accurate. The characteristics of emergence and lack of preconceived theories about what is going on make grounded theory particularly suited to the type of assessment required in this case, in which data collection was ongoing and results continued to evolve throughout the process of acquiring information. The adequacy of the explanation of the situation or issues under study can thus be evaluated on the basis of whether or not it helps people in the situation make sense of their experience and enables them to manage it better.

#### **RECREATIONAL MINING ON SCENIC WATERWAYS – THE CASES FOR AND AGAINST**

The strongest case for continuing to permit recreational placer mining on Scenic Waterways is that those who engage in suction dredging are recreationists, as much as boaters, anglers and campers. Recreation is one of the “highest and best uses” of Scenic Waterways, according to statute, therefore recreational mining is as legitimate a use of the waterways as any other activity. Miners should not be removed from these rivers simply because of others’ ideological preferences. In addition, miners have to comply with certain standards and practices, as any river users do, and their activities are more strictly regulated than other users. The result of the regulations put in place by the state is that suction dredge mining has only a minimal impact on fish, wildlife and habitat. Moreover, the impact it does have is both localized and temporary. Mining affects only the areas dredged, and every year the high water flows associated with winter rains and spring runoff erase all indications that any mining took place.

The strongest case against recreational placer mining is that it is inappropriate on waterways designated as scenic and preserved specifically for their natural qualities, many of which are important fish habitat. The state has set aside certain rivers and one lake to protect them from degradation and preserve them to the greatest extent possible. The types of values specified in the Oregon Scenic Waterways Act and provided by wildland recreation areas – encompassing a preference for nature over industry and

machines – are inconsistent with the practice of prospecting for gold with a motorized dredge. While this activity may have been more acceptable in an earlier day, this is no longer the case. Social values have changed, and there are more and more recreationists on a finite land base. In addition, there are impacts to the rivers where mining occurs. High water flows erase the obvious markers of suction dredging, but there are cumulative impacts that harm the health of riparian areas, disrupt the natural life cycle of fish species, and diminish ecology complexity in a particular area. While regulation can mitigate impacts, it does not eliminate them. Simply operating a suction dredge causes a major disturbance where it is used. And since not all suction dredgers follow all regulations scrupulously, there are probably larger impacts than are accounted for by regulation.

The following sections of this report examine these arguments in greater detail, looking at what recreational placer mining entails, how it is viewed and regulated by different agencies, what different stakeholders think of the activity, what environmental impacts it can have, the extent to which it causes recreational conflict, and the social values that inform the issue. It looks to three areas for information – stakeholders, government agencies, and academic and government studies, which are addressed respectively in the following three sections. It should also be noted that not all of the comments, studies, and opinions apply only to recreational placer mining on Oregon Scenic Waterways, but often more generally to other waterways as well. The state’s designation of a waterway as “scenic” is legal matter, and many (though not all) of the arguments explained below are applicable regardless of where this legal designation begins and ends.

## **WHAT THE STAKEHOLDERS SAY**

### Recreational Miners

Recreational miners make several points to support the case for allowing suction dredge mining on Oregon Scenic Waterways.

- They truly are recreationists and are not making a living off of their mining.
- Oregon’s rivers are meant to support multiple uses, and recreational mining is a legitimate use. Recreational miners should have as much a right as other river users to the waterways.
- Suction dredging has minimal impact on the environment, and numerous government agencies and scientific studies have supported this claim.
- Winter rains wash away all evidence of suction dredging.
- Suction dredging can bring about some improvements by removing lead and mercury from rivers and stream, and by loosening up compacted gravel, making such areas more suitable for fish spawning.

### *Recreational Suction Dredging Really Is Recreational*

Those who engage in recreational placer mining point out, first of all, that they are mining for recreational purposes. It was argued that none of them make a living from the gold being retrieved; they are not even finding enough gold to pay for the costs they incur. Quantities of gold are too small to support that. (This point was made not only by miners themselves, but also by representatives from a number of other government agencies and stakeholder organizations.) More importantly, however, that is not the primary reason they give for recreational placer mining. Miners point out that first and foremost, they mine because they enjoy it and want to, not because they need to or feel they have to. A number of factors contribute to this enjoyment. While mining, people get the opportunity to get outside, to “play with their toys,” and to have a good time. One participant likened the practice to fishing – people may spend all day fishing and not catch anything, but they can still enjoy themselves. Mining is similar for this group. Even if a miner does not “catch” anything, he or she can still have an enjoyable experience. By the same token, when one encounters what they sought to find, i.e., a line of gold in the river or streambed, this provides the same type of excitement as landing a fish does to a fisherman.

### *Recreational Mining Is a Social Activity and Historically Significant*

Many miners stated that mining was a very social activity – they bring their families, camp out for a weekend, and teach their children how to operate a suction dredge and pan for gold. There are several mining organizations in the state; some members have likened them to social clubs in which people who have the same interest meet periodically and plan group activities. Others pointed out that suction dredging is a way for them to keep active. A number of the recreational miners are retired, and for some this their way of getting out and getting some physical activity (one person pointed out that her husband is over 80 years old and that mining is “good for him,” keeping him active and thus healthy). Finally, the historical place of mining in parts of Oregon is something that mining organizations have claimed to be part of the attraction to both Oregon residents and tourists who come to the state to prospect for gold. These motivations are cited as reasons why recreational mining is a legitimate activity that should not be banned on scenic waterways.

### *Miners Should Not Be Discriminated Against Because of Their Recreation Choice*

Miners also make their case by arguing that they should not be singled out as a group. Oregon’s Scenic Waterways, like other Oregon rivers, provide for multiple uses. On Scenic Waterways, certain commercial activities are prohibited. Recreation, however, is considered to be one of the highest and best uses of these protected rivers according to the Scenic Waterways Act. Like boaters, anglers, campers and hikers, miners point out that they too are using rivers for their preferred recreational activity, and that their activity is no different from the others in that sense. It is not fair to single out one group among many for ideological reasons.

Other users and non-users should not be allowed to remove one segment of river users simply because they don't like mining on the rivers and believe it to be a nuisance or inappropriate. Some miners (though not a lot) reported comments made by others who had observed their activities, complaining to the miners that their dredging was ruining the ability of others to enjoy the natural qualities offered by the landscape. But the miners attest that they should have as much a right as anyone to enjoy Oregon's waterways in the way they wish to. The only legitimate reason for banning some activity on Oregon's waterways would be if that activity were causing significant harm to the health of the river and the fish and other organisms in it. Miners and their representative organizations, however, repeatedly make a strong claim, backed by a number of studies done by government and academic institutions, that recreational placer mining does not have a harmful impact on the natural environment if certain practices are followed.

### *Recreational Mining Causes Minimal Ecological Impacts and Is Heavily Regulated*

Mining organizations argue strenuously that recreational placer mining has minimal impact on the health of rivers, fish, plants, invertebrates, and other parts of the ecosystem. They argue that the size of the equipment, the small amount of gravel they move, and the small amount of time spent mining each year ensures that environmental impacts will be small. And because the number of miners who use suction dredges is not terribly large, the cumulative effects of all the recreational placer miners in the state will likewise be small. Finally, after the mining is completed in a given season, all evidence of the activity is washed away by the winter rain and snow. The runoff raises water levels and moves far more gravel than suction dredges do. The result is that rivers are restored to their natural state each spring.

This "de minimus" impact is a result in no small part from the regulations placed by state and federal agencies on miners. Though many of the miners readily claim that they bristle at the extent to which their activities are regulated, they do also argue that due to the limitations placed on their work, it is impossible for them to have a significant harmful impact in the waterways where they mine. DSL and DEQ require all suction dredgers to obtain permits prior to any mining activity. Permit applications must state the waterway(s) to be mined and what sections will be visited. At the end of the year, miners are also required to submit a report to DSL specifying where they actually did go. State regulations specify the practices, or "best management practices (BMPs)" to be followed by miners.

DSL requires that suction dredge engines can be no larger than 16 horsepower and that a miner may move no more than 25 cubic yards of material in a given year from any single site. DSL and DEQ require that intake nozzles and hoses for taking in gravel can be no larger than four inches in diameter. The mining season, called the "in-water work period," is set by DSL on the recommendations of ODFW and usually lasts no longer than a few months each year. Mining is prohibited at those times when fish are spawning so that mining does not destroy the clusters of eggs, or "redds." Numerous

other stipulations also apply to recreational placer mining. Miners may not cut vegetation out of riparian areas or suction dredge outside the wet perimeter of the waterway. They cannot move large boulders or logs that are in the stream. They must also level their tailings piles and fill the holes they create once they are done in an area. All of these regulations, and several others, are meant to ensure that impacts are kept to a minimum.

### *Most Miners Genuinely Want to Abide by Regulations*

Clearly, not all miners scrupulously follow every prescribed practice every time they mine, and major mining organizations in the state will readily admit that this is true. They do point out, however, that in general they want to comply with laws and regulations that apply to them. Representatives from the state's mining organizations helped to write the regulations, along with state agencies and other stakeholders. Miners understand that they are a heavily regulated group (over-regulated, it is often attested) and that their activity carries a stigma in the eyes of many who do not mine. For these reasons, miners know that if their activities cause significant damage to the environment, they are increasingly likely to lose the opportunity to mine in more and more locations or face greater restrictions in areas where they can mine.

Therefore, there is a degree to which independent mining organizations wish to and do police their own members and other recreational miners they encounter. One organization noted that some of its members go out on rivers to find people mining and make sure they know the regulations and abide by them. This group and others have expressed their interest in putting a stop to illegal mining, especially by squatters who live on lands they are not supposed to, which generates complaints. Those who abide by the regulations express that they end up bearing the brunt of resentment targeted at those who do not comply. It is also not uncommon for independent mining organizations in the state and region to post messages on their websites emphasizing the importance of mining in an environmentally friendly manner and urging miners to engage in responsible stewardship practices.

### *Dredging Activities Can Sometimes Benefit Waterways*

Miners suggest that not only do their activities have no adverse environmental impacts, but in certain cases, they can improve river health. Miners often work in sites with a history of larger-scale mining and environmental damage in the form of compacted sediments or traces of mercury. Suction dredge mining can loosen compacted gravel and thus create new potential spawning beds that were previously unavailable. Miners also occasionally find mercury left behind by older large-scale mining operations or lead weights lost by fishermen, both of which are removed from the water quite frequently according to various miners. In one year, miners statewide turned in 10 pounds of mercury, a significant amount according to the DEQ.

Miners also argue that their activities loosen up invertebrate food supplies for juvenile fish. Almost all miners contacted reported instances of small fish feeding around

the suction dredge as prey organisms were dislodged from the substrate and mobilized in the current as food. (This may not be as beneficial as the miners suspect. One researcher suggested that while it provides abundant food during the dredging, this may come at the expense of a longer-term decrease in food supply.)

Miners said that they continually try to explain how their activities are not harmful and are beneficial in some cases. In general, they report being on the defensive, and most of their comments reflected this attitude. Negative perceptions of recreational suction dredging are likely related to the history of mining in Oregon, which often resulted in significant environmental harm. Miners we contacted admitted this, but pointed out that they are not engaging in large-scale operations. They don't use mercury or heavy equipment or cause significant, irreparable damage, and they don't want to be associated with large commercial mining by the public. Recreational miners feel that the stigma attached to mining because of its historical record is unfairly transferred to them, and suggest this is one of the reasons they face opposition from several quarters.

One criticism miners responded to was that they should be required to prove that their activities do not have any harmful effects before they can be permitted to mine. In other words, the burden of proof should be on the miners. They counter this argument by stating that putting the burden of proof on the miners is contrary to how all kinds of activities are carried out in this country. People are generally given freedom to pursue their various activities unless it is determined that they are causing some type of harm – to other people, to the environment, or other interests or standards. Laws and regulations limit or ban the harmful activity, they don't require that people prove no harm before they can engage in their pursuits. Miners see no reason why they should have to prove their case; rather it is up to those who want to remove the miners from Scenic Waterways (or other areas) to make their case proving significant harm from recreational placer mining.

#### *Dredge Motors Are No Noisier Than Motorboats or Cars*

Another criticism of suction dredge mining is that it is a noisy activity. Some miners and several other river users said this was the most common complaint they heard, but a minor one and not often voiced. They also pointed out that suction dredging is no louder than motorboats, or vehicles on roads that parallel some rivers. As one miner noted, there are specific areas around the state where motorized equipment is not allowed, and people can go to these areas to avoid engine noise. On waterways such as the recreation section of the Rogue River, river users would not be able to completely escape noise even without suction dredges.

#### *Miners Report Few Conflicts with Other Recreationists*

Complaints about noise or other issues tend not to be made directly to miners when they are on the rivers. Mining organizations we contacted said their members have rarely been the subjects of complaints by people they encounter while suction dredging. They maintain that the reaction of other river users including sportfishers, campers,

boaters and people on day trips is primarily not hostility, but interest. Miners reported that they rarely experience any kind of recreational conflict with others engaging in their recreational activities. People generally try to provide one another with sufficient space and are courteous. One miner did allow that people had told him his activity was impacting their experience, but felt it was their problem – he had just as much right to be there as anyone else. In addition, he, noted, other recreationists get mad at each other very often, conflict is not only due to mining.

### *Miners Say They Make Significant Contributions to Local Economies*

It was suggested that recreational mining generates significant economic activity in local towns near where mining is done, and that miners often visit from out of state because of the “unfriendly” regulatory climate in California and Washington. Miners generally do not extract enough gold to have much economic impact, but as both tourists and residents they do spend money in local communities, with rare exceptions more than they get back in gold. No solid statistical data exists regarding exactly how much economic activity recreational placer mining generates for local communities. A 1994 State of California environmental impact report on suction dredging estimated that a typical dredger spends around \$9,000 per person per year on equipment, gasoline, repairs and maintenance, motels, groceries and restaurants, other forms of recreation and occasionally on medical services. The Waldo Mining District in southwest Oregon surveyed its members in 2001, and came up with similar results.

Critics have suggested that the miners exaggerate such figures and their importance to local economies. Federal managers observed that miners tell of large numbers of participants in the activity when talking about economic impacts, but take the opposite tack and downplay miner numbers when discussing environmental impacts. Again, it is unclear exactly how much recreational mining contributes to Oregon’s economy. Federal land managers and local government officials in southern Oregon, where mining is heaviest, seemed confident that local businesses are not overly dependent on it.

### *Many of the Good Sites for Mining Are in Designated Scenic Waterways*

A final point made by miners involves maintaining access to good gold-bearing sites. Opponents of suction dredging point out that waterways designated as scenic make up only 1% of all river miles in Oregon, so it would not affect miners significantly if these areas were deemed off limits, as there would be plenty of other places to go. Some miners granted a small amount of validity to this claim, and admitted that if recreational suction dredging were to be banned in Scenic Waterways, there would still be other streams where mining was practical.

However, miners argued that the “one-percent argument” inaccurately represents the true situation. Scenic Waterways may be only 1% of the state’s total river miles, but they encompass much more than 1% of the good mining sites. Since this form of

prospecting is considered a legitimate recreational activity, it seems quite unfair to force residents or tourists to drive an extra 2-3 hours in order to engage in their preferred form of recreation. Others are not forced to do that. Many people would simply stop suction dredging altogether, because it would be so inconvenient to do. The seemingly minor limitation would result in a significant or total curtailment for some people. Second, while there are alternatives to Scenic Waterways for recreational mining in Oregon, there are not a lot of them. Most gold-bearing areas are either already claimed under the 1872 Mining Law, or the mining rights are owned by timber companies and other private landholders. In either case, this makes many potential sites off limits to recreationists.

#### Resource Conservation/Environmental Organizations

- Environmental and resource conservation organizations oppose recreational placer mining.
- Motorized mining is inappropriate and incompatible with the ecological, esthetic and recreation values for which the waterways were designated.
- Recreational placer mining has harmful environmental impacts, particularly on fish.
- It is important to implement policies that favor protecting natural resources unless and until it can be proven that suction dredge mining does not cause harm. Only then can the activity be allowed.
- Enforcement and monitoring by the state are virtually non-existent, and many miners do not follow all applicable regulations.
- Noise, fumes and spills are distasteful and harmful results from suction dredges, as are unclean campsites left by recreational miners.

#### *Environmentalists Oppose Recreational Placer Mining*

We contacted a range of environmental interest groups that are currently active in Oregon, from local entities to state groups and regional offices of national organizations. None of the environmental interest groups contacted supported recreational placer mining and nearly all were opposed to it, many quite strongly. Some groups were unaware that small-scale suction dredge mining was a sanctioned recreational use, or said that they were primarily focused on other issues. These groups either had general reservations about the activity, or stated that they had no strongly developed position. However, most groups we contacted had some degree of familiarity with recreational placer mining and wanted it curtailed.

The degree of opposition tended to be correlated with the level of awareness of the activity – the more knowledgeable a group was concerning recreational mining in Oregon Scenic Waterways, the more it made articulate, detailed and forceful arguments against it. Groups that are active where recreational placer mining occurs, and those for

which fish habitat was an area of focus, tended to be most strongly opposed. Opposition stemmed mainly from concerns about direct impacts of dredging on fish, but also from a range of other issues. These included noise, fumes and potential fuel spills from dredge motors, ecological impacts of mining on other species besides fish, the appearance and impacts of miners' campsites along rivers and streams, and conflict and safety issues involving other river recreationists.

To support their assertions that small-scale suction dredge mining is not an appropriate form of recreation in Scenic Waterways, environmental interest groups focused mainly on the potential for mining to degrade ecological conditions in designated streams and rivers. Most concerns that were voiced related to salmon, steelhead and trout, and riparian organisms and conditions upon which these fish depend.

### *Recreational Suction Dredging is Incompatible with Oregon Scenic Waterways*

Environmental groups consistently emphasized that Scenic Waterways were designated, and are supposed to be administered, specifically to preserve and enhance fish and wildlife habitat, natural scenic and esthetic qualities, and types of recreation that rely on, and/or are "compatible" with these values. Motorized mining of any kind is considered to be contrary to the ecological, esthetic and recreation values for which the waterways were designated.

Describing small-scale, not-for-profit suction dredge mining as "recreational" does not mean it must automatically be included among the types of recreation allowed in Scenic Waterways. It is commonplace for certain kinds of recreation, especially motorized and extractive activities, to be deemed inappropriate and prohibited on a variety of public lands protected for high quality ecological and esthetic characteristics. Oregon Scenic Waterways are an excellent example of such lands, designated for protection because of their special nature-based attributes (e.g., fish and wildlife habitat), so a ban on a motorized resource extraction activity would be legitimate.

Several environmental groups were dubious that recreational placer mining was truly recreational, noting that it is a resource extraction activity with economic and utilitarian implications, even if the operation is not profitable. Groups such as outfitters and guides also make money by "using" river resources, but these uses are almost exclusively non-consumptive aside from fish retained by sportfishers. No group besides miners has a primary goal of extracting and selling physical resources from the river. All recreationists impact the landscape to some degree, but miners have a greater per capita impact on river resources because they physically rework the river bottom with motorized equipment that produces noise and pollution.

### *Impacts on Fish Are a Primary Concern*

The principal fish-related impacts from suction dredge mining voiced by environmental groups were:

- disturbance and destruction of eggs and fry in spawning beds
- ingestion and destruction of invertebrate food species in suction dredges
- destabilization and siltation of gravels used for spawning and food sources
- affects of sediment turbidity plumes on fish and their ability to find food
- redistribution or removal of large woody debris and rocks

Environmental groups argued that recreational mining disturbs fish spawning areas by destabilizing and redistributing gravel, and mobilizing fine sediments. Turbidity plumes had been seen personally by members of several groups, and were mentioned frequently as a concern. In response to miners' contentions that turbidity caused by their activities is inconsequential compared to that which occurs during high winter flows, it was pointed out that in most salmon-bearing streams turbidity occurs naturally during winter but very rarely during the summer. Fish have evolved to prefer these clear summer conditions. Unnatural turbidity in the summer resulting from recreational placer mining interferes with the aquatic food chain during the time of year when it is most productive.

Mobilized sediments can clog and kill aquatic vegetation on the stream bottom and the organisms it supports, including insects and other invertebrates. This in turn affects the amount of food available for salmon and trout. Coarser suspended sediments are abrasive, so they may affect fish physiologically. Turbid conditions also affect the ability of fish to find food. Some groups also noted that in various life stages of trout and salmon species use riparian ecosystems at all times of year, so even carefully managed in-stream work periods cannot fully mitigate the impacts of mining on fish. For example, in the summer trout and salmon fry depend on near-shore microhabitats where recreational placer mining typically occurs.

Logs, rootwads, rocks and stable, vegetated streambanks contribute vital structural diversity to fish streams. Environmentalists alleged that miners sometimes remove large rocks and woody debris in order to set and move their dredges more easily, and that miners sometimes excavate and destabilize stream banks by undercutting. These activities are explicitly prohibited, but even mining groups admit that violations sometimes occur. Some environmental groups charged that such violations are fairly common based on personal observations. Nearly all noted that official monitoring of recreational mining activities in Scenic Waterways has been spotty at best, and argued that miners are largely free from regulatory oversight once they are at a mining site.

Many groups emphasized the large amount of time and money being spent in Oregon to recover and protect salmon populations endangered by past land use practices such as logging and mining, and limited evidence that threats to salmon runs have been successfully mitigated. In light of this, they strongly questioned why any activity with the potential to harm salmon and trout or hinder recovery efforts, even only marginally, should continue to be allowed in Scenic Waterways. It is indisputable that many threats

to wild salmon, steelhead and trout remain, so environmentalists argue that it makes no sense to allow an activity that physically disturbs the structure of streams and clearly cannot benefit fish, even in systems where they appear to be thriving.

#### *Winter Flows Don't Necessarily Occur or Mitigate Impacts*

A common contention by miners is that high winter flows eliminate excavation pits, tailing piles, and other artifacts of mining that can impact fish and habitat. Environmentalists respond that lack of visual evidence following winter flows in no way proves that ecological conditions prior to mining activities were restored without long-term impact. Tailing piles and pits in the stream bottom are more susceptible to further destabilization. More gravel may be moved farther and eventually lost from the system. High flows do tend to obliterate visual signs of disturbance, but long-term stability of the reworked, "natural" looking streambed would likely be reduced if mining had not occurred. Environmentalists also argued that evidence of recreational placer mining can and does persist for many years in streams that do not receive high winter flows regularly because of dams or periods of dry winters.

#### *Regulations Are in Place, but Violations Are Probably Common*

Inadequate and inconsistent monitoring was one of the most frequent concerns voiced by environmental groups, and some charged the DSL and DEQ in particular with lax oversight of recreational placer mining activities. They note that enforcement of regulations concerning in-stream work periods, requirements to backfill tailing piles, and prohibitions on bank excavation and removal of large logs and rocks is very limited. Similarly, monitoring of effects that mining activities are having on ecosystem processes and native species is limited or non-existent. Furthermore, because the permits required of miners do not ask for a great deal of specificity about where miners go, there is no way to know how much mining is actually occurring in a particular watershed. Thus it is unclear to what extent violations may be occurring on Scenic Waterways, or on other tributaries and streams.

In determining that recreational suction dredge mining is having no significant impacts in Scenic Waterways, the DSL and DEQ assume that all miners have permits and that all regulations are being followed. Even mining groups admit this is not the case, and that impacts are highly dependent on the stream in question, the actual stretch of river being mined, and the behavior of individual miners. Scientific knowledge is incomplete, regulations are weakly enforced, and knowledge of where and how much mining occurs is minimal. In light of this uncertainty and lackluster oversight of recreational mining, environmentalists ask where the evidence is to support state agency assertions that mining has no significant impacts.

### *Suction Dredge Motor Noise and Pollution*

Concerns about degradation of general riparian conditions and fish habitat from operation of suction dredges were the predominant reasons environmental groups were opposed to recreational placer mining, but other issues were also consistently raised. The impacts of suction dredge motors, particularly noise but also fumes and the potential for fuel spills, were frequently voiced. The extent of fuel spills is largely unknown because monitoring is so limited. Many found the noise from suction dredge motors offensive, intrusive and out of place in the context of rivers supposedly managed for natural scenic qualities. It was further noted that even though cars may sometimes be heard near Scenic Waterways, they soon pass. Motor noise from a suction dredge is continuous. Some groups also pointed out that motor noise could also affect wildlife, and that little was known about these potential effects.

### *Off-river Impacts*

Several environmental groups said miners' camps along rivers were often "unsanitary" or "trashy," and questioned why miners were allowed to live for "weeks at a time" in areas used by many other kinds of recreationists. Sanitation concerns related mainly to latrines and the potential for fecal coliform bacteria to impact water quality. Some groups expressed concern about off-river impacts from the unauthorized access roads that lead to some camps, such as soil erosion and impacts on wetlands adjacent to waterways. In fact, several individuals and organizations surmised that indirect impacts caused by illegal access roads and miner camps may equal or exceed direct impacts from suction dredging itself.

### *Science, While Imperfect, Buttresses Environmentalist Positions*

In general, environmental groups strongly support ecological research and commonly utilize research findings to buttress their policy positions. However, many groups objected to contentions by miners that further restrictions on recreational placer mining are unnecessary because impacts on fish have not been scientifically proven. Environmentalists generally acknowledge the latter, but maintain that lack of conclusive science is a poor rationale for continuing to allow recreational placer mining. While there may not be a definitive understanding of all possible ecological ramifications, it is already well established that suction dredge mining can significantly impact fish and other riparian organisms.

It is beyond dispute that recreational mining can cause serious impacts, environmentalists argue. The more pressing scientific questions have to do with 1) cumulative impacts from past and present activities, 2) quantifying impacts that can be attributed specifically to mining, and 3) relationships between impacts and how the activity is conducted. Though questions remain about contextual factors that influence how serious and common mining impacts are, available evidence leaves little doubt that

serious impacts can and probably do occur. This alone, it is argued, makes the wisdom of permitting mining highly questionable, especially in important salmon habitat.

In addition, environmental organizations noted that ecological integrity is an important value for which Oregon Scenic Waterways were designated, so in the absence of complete knowledge, the proper approach to making decisions about appropriate use is to err on the side of resource protection. Small-scale suction dredging may not ever be convicted of, or exonerated from linkages with fish mortality or spawning failure. But that is beside the point, say many environmental groups. Enough evidence already exists regarding the actual and potential impacts of recreational placer mining to ban it in Scenic Waterways.

#### *Ecosystem Complexity and Multiple Past Uses Make Certainty About Impacts Elusive*

Environmental groups also point out that understanding how human uses affect complex riparian ecosystems requires effective monitoring and long-term interdisciplinary research, the staffing and funding for which are often inadequate or unavailable. Land management agency support for such work is limited and declining, and even with sufficient time and resources, science may not provide definite answers. The complexity and inter-relatedness of ecosystem organisms and processes, and multiple past and current human uses on many rivers, make proof of direct linkages between any particular activity and impacts on fish a problematic goal.

It is further argued that there may simply be too many multiple and overlapping activities and processes going on at once to find definitive scientific evidence about the effects of any one of them. It can be difficult to predict how a pristine system will respond to disturbance, and for river systems with a past history of significant human use the challenges are even greater. There is often little data available about conditions prior to large-scale settlement and use of these rivers, which makes identification of baseline or “natural” conditions difficult. Long-term, integrated research and monitoring can provide a clearer picture of ecosystem function, and with enough time and work a compelling case may eventually be made concerning a particular effect or trend, but these things are rarely, if ever, “proven.”

#### *Burden of Proof Should Be on Miners to Show No Impact*

Some environmental groups argued that while additional research was definitely needed, land management agencies should not have to prove that recreational placer mining causes significant impacts before restricting it. The burden should lie with miners to make the case that their activities do not have significant effects.

Mining groups acknowledge that large-scale or improperly conducted mining can be harmful to fish and habitat. Instances where it is asserted that small-scale placer mining activities can actually benefit fish are special cases and controversial. In general, the argument in defense of recreational mining tends to be couched in the premise that

overall impacts are negligible because relatively small amounts of material are being moved, and there are not that many miners anyway. Implicitly then, miners acknowledge there are probably some impacts, but they maintain that these are acceptably small. In environmentalists' views, acceptability is in the eye of the beholder, and the tacit admission that impacts occur clearly places the burden of proof on miners to show exactly what and how large these impacts are before mining is allowed to continue.

Miners and environmentalists invoke science in very different ways. Miners assert that mining should be innocent until proven guilty of impacts. Environmentalists argue that the obviousness of some level of impact, the legacy of past impacts in many rivers, and the importance of maintaining and restoring salmon runs places the burden of proof on miners. In addition, the complexity of the issue makes certainty an elusive goal. Requiring proof of impact reflects a lack of understanding of how ecosystems work, and is simply a stalling tactic while mining continues.

#### *Banning Suction Dredging Would Be Cheaper Than New Studies or Effective Monitoring*

Added monitoring and enforcement of state regulations, as well as increased scientific study, can help to clarify and mitigate the impacts of recreational placer mining. Clearly, however, such work would be time consuming and expensive. More to the point, it is likely that such work would not be conclusive for reasons outlined above – the state cannot monitor every miner, nor can scientific work conclusively resolve a number of important issues. Environmentalists understand this, and have noted that the funds and human resources necessary to research and monitor suction dredging activities and be sure that ecological impacts are known and minimized make it uneconomical. A much more cost-effective alternative to necessary research and effective monitoring would be to simply curtail recreational placer mining in Scenic Waterways.

#### *The Will of the People of Oregon Is Not Being Met*

The initiative voters passed in 1970 explicitly prohibited placer mining of any kind, and was intended to preserve and improve ecological and esthetic conditions that existed in Scenic Waterways at that time, not simply slow the rate at which conditions decline.

Many environmentalists believe that current implementation of the Oregon Scenic Waterways Act is not keeping the ecological, recreational and esthetic values in Scenic Waterways from being degraded. Because this can be at least partly explained by the way the Act has been administered, environmentalists maintain that the expressed will of the people regarding the Oregon Scenic Waterways System is currently not being achieved because of failure by state government agencies to vigorously implement and enforce the law. The continuation of recreational suction dredge mining is considered to be a clear example of this failure.

## Recreational Boaters

- River floating is one of the fastest growing forms of outdoor recreation in the Pacific Northwest.
- Most recreational boaters in Oregon are highly unlikely to encounter recreational mining on Scenic Waterways due to the limited number of mining sites on Scenic Waterways.
- Opposition to suction dredge mining is widespread among boaters who encounter such miners. This opposition, however, rarely results in complaints to land managers and commercial outfitters, or in calls to ban the activity.
- When boaters encounter suction dredgers, some level of recreation conflict usually results. Motor noise, intimidation and displacement of boaters, the presence and appearance of miner camps, sediment plumes and occasional safety issues contribute to conflict.
- The number of boaters on Scenic Waterways is increasing, while participation in mining appears to be declining, making future trends in boater-miner contacts somewhat uncertain.

### *Popularity of River Floating is Growing Rapidly*

River floating by canoe, kayak or raft is among the fastest growing forms of human-powered outdoor recreation in the United States, particularly in the Pacific Northwest, where growth in participation is outpacing population growth by a healthy margin (Outdoor Industry Association, 2002; Bowker, English and Cordell, 1999). Many Oregon rivers are highly valued for river running, and preservation of recreation opportunities was a primary reason that several were designated as state Scenic Waterways. We contacted a range of river managers, kayak and canoe clubs representing private boaters, commercial river trip outfitters, and retail boating equipment businesses statewide to solicit their views on boating trends, recreational suction dredge mining and Oregon Scenic Waterways.

In addition to floating and whitewater, boaters cited natural ecological and esthetic conditions, scenery and wildlife as attributes that make river running rewarding. Fishing from drift boats is also very popular in Oregon. Float anglers may share some attributes with boaters who do not fish, but there are also important differences, and conflict between these groups is an issue on some waterways. Therefore, the focus here is on kayakers, canoers and non-fishing rafters, with the views of fishing groups summarized in a subsequent section.

Federal managers on the Rogue River explained that growth in commercial rafting seemed to have slowed in recent years after a period of rapid expansion. River guides agreed with this assessment, but indicated that commercial boating was still

strong, and private boaters in hard shell kayaks, inflatable kayaks and rafts were growing rapidly in number. This was echoed by resident private boaters, who said that river running by individuals on the recreational reach of the Rogue was exploding. These boaters specifically chose weekdays to float because the weekends are now “too crazy” and “a circus.” Similar trends have also been noted on the Deschutes River.

Retail boating equipment businesses painted a picture of rapidly rising sales of kayaks, rafts and other boating gear. A recently opened Grants Pass shop that focused on retail kayak and raft equipment sales reported very strong business, and much faster growth than they had anticipated. The manager of a well-established Willamette Valley shop stated that dollar volume of kayak equipment sales had increased 30% annually over the past three years. Other shops reported similar stories of dramatic increases in sales.

### *Boaters Statewide Rarely Encounter Recreational Suction Dredging*

On a statewide basis, it was fairly common for boaters to say they were unaware that recreational suction dredge mining was allowed in Oregon Scenic Waterways, or that they had heard of it but had not personally seen it. This probably reflects the limited number of waterways in which dredging occurs, and the relatively small number of people who are recreational miners. Obviously, the chance that a boater will encounter a recreational suction dredger depends on whether the river chosen contains gold and is frequented by miners. Additionally, some smaller waterways are utilized by boaters mainly during the winter when flows are higher and by miners during the summer, which would serve to minimize contact between the two user groups on these streams.

Most boaters who had no direct experience with recreational suction dredging still disapproved of it in principle, for reasons roughly paralleling those cited by environmental and fishing interests. Several expressed surprise that dredging was allowed in designated Scenic Waterways. Some boaters were reluctant to strongly condemn or support dredging, although these individuals usually had no direct experience with it. In general their position was that while they did not personally support such an activity, the rivers should be open to all legal uses and that it was unfair to discriminate against someone just because they didn't agree with their recreation choice.

### *Nearly All Boaters Who Encounter Recreational Suction Dredging Oppose It*

Boaters we contacted who visit rivers where recreational suction dredging occurs had at least passing familiarity with the activity, and most had encountered miners at some point. Designated Oregon Scenic Waterways where boaters encounter miners include the Rogue, Illinois, Elk and North Fork of the John Day Rivers. Nearly all boaters that had encountered recreational suction dredging disapproved of it, many quite strongly, and a considerable number had anecdotes about first-hand contacts.

Motor noise was often cited as the most negative aspect of the encounter, but boaters also complained of sediment plumes and “trashy” or “unsanitary” miner camps.

Several boaters complained about miners camping near Scenic Waterways for weeks at a time and argued that this was essentially “squatting” on public land, which displaced other visitors from that location for as long as the miners remained. Many boaters who encountered suction dredgers echoed environmental and fishing group concerns about ecological impacts.

#### *Miners May Intimidate and Displace Boaters*

Several boaters (and other recreationists) relayed instances of being intimidated by miners, some of whom carried sidearms and behaved in what was thought to be a threatening manner. Miners were often perceived as acting territorial toward other recreationists who encountered them, and possessive of the area where they had established a camp, as if their mining activities included “rights” to exclude others from the site. In these instances, miners may very well be mining upon sites where they have a legal claim. They may also be taking advantage of confusion about the existence of mining claims and rights that accompany them. Boaters indicated that they sometimes avoided sites where they otherwise would have stopped to camp, run rapids or “surf” waves because of the presence and territorial behavior of miners.

#### *Safety Issues*

Private boaters relayed instances of safety concerns associated with suction dredging on two designated rivers, the Klamath and Illinois. Miners had placed dredge anchor cables across the entire stream channel, requiring kayakers to stop suddenly to avoid striking the cables, and portage around the obstacle. No serious accidents were reported, but the potential for one was said to be quite high in such instances where kayakers are not able to stop suddenly, which can be problematic for inexperienced boaters. A commercial kayak outfitter raised this issue as well, but explained that he tried to give a positive interpretation on recreational suction dredging by describing it as an historic activity when his clients asked or complained about it. This measure was intended to avoid perceptions that the trip was not of high quality.

#### *Most Commercial Outfitters Are Not Strongly Opposed to Recreational Mining*

Rogue River commercial rafting outfitters contacted were often neutral on recreational suction dredging, but some expressed concern about esthetic issues such as turbidity and bank erosion. Interpretation by river guides can strongly affect visitor perceptions, and guides are understandably interested in directing attention away from things that could potentially degrade experience quality. One outfitter indicated that their guides try to downplay interest in recreational placer mining, or attenuate any negative perceptions of it in an effort to provide a positive river experience. Our data collection methods did not allow us to interview clients of commercial rafting outfitters, who may or may not share the views of company owners.

Commercial boating outfitters may not often come in contact with suction dredge mining. Much of the commercial boating on the Rogue takes place in the Wild section, where dredging is not allowed. Recreational suction dredging is not an issue on the popular Deschutes River, another Oregon Scenic Waterway heavily used by commercial outfitters. Area managers indicated that commercial boating is not conducted on the North Fork of the John Day River, a Scenic Waterway where recreational mining occurs.

#### *River Manager and Boater Perspectives May Differ*

Federal managers on the Rogue River said that river floaters “occasionally” complain about recreational suction dredgers. Most managers indicated that recreational mining impacts on boaters were not a serious issue and that they do not receive enough complaints to warrant taking action. Boaters sometimes disagreed and interpreted managers’ responses as an effort to downplay the impact of recreational mining, perhaps because of inadequate staff for monitoring of recreation conditions and the controversial nature of the issue. This may result in a “triage” approach to management challenges, with conflict between recreational miners and boaters seen as both less pressing and more difficult to resolve than recreation access, crowding, capacity, or facility and site maintenance.

In addition, several boaters said they disapproved of recreational suction dredging and thought it should not be allowed, but admitted they had not made this case to river managers. Voicing complaints was viewed by some as “a waste of time” because mining was still legal, and river managers were seen as uninterested or unable to do anything about it. It was also fairly common for boaters to say it was pointless to complain about valid mining claims, although this is rarely the way miners obtain access to Oregon Scenic Waterways. One long-time Grants Pass resident involved in the fishing equipment industry noted that non-local visitors (who tend to be unfamiliar with suction dredge mining) comprise the majority of commercial outfitters’ clients. He argued that even if they encounter mining and question its legitimacy, these visitors are unlikely to develop strong positions and voice complaints during their short stay.

Taken as a whole, these factors suggest that the lack of a substantial number of complaints to river managers does not necessarily mean that recreational dredgers have no significant impact on boaters. Private boaters may not be sufficiently motivated or organized to complain, or pessimistic that anything would come of it if they did. Commercial visitors may visit for a short time, be diverted by guides wanting to avoid conflict, or may not feel knowledgeable enough to question local managers about why the activity is allowed. It is of course possible that conflict between boaters and recreational suction dredgers really is negligible in extent and severity, but the responses provided for this report give reason to at least question this assumption.

### *Future Trends Concerning Boater-Miner Encounters Are Uncertain*

Contacts between boaters and recreational suction dredgers may increase in coming years, but this somewhat uncertain. Rapid growth in numbers of private boaters indicates that encounters with miners may rise. Recreational mining could also increase in the coming years. An Oregon business that sells suction dredges said that more people are now visiting Oregon to mine because the regulatory climate in Washington and California is so “unfriendly.” This reinforces the conclusion that contacts may increase.

On the other hand, several long-time boaters said they saw fewer recreational suction dredgers now than they did several years ago, indicating that interest in recreational mining may be declining. Mining groups stated that participation is correlated to some degree with the price of gold, which is currently relatively low. If gold prices rise, participation in mining may also rebound. There are also some indications that miners are not so much fewer in number as concentrating more on tributary streams in order to be less visible or to seek better mining opportunities.

In summary, this analysis indicates that the average number of miners a boater encounters on a particular day seems to have declined. However, the number of boaters who encounter a miner may rise in future years if numbers increase in either activity. If rising numbers of boaters do indeed contact miners, conflict between these groups could also increase as well.

### Sportfishing Groups

- Sportfishing groups familiar with the practice of recreational placer mining generally expressed some degree of opposition, though the level of opposition varies.
- Sportfishers’ greatest concern involves the possible harmful effects of suction dredging on fish habitat and reproduction, and question the permissibility of dredging in rivers or areas that have been the focus of salmon restoration efforts.
- Fish are more likely to be affected by suction dredging in smaller streams than in larger rivers.

### *Sportfishers Share Many Concerns with Environmentalists*

Recreational fishing is a perennial favorite among outdoor activities in the United States. Oregon rivers and lakes are heavily visited by private sportfishers and also support a significant commercial fishing guide industry. Some designated Scenic Waterways are internationally known for their salmon and steelhead fishing. We contacted groups representing non-commercial and commercial fishing interests including regional fishing clubs, fishing guides and retail businesses that depend on the sportfishing industry. These groups were often suspicious about the effects of

recreational placer mining on fish but as with environmental interests, strength of opposition varied with how familiar the group was with the activity. Most sportfishing groups are actively opposed to recreational placer mining, holding essentially the same views as environmentalists, but with an even stronger focus on fish habitat and reproduction, and several were quite knowledgeable and articulate about fish biology.

Some groups were also concerned about impacts from suction dredge motor fuel spills. Motor noise was a somewhat less significant issue for this group than for environmentalists. This can be partly explained by the diversity in fishing methods and destinations represented, from flyfishing in small streams to spincasting in large rivers or the ocean. Sportfishers access fishing areas any number of ways, including motorboats, and may use other motorized recreation equipment such as generators for camping. Some groups were reticent to criticize recreational suction dredge mining on the basis of motor use, because this was seen as potentially hypocritical. Flyfishing groups were more likely to parallel environmental groups and make a case for human-powered recreation. All fishing groups did agree on what matters most: impacts on fish must be understood, monitored and prevented.

Many groups pointed out that extensive fish habitat restoration work has been conducted in Oregon and much more is needed to restore fish runs to long-term viability. Thus, they strongly questioned whether even small-scale mining makes any sense in streams that need, or have had such work done. Some groups' members actively participate in these restoration efforts, both through fundraising and implementing the actual work. These groups were understandably quite strongly opposed to recreational placer mining in any streams that were candidates for restoration.

#### *Suction Dredging Impacts Smaller Waterways More Heavily*

Fishing groups frequently pointed out that impacts from recreational placer mining can vary greatly depending on the size of the stream. Suction dredging is most questionable in smaller volume streams, where it can significantly impact water quality and bed stability across the entire stream channel. In larger streams and rivers, dredging probably has less overall impact, although this is not to say it should be condoned. It was also noted that smaller streams were not usually major recreation destinations, and that miners in these areas were therefore less visible, and perhaps more likely to violate regulations intended to minimize impacts on fish.

A long-time resident of the Rogue Basin now employed in the fishing equipment industry was quite certain that many area miners did not follow regulations very well. He said he had observed riparian conditions in the Illinois and several other tributaries of the Rogue decline significantly over the past twenty years due to recreational placer mining. He also indicated that the BLM is seeking funding through federal compensation payments to mitigate and clean up impacts of recreational miner campsites. Questions about agency oversight and monitoring of smaller waterways were voiced by fishing groups elsewhere in the state as well. Because of the attention required to deal with

heavy and diverse use of the Deschutes and other major rivers, some groups thought it unlikely that state agencies were monitoring less popular Scenic Waterways very often, if at all.

### Campers, Hikers and Other Recreationists

- A variety of river users have some familiarity with recreational placer mining, and while views on the activity can vary (or be nonexistent), those who do have a strong view tend to express opposition for reasons similar to boaters and sportfishers.

Recreational boaters and sportfishers are two prominent types of recreationists who depend on rivers, but campers, backpackers, day hikers and birdwatchers also frequent Oregon Scenic Waterways and may encounter recreational suction dredgers. Several people we contacted submitted anecdotes about encountering suction dredgers while hiking. Attitudes towards recreational mining based on these encounters were mostly negative, for reasons similar to those of boaters. Federal managers on the Rogue River indicated that campers actually complained about recreational suction dredgers more often than boaters.

Our methods did not permit us to sample all types of visitors, and in any case there are limits to the utility of differentiating among them. Casual visitors that do not directly depend on rivers may not have strongly developed views on recreational placer mining, but other land-based river visitors may strongly disapprove of the activity. This certainly seems to be true of birdwatchers, another rapidly growing recreational activity. In general, opinions of hikers and campers did not appear to be significantly different from those of the average boater or sportfisher.

### Watershed Councils

- As institutions that operate most effectively by using a consensus-based approach, watershed councils usually prefer to avoid involvement in politically divisive issues such as recreational placer mining.

Watershed councils are institutions comprised of stakeholders with a common interest in sustainable management of lakes, streams and rivers that make up the watershed where they live and work. Watershed councils have emerged as a result of conclusions that watershed protection is unlikely to be effective without engagement of local constituencies, although some environmental groups have expressed wariness that business interests have too much influence at this level. Ideally, a watershed council should include all local interests in order to identify shared watershed values thought to be important.

In actual fact, the makeup, activities and policy directions of a particular council can vary widely with issues faced, personalities involved and level of participation from constituent stakeholders. The basic idea is to assess past and present conditions of rivers and lakes in the watershed, work toward consensus on desired future conditions, and develop watershed protection and restoration projects. Watershed councils have paralleled increasing scientific consensus on the need to address land management issues at the landscape level, and realization that the benefits of sound watershed management transcend all ownership and political boundaries.

#### *Watershed Councils Are Consensus-Based*

One of the primary tenets by which most watershed councils operate is a consensus-based approach to addressing watershed issues. The overarching goal of moving ahead on watershed projects upon which everyone agrees sometimes precludes attention on other important but more controversial issues. Some watershed council spokespersons contacted specifically stated that they had a policy in place to avoid taking positions on issues for which there was not consensus within the council. It had been agreed that political issues with ramifications for any council member or seen as potentially controversial could be counterproductive to finding common ground. The goals were to locate areas of consensus or agreement and avoid issues on which common ground was unlikely or about which some council members held opposing views.

For this reason, most watershed councils were unwilling to take a position on recreational placer mining. This was especially true for watershed councils operating in areas where recreational placer mining occurs, such as the Rogue River and North Fork John Day areas. Individual watershed council members were more willing to express their views. Unsurprisingly, the views of individual members closely paralleled the views of interest groups they represented.

#### Landowners

Citizens who own land on Scenic Waterways that sits within the quarter-mile corridor have a variety of experiences with the Scenic Waterways Program. For this assessment, several landowners were contacted in order to get a spectrum of views about how the program is administered and about recreational placer mining. Landowners whose land is on Scenic Waterways are stewards of lands that have been deemed to be very special to Oregonians. The landowners themselves are the first to note this, and to point out that they have a special responsibility. Many of them also noted that the reason the state of Oregon designated areas as scenic is the same reason they purchased the land.

None of the owners contacted for this assessment had ever witnessed any recreational miners with suction dredges operating near their property. Some did not know about the activity at all. This is not surprising, considering that the gold bearing sites on Scenic Waterways have not been adjacent to private homes. Most of landowners did state, however, that if suction dredge mining were an activity pursued along stretches

of the rivers where they live, they would not be inclined to view this favorably, and would support a ban on Scenic Waterways.

### **WHAT THE GOVERNMENT AGENCIES SAY**

Multiple land ownership patterns, human use history, and jurisdictional boundaries often characterize Oregon Scenic Waterways. Some have both state and federal scenic designation, while others do not. Several are designated critical habitat for endangered fish species. Some traverse state parks and many see heavy recreational use.

The range of social and ecological values attached to Oregon Scenic Waterways ensures that several different state and federal agencies are involved in management and regulation of recreational placer mining. In the following section we summarize the roles and views of these agencies:

- Oregon Parks and Recreation Department
- Oregon Department of State Lands
- Oregon Department of Water Quality
- Oregon Department of Fish and Wildlife
- Oregon Water Resources Department
- US Department of the Interior Bureau of Land Management
- US Department of Agriculture Forest Service
- US Army Corps of Engineers
- Oregon Department of Geology and Mines
- US Department of the Interior Fish and Wildlife Service
- National Marine Fisheries Service
- Oregon State Police

#### Oregon Parks and Recreation Department (OPRD)

- OPRD is the agency with overall administrative responsibility for Scenic Waterways.
- The agency has little to do with overseeing or regulating suction dredge mining.
- The agency has expressed in the past its preference to eliminate recreational mining from Scenic Waterways as a practice that is inconsistent with the goals and priorities of the program.

OPRD is the lead agency for the Scenic Waterways Program. It maintains overall responsibility for program administration, coordinating with federal, tribal, state and local agencies as necessary to protect and enhance the special attributes of Scenic Waterways. The agency's primary responsibility involves ensuring compliance regulations intended to protect waterway qualities within the one-quarter mile corridor of land along the water's edge. OPRD must be notified of certain activities proposed within this corridor,

such as cutting trees, clearing land, mining, constructing roads, railroads, utilities, buildings, houses, or other structures, or other activities that affect the scenic qualities from the river perspective.

Proposed uses or activities may not be started until the landowner's written notification is approved, or one year after the notice is accepted. Landowners are directed to comply with limitations regarding these activities, and in fact, the lion's share of OPRD efforts on Scenic Waterways involves working with landowners to bring land use activities into compliance with regulations. The agency generally reaches agreement with landowners whose original land use plans did not comply with regulations. However, the agency does have the authority to purchase property or scenic easements from landowners and in certain cases it can exercise the state's right of eminent domain, but these options have been used only rarely.

With respect to recreational placer mining, OPRD does not carry out any day-to-day administrative responsibilities such as issuing permits or monitoring mining activities. Agencies that do issues permits – DSL and DEQ – do not coordinate with OPRD in issuing permits or asking for consultations on applications. In the past DSL did do this, but since the process has generally become routine, the practice of soliciting comments from OPRD has been discontinued.

OPRD does not have direct administrative responsibilities for recreational placer mining in Oregon Scenic Waterways, but as the lead agency for the program, OPRD has expressed its views on recreational mining in the past when asked to comment by the state legislature. In general, the department has expressed the view that recreational suction dredging should not be permitted on state Scenic Waterways. OPRD bases this position on the original placer mining prohibition in the Scenic Waterways Act and the subsequent legal opinion in 1994 supporting that prohibition.

OPRD staff also noted that these waterways are considered special by virtue of certain scenic and other physical qualities, and suction dredge mining diminishes these values. Dredging is noisy, causes turbidity in the water and has potential impacts on the health of fish populations. More importantly, mining is not typically considered to be a recreational activity in the way that camping, hiking, boating and fishing are. The departmental values of OPRD involve the preservation of open spaces to be used as parks and for recreation in general. These values do not often include mining, even on a small scale, as one of the activities that parks, scenic rivers, and open spaces should be used for. The practice seems inconsistent with all the other values that are protected by the "scenic" designation.

OPRD staff pointed out that they see very little placer mining on the scenic rivers they manage, and some have noted, that based on what they actually see, there is not a strong case to be made that recreational miners are having an adverse ecological impact. However, Scenic Waterways staff also explained that only four of them cover the entire state, so they are not in a position to actually see and monitor most of what is done in the

waterways. Waterway administrators familiar with recreational placer mining indicated that impacts associated with miner camps and access roads were significant issues, but that DSL did not consult with OPRD any more about specific permits so these impacts had become harder to assess.

### Division of State Lands (DSL)

- DSL regulates all removal and fill of gravel from Scenic Waterways.
- Recreational miners may move no more than 25 cubic yards of material from a stretch of river in any year, and all recreational mining in Scenic Waterways requires a DSL permit. DSL, however, does not engage in monitoring specifically for recreational placer mining, though it did for a few years.
- A number of DSL regulations have been adopted to protect fish, wildlife and habitat on rivers and stream.
- The agency states that if all rules and regulations are strictly adhered to, environmental impacts will be kept at an acceptable minimum level.

DSL maintains authority over the beds and banks of Oregon’s waterways, up to the ordinary high water mark, with the goal of effectively managing and conserving the state’s natural resources. State law prohibits any removal, fill, or alteration of the beds and banks of all scenic waterways, except under certain conditions, which are specified in law and regulations. In most cases, activities that involve removal, fill, or alteration of the beds and banks require a permit to be issued by DSL.

### *DSL Regulates and Issues Permits for Recreational Placer Mining*

In Scenic Waterways DSL has provided a set of regulations that are designed to provide extra protections, due to the fact that these waters have been deemed special by the state (similar regulations exist for waterways designated as “Essential Salmon Habitat”). In fact, it is this regulatory function – the issuing of permits for removal/fill activities – that comprises the greatest efforts of DSL in connection with the state Scenic Waterways System, and a good part of that effort involves recreational placer mining. Recreational placer mining, by definition, involves the movement of materials in rivers and streams, and since Scenic waterways are specially protected areas, very strict standards apply for working in the river or on the banks, regardless of the amount of material involved. Since 1996, DSL has required that suction dredge operators must obtain approval from DSL before any work can take place that moves material or alters the bank in any way. In order to be approved by DSL and obtain a removal/fill permit, an operator must meet the following conditions:

- The dredge must have an intake nozzle no larger than four inches in diameter.
- The dredge must have an engine of 16 horsepower or less.
- Operators may work only during specified in-water work periods.

- Operators may not move more than 25 cubic yards of material annually per stream segment.

Operators are also subject to numerous additional conditions, including the following important items. Recreational placer miners cannot:

- Work outside the wet perimeter of the river (no mining on dry land)
- Undercut the riverbank, also known as highbanking
- Dam or divert the waterway
- Obstruct fish passages
- Remove woody vegetation from the bed or bank
- Move or remove boulders, logs, stumps, or living plants
- Work outside the hours of 8 am to 6 pm.

The thrust of all these conditions is to allow for legitimate recreational uses, as allowed by the state of Oregon, while minimizing impacts on the physical landscape or on fish and wildlife.

To obtain a permit, recreational miners must submit an “Oregon Removal-Fill Application Form” (the same application is used for those who operate in “Essential Salmon Habitat”). This application has been recently simplified to make the application process quicker and less cumbersome. It asks operators of suction dredges to provide their name and address, and to specify the type of equipment to be used, including horsepower and suction hose size. In Scenic Waterways (but not in Essential Salmon Habitat), operators must also include the name of the waterway(s) to be mined, the section of the waterway, the estimated amount of cubic yards to be moved, and the estimated number of work days. The permit issued lasts for three years before it must be renewed. (The old application, at 4-plus pages, asked for much greater detail, including some information the average recreationist might not know.)

DSL also requires miners to send a year-end report form summarizing their activity for the year. Failure to report may result in one’s approval being revoked. The reporting requirement has been in effect for several years but has not been well enforced (less than 10% of the year end reports were usually collected, and no permits were revoked for failure to comply). DSL expressed its intention to better enforce this requirement in conjunction with the new application process. By collecting detailed information at the end of the year, DSL expects that it will be better able to compile data on usage and promote compliance with regulations.

### *Numbers of Miners*

For the past several years, DSL has compiled data on the number of permits issued each year, and has also gathered some information on compliance. In 1995 DSL

began issuing the current removal/fill permit to recreational placer miners on Scenic Waterways, and rates of use are as follows:

	# of Removal/Fill Permits Issued for Scenic Waterways	# of Removal/Fill Permits Issued for All Waterways
1996	49	123
1997	87	339
1998	149	480
1999	22	109
2000	31	116
2001	36	162
2002	52	308

As of October 2002, there were 121 active removal/fill permits for recreational placer mining in Scenic Waterways, and 584 permits in total for recreational mining statewide.

After beginning the practice of issuing permits, DSL began to visit mining sites around the state to monitor compliance with the requirements for recreational placer mining in Scenic Waterways and Essential Salmon Habitat (regulations governing both areas are the same). The monitoring effort went on for three years, and what DSL found is that, of the miners they contacted in the rivers and streams, less than half the miners had permits. However, DSL did find that miners maintained greater compliance with the actual practices prescribed in its regulations, also known as Best Management Practices (BMPs).

Compliance Rates			
	# Miners contacted	% Compliance with permit	% Compliance with BMPs
1996	80	7.4	39
1997	67	20.9	89.5
1998	31	48.4	83.9

DSL stopped monitoring efforts after 1998, with an understanding that previous efforts were having the desired effect, educating the miners as to what is expected of them and getting them to comply with the regulations.

*Impacts Are Acceptable Provided That Regulations Are Followed*

Making certain that regulations and best management practices are adhered to is an essential element of preventing adverse impacts. DSL operates on the basis that recreational placer mining does not have a significant impact on the health of the rivers and streams, on fish and wildlife, and on the free flowing nature of the waterways, **AS LONG AS BEST MANAGEMENT PRACTICES ARE FOLLOWED**. If they are

not followed, DSL points out that there can be significant harmful impacts. For example, tailing piles that dam the waterway can raise stream temperatures, block water flows, or create barriers to fish. Highbanking can decrease the amount of algae and number of invertebrates, both of which provide essential forage for juvenile fish. It also destabilizes the bank and increases erosion. Removing woody vegetation disconnects the riparian area from the waterway, impacting the health of the riparian area and encouraging erosion. Finally, operating outside the in-water work period can impact fish populations by causing the destruction of redds.

One thing DSL pointed out that it does not believe is currently a problem is the cumulative effect of recreational miners. The number of new permits issued each year for mining in Scenic Waterways is not a large number. Therefore the density of use, and the resultant cumulative effects, are not issues that DSL believes it needs to address at this time.

#### Department of Environmental Quality (DEQ)

- DEQ is responsible for protecting the water quality in Oregon streams and rivers.
- DEQ issues permits for all suction dredging in the state, and no one is permitted to dredge on any state waters without a DEQ permit. The agency, however, does not engage in monitoring or enforcement of its permits.
- A number of regulations have been adopted to protect water quality on rivers and streams.
- The agency states that if all rules and regulations are strictly adhered to, environmental impacts will be kept at an acceptable minimum level.
- The agency has stated that the impacts on water quality from suction dredging are small compared to other substances and practices DEQ oversees and regulates. Because of this, the agency is reviewing its permitting requirements and procedures with respect to recreational mining.

DEQ is a regulatory agency whose job is to protect the quality of Oregon's Environment – protecting and improving Oregon's water and air quality, cleaning up spills and releases of hazardous materials, and managing the proper disposal of hazardous and solid wastes. The water quality division is responsible for protecting the state's waters, with a mission to ensure that water quality standards are upheld for surface and groundwater so that they are safe and clean for all uses. DEQ is not charged with upholding or enforcing any special requirement for Scenic Waterways. The agency applies its water quality rules and standards uniformly statewide. DEQ interacts with the Scenic Waterways program in a variety of ways. It is provided the opportunity to comment on land use notifications. Also, if some activity on a Scenic Waterway may affect water quality through erosion or discharge, DEQ is involved in the permitting and review process.

### *DEQ Regulates and Issues Permits for Recreational Placer Mining*

With respect to recreational placer mining, DEQ is involved through the permitting process, and this represents the major part of DEQ's involvement with the Scenic Waterways program. Before recreational miners are allowed out on the state's waters, they must first obtain a permit from DEQ. The application process is carried out simultaneously at DEQ and DSL, with a single, one-page application to be filled out and sent to both agencies. Each agency then issues its own separate permit. DEQ reports that there are currently a total of 1011 people permitted for recreational suction dredging. This number does not include a distinction between Scenic Waterways and all others. The number of DEQ permits may larger for two reasons: they stay in effect for a longer period of time, so even if an individual has not used his equipment in a few years, he may still have an active permit; DSL does not require permits outside Scenic Waterways and Essential Salmon Habitat if the amount of material to be moved is less than 50 cubic yards, so some suction dredgers can operate without a DSL permit.

Until this year, DEQ has issued permits to miners under EPA's National Pollutant Discharge Elimination System (NPDES). These NPDES permits are administered by the states to control discharges into waterways, and DEQ has used this program and a particular type of permit, known as 700-J, to regulate recreational placer mining. In March 2002 these permits expired, but rather than renewing them, DEQ has begun issuing a temporary Mutual Agreement and Order (MAO) while it reviews the appropriateness of NPDES permits for recreational placer mining. The reason for this review is that DEQ wishes to determine if tailings from suction dredges constitute "discharge" into the water. The minerals were originally part of the riverbank before being run through a dredge, and thus no new materials are being discharged into the water once the tailings are redeposited into the river. In the interim, DEQ will issue an MAO to recreational miners that includes all the same stipulations and practices that miners must adhere to.

These provisions include the following: no dredging outside the active stream channel or on the stream banks; turbidity must be minimized to the local dredging area and cannot be visible 300 feet downstream from working dredges; no discharge of tailings into a natural pool if this will reduce the depth or volume of the pool; no harassment of fish in the stream, which include providing safe passage for fish through the mining area; no dredging outside the ODFW in-water work period guidelines; no spillage or disposal of fuel or oil into waters; no disturbance of rooted or woody plants in the stream; no undercutting of riparian vegetation; no dams, channel alterations or diversion of water.

### *Water Quality Impacts are Minimal Provided Regulations Are Followed*

DEQ's view is that its role is to prevent or mitigate harm to water quality and that these regulations accomplish exactly that. Like DSL, DEQ operates under the assumption that these best management practices rules must be followed, and when they

are, this ensures that recreational placer mining will have only a de minimus impact on water quality. Any impacts that do occur are confined to the dredging area, they are not significant at the time they occur, and they are of short duration.

To provide a comparative perspective, DEQ noted that recreational suction dredge mining is considered to be a very small activity when it comes to impacting water quality. There is no discharge of pollutants into the waterways, there are no chemical components being used in the mining process, and for these reasons, recreational placer mining is one of the most benign activities the department regulates, nor does the agency monitor or enforce its regulations. This is in part due to the fact that the resources are not available to monitor compliance, but this is a low priority for DEQ, and the agency would not be likely spend additional funds on enforcing compliance.

#### *Recreational Mining Can and Does Produce Some Benefits to Water Quality*

DEQ noted that recreational mining can actually produce a benefit to water quality, when miners remove mercury from the rivers left behind by old commercial mining operations. At the “Dredge Earth First” rally in Roseburg in July 2002, ten pounds of mercury were collected for disposal, and miners stated that this amount was only a small portion of what is often found. Some miners reported encountering one pound of mercury for every 4 to 5 hours of dredging in areas where high concentrations of mercury remain in the water. (Ten pounds of mercury, a substantial amount, is equal to the mercury in 900,000 fluorescent bulbs – about half the number recycled in Oregon each year.) DEQ suggested that some educational efforts and one technological innovation currently under development, a mercury trap for suction dredges, could further contribute to the removal of mercury from Oregon waterways.

#### *Concerns*

Some concerns were also expressed at DEQ. Even by staying in compliance with the regulations covering recreational placer mining, individuals can still have an impact, and a large one if they are not careful stewards of the natural resources. It depends very much on the individual miner and the treatment he affords his surroundings. Even compliance with the rules cannot prevent all impacts. Also, there is little understanding of the cumulative effects of placer mining on water quality – either from multiple users or from mining being conducted in the same places year after year. In addition, since there are multiple uses on these rivers, there is no good way to determine what types of activities are having which impacts over the long-term. Lastly, it was suggested by some in the agency that the permitting process has become so routine it almost amounts to a rubber stamp, and perhaps this process might be reviewed to make sure it is furthering the goals being sought.

### Oregon Department of Fish and Wildlife (ODFW)

- ODFW is responsible for protecting fish and wildlife, and their habitat throughout the state.
- Recreational mining is limited by ODFW's recommended "in-water work period," which prohibits this activity when fish are most likely to be spawning and when eggs and fry are present in the water. Work periods are applicable on all fish bearing waters and usually last a few months during the summer and fall.
- The greatest protection to fish and wildlife on Scenic Waterways would occur if no recreational mining took place. However, ODFW guidelines, combined with DSL and DEQ regulations significantly mitigate the environmental impacts of suction dredge mining.

ODFW is responsible for managing and protecting Oregon's fish and wildlife and their habitats. The agency advises local, state and national agencies on policies that affect Oregon fish and wildlife, and works with them as well as public and private landowners to improve habitat. It issues hunting and fishing licenses, regulating these activities to protect animal populations. ODFW also develops guidelines regarding what is called the "in-water work period," those times of the year when certain activities are permitted. These can include riparian restoration, road/bridge construction and repair, work on agricultural irrigation projects or municipal water projects, and of course, recreational placer mining.

#### *"In-Water Work Periods" Account for Potential Impacts to Fish, Not Scenic Designations*

ODFW guidelines are in place to minimize impacts, and potential impacts, to fish, wildlife and habitat resources, and they help the public plan their activities around times when streams and rivers are off-limits to certain uses. For the most part, the guidelines protect fish species, and the agency's fish biologists make the recommendations for in-water work periods. Work periods are determined by the species of concern, and the time of year they are in particular parts of a river or stream. This involves surveys of specific areas to find evidence of when fish, eggs or fry are present, and the result is a set of guidelines that are tailored to the conditions of each area covered. The idea is to avoid work during the most vulnerable periods of the life cycle, including migration, spawning, and rearing. For all listed streams and rivers, the work period applies not only to these specific areas, but also to the watershed as a whole, including unlisted upstream tributaries and associated lakes and reservoirs. In some cases, exceptions can be made to extend the work period for a given activity in a given year if it is determined that fish species are not present at the time when work would be carried out.

ODFW does not produce guidelines that are specific to designated Scenic Waterways or issue special permits and licenses for these areas – fish, wildlife and habitat receive equal levels of protection throughout the state. The agency is, however,

an important part of the program and works closely with OPRD and other agencies to manage and protect fish and wildlife. The in-water work periods are the most significant part of their contribution. ODFW also reviews all land-use notifications sent to OPRD, and it sometimes reviews DSL removal/fill permits, including those involving individual permits for recreational placer mining. If ODFW finds that an activity may be harmful, it notes the potential harm and suggests alterations to the work period or the area to be worked in. This review process is the agency's other major responsibility for the Scenic Waterways program.

#### *ODFW Guidelines Contribute to Making Impacts of Suction Dredge Mining Acceptable*

The in-water work periods vary from place to place, but in most areas where recreational placer mining takes place, the season usually lasts three to four months, in the summer and part of the fall. The guidelines are in place to mitigate any environmental impacts, but the extent of the impact on fish from suction dredge mining is not always clear. ODFW agrees that most recreational mining is done on a small scale, and that the impacts are generally small enough that they can recommend mining be allowed. As long as the regulations are followed, the damage that can potentially be done to an area in a scenic waterway is not large. (ODFW and others noted that the relative impact of suction dredge mining in smaller streams and tributaries can be much more significant because of the relatively small size of the waterway, but this consideration is outside the scope of this report.) Impacts do depend, however, on individual behavior – a careful miner can have less impact than a careless group of campers. The agency noted that the regulations appear to be doing the job they were intended to do, covering the vast majority of areas and periods where there could be significant impacts.

While the agency notes that following the guidelines, along with all DSL and DEQ requirements, will mitigate the damage done to fish, eggs, fry and habitat, it cannot completely eliminate them. There is always some impact, and in some rivers there are always fish present at a vulnerable part of the life cycle, even if eggs have already hatched. This has led to some concerns at ODFW. One is the general sense that the onus is on the agencies to prove serious impacts before protective actions are taken, not on the miners to show negligible impacts, and this may not be the most effective means for ensuring protection of fish and streams. The agency also noted that impacts are very difficult to quantify. A number of activities take place in the state's rivers, so determining mining's exact contribution to changing the natural dynamic of a waterway is next to impossible. Nonetheless, some things obviously do change the natural cycle of the river. For example, the turbidity caused by suction dredging stirs up invertebrate food sources that juveniles like to feed on. Miners have suggested this is a positive development – they are feeding the fish – but this means that these food sources will be gone shortly and then the food sources for the juveniles will be minimal. The effects of upsetting the natural feeding cycle may not be quantifiable in a study, due to multiple uses and their cumulative impact, but it could be an important factor that affects the survival of fewer juveniles and results in smaller populations in the long-term. Another concern is density of use. Miners understandably tend to concentrate in certain spots

where gold is most plentiful. Sometimes mining organizations take large groups to a single area. This can have a significant impact on fish and habitat, but the state has little or no regulatory authority over this type of use.

In sum, the most beneficial outcome for fish, wildlife and habitat would be for no mining activities to take place. However, the guidelines and regulations mitigate or prevent serious harm. Moreover, even without recreational mining, other activities would still impact fish, wildlife and habitat.

#### Oregon Water Resources Department (WRD)

- WRD grants water rights throughout the state, and is responsible for assuring that the free flowing character of Scenic Waterways is maintained.
- The agency has determined that recreational mining, which it has defined in regulation as suction dredging with a hose no larger than 4 inches in diameter, does not create a diversion of water and therefore has no effect on water quantities and flow.

WRD is responsible for granting water rights to various users; they are the body responsible for permitting and prohibiting various uses of the state's water. Under the Scenic Waterways Act, WRD (and the Water Resources Commission, which directs the activities of WRD) has multiple responsibilities. Within Scenic Waterways, WRD has the authority to deny a number of uses of water, including dams, impoundments, certain mining operations, and many other activities. Curbing these activities in certain parts of the state was, in fact, one of the primary reasons for establishing the Scenic Waterways System in the first place. These types of activities are not eligible to receive water rights on Scenic Waterways. This is true not only on stretches of rivers designated as scenic, but it can also be applicable to areas upstream as well. WRD must make determinations about the likelihood of an upstream activity to significantly affect water quantity. If an activity will ultimately affect the free-flowing character of a Scenic Waterway downstream, then WRD is not supposed to grant a water right for that activity.

WRD will grant new water rights until there is an effect on water quantity, and there is a standard that has been developed to weigh the effects of new water rights. This standard is known as the Diack flow, which is the amount of water needed in a river to preserve its free-flowing character. The establishment of Diack flows resulted from a lawsuit brought against the state. The case established that WRD is required to limit water usage if such usage will diminish the free flowing character of scenic rivers. WRD has been routinely criticized for not meeting the goals of the Diack flows, and allowing too much water to be allocated.

WRD is also charged under the Scenic Waterways Act to work collaboratively with other state agencies on actions that involve Scenic Waterways. WRD is to review and concur on management plans for adjacent lands, on land condemnation actions, and

on new additions to the Scenic Waterway System, and the agency is given an opportunity to make comments whenever any of these actions take place.

*WRD Considers Recreational Mining to Have Minimal Impact; It Does Not Divert or Take Water*

With respect to recreational placer mining, WRD has little to no involvement in the day-to-day management of these activities. WRD wrote the regulation that defined the parameters of what is meant by the term “recreational,” and from this definition, DSL and DEQ have established their permitting guidelines and procedures. The definition of recreational as “utilizing mechanized or hydraulic equipment, except a motorized surface dredge with a suction hose intake four inches or less in diameter” has effectively meant that no recreational equipment is capable of moving enough water to divert or disrupt the free flowing character of any of the state’s designated Scenic Waterways. These waterways are not small streams and tributaries, but rivers whose flow cannot be significantly altered by a suction dredge with a four-inch hose. Moreover, water pulled into a suction dredge for mining purposes stays in the river. There is no taking of the resource out of the river. Thus WRD has determined that there is no diversion or taking of water by recreational placer miners, no water quantity issue at stake, and thus no affect on the free flowing character of the waterway. As far as the responsibility of WRD is concerned, recreational placer mining has de minimus effect. Therefore the agency has no permitting authority or responsibility for this activity, and has expressed no opposition to recreational placer mining in scenic waterways with respect to its responsibilities.

US Bureau of Land Management (BLM) and US Forest Service (USFS)

- Federal agencies manage significant amounts of land in Oregon.
- Mining is permitted on federal lands subject to applicable federal and state regulation, though both agencies have found numerous examples of non-compliance.
- At times regulations are inconsistent across BLM and USFS lands, and are also at times inconsistent with state regulations.
- Environmental impacts of recreational mining are considered to be small by federal land managers, as long as regulations are adhered to. There are, however, some concerns about ancillary activities – camping, getting access to mining sites – and possible long-term cumulative effects of suction dredging.

The BLM and the USFS manage a significant portion of federal land in Oregon, and have an especially strong presence in areas that are scenic, wild, forested, or otherwise notable for their special features. As a result, these areas under federal management are highly visited by various recreationists for these special qualities.

The BLM and the USFS maintain a significant presence on vast tracts of land throughout the state, in contrast to state agencies that do not and often cannot. As a result, officials at OPRD and other state agencies often comment that federal agencies in many ways “carry” the state, taking responsibility for management and supervision of activities – recreation, fishing, boating passes, recreational mining, to name a few – that should involve greater responsibility from Oregon state agencies. Without this federal presence and assistance, effective management of many lands and waterways throughout the state would be severely diminished.

There are opportunities for placer mining on some lands that BLM and the USFS manage, and miners from both in and out of state will frequent available sites during the appropriate in-water work periods. Most active miners on BLM and USFS lands are not working in Scenic Waterways, but as both miners and land managers note, suction dredging is suction dredging no matter where it takes place. Land managers have provided comments and observations based on all lands and waterways they manage, not just areas that include designated state Scenic Waterways. In most cases, the observations and views are applicable across areas. (Most mining activities occur on mining claims made on federal lands under the 1872 Mining Law. This is not considered recreational mining and its permissibility is not at issue in the Scenic Waterways System.)

#### *The Impacts of Recreational Mining Not Considered Significant*

Both BLM and the USFS noted that recreational mining is exactly that: not for making a living but indeed engaging in recreational activities. First of all, recreational miners are engaging in very small-scale operations (especially when compared to current and past large commercial mining operations on federal lands). Second, their activities do not involve any claims involving property rights. Third, there are no commodities coming out of recreational operations. People generally recover only very small amounts of gold, and this gold has no economic impact. These last two items are important distinctions for federal land managers in considering different types of mining operations.

It follows from this assessment that the impacts of recreational mining are not usually significant. This seems to be especially true for larger rivers, which tend to be those that make up the Scenic Waterways System. (A suction dredge with a four-inch hose has a proportionally greater impact on a small stream or tributary than it does in a larger river.) Both BLM and the USFS are in the process of reviewing mining practices in areas they manage in southwest Oregon and in both cases their respective assessments suggest that if proper guidelines are followed, impacts can be kept at an acceptable level. The USFS and BLM have both produced pamphlets describing the practices that suction dredgers need to follow in order to mine with acceptable impacts. (The USFS has also completed a Draft Environmental Impact Statement that will be reviewed in a later section.)

Acceptable in this case means evidence of mining that includes: minimal sedimentation of the waterway, small tailings piles that are then redistributed if necessary to prevent dams or diversion of waters, and a hole where the suction dredge removed gravel from the riverbed. Operations which do not impact the waterway more than this are considered to have minimal environmental impact. These agencies also suggest that because the winter rains and spring runoff redistribute all tailings and move more gravel than recreational miners do, there is little to no evidence each new year that recreational mining has even taken place in areas where regulations have been followed.

In spite of this understanding, there are three major concerns: the level of compliance with regulations, cumulative effects (which are harder to assess and almost impossible to measure) and ancillary impacts that accompany suction dredging. In northeastern Oregon, BLM reports that there is often very good compliance with regulations among suction dredgers. However, the USFS reports that in the southwestern part of the state compliance is not as good, especially on smaller waterways where most mining activity takes place, and this results in heavier environmental impacts.

#### *Federal Agencies Are Doing Some Monitoring; The State Is Doing Much Less*

As noted above, DSL and DEQ do not monitor the suction dredging activities they permit, so when violations do occur they are not met with any penalties. This makes it more likely that the same violations, and thus the same impacts, will occur repeatedly. BLM and the USFS are not required to enforce state permits on their lands, and for the most part they do not involve themselves with state requirements. They do, however, watch for abuses, and in parts of eastern Oregon, the BLM does in fact check to see that recreational miners are in compliance with state permitting requirements.

#### *Cumulative Impacts Are a Concern*

Federal land managers are also concerned about cumulative impacts of suction dredging. These are very difficult to measure and quantify, and are nearly impossible to attribute to one type of activity or another. Considering that Scenic Waterways are open to multiple uses, making a definitive determination that recreational mining has a certain long-term impact seems to be beyond current scientific capabilities. Federal land managers note, however, that scientific certainty is not necessary to make qualitative assessments about the long-term health of waterways and riparian areas. Recreational mining takes place at or near sites where mining occurred in decades past. The damage done from these large-scale commercial mines was often significant, and in many cases these areas are still recovering from the “insult.” Though the commercial operations had far greater an impact than could ever be caused by recreational miners, any additional mining in these same areas means that recovery from historic practices is likely to be weakened. Some officials submitted anecdotal evidence that there are noticeable differences in riparian areas where mining does and does not occur. There is less vegetation in mined areas, both in terms of density and diversity, making for a comparatively less healthy looking site.

Lastly, when recreational mining takes place, impacts result from more than just suction dredging. Miners set up areas to camp, often for days at a time. The USFS has found evidence of lack of proper toilet facilities, improper garbage disposal, and use of soaps and detergents. In other instances, miners have developed new roads or trails, or cut logs and moved boulders to access a dredging site. There can be fuel spills as well. All of these items can result in substantial impacts, as significant if not more so than those attributed directly to suction dredging, according to some officials. These impacts can be both immediate and cumulative.

The BLM and USFS, though large and diverse organizations, seem to be expressing similar ideas to those found at state agencies: the impacts of recreational placer mining can be kept to a minimal, acceptable level provided that all applicable rules and regulations are adhered to and good stewardship is practiced. The extent to which these good stewardship practices are adhered to, however, is inconsistent. So in practice, the effects that regulators and managers seek to avoid still occur.

#### *Public Lands Are to Support Multiple Uses*

Another aspect of the recreational placer mining issue concerns social goals and values. The BLM and USFS pointed out that they both manage their lands for multiple uses, and that a variety of activities should be able to take place on public lands. They reported that there is minimal direct conflict on federal lands between recreational miners and other river users. Conflict tends to be over social and political values, with respect to whether or not suction dredging should be allowed at all.

The idea is that some public lands are considered especially valuable and thus are provided with special protections that do not apply to other “normal” public lands. For example, some areas are off limits to mineral withdrawal, or to motorized activities, or even to certain recreational uses. Special management guidelines of this type apply on a considerable amount of land managed by the BLM and USFS. It may very well be the case that additional restrictions on use should be considered in the Scenic Waterways System, which was designed to offer extra protection to particular sites recognized by the public as especially valuable.

#### US Army Corps of Engineers (COE)

- COE has authority to issue permits – under the Clean Water Act – in order to protect water quality.
- COE no longer issues permits for recreational mining in Oregon, having determined that effective state regulation sufficiently mitigates impacts on water quality.

Until the recent past, the Army Corps of Engineers issued permits for recreational placer mining in Oregon. Under Section 404 of the Clean Water Act, the Corps is responsible for determining what activities will affect water quality and issuing permits to regulate these activities. The Corps has now determined that small-scale suction dredging in Oregon involves no more than an incidental discharge of dredged material into waterways. Therefore the Corps has decided that recreational placer mining does not require a permit provided the activity is conducted with intake nozzles 4 inches or less and operated with a 10 horsepower engine or less. While it continues to maintain the authority to regulate recreational placer mining, the Corps has effectively gotten out of the business of issuing permits to recreational miners in the state of Oregon, based upon the determination that the activity is effectively regulated in the state by DSL and DEQ and thus has minimal impact on water quality and is not inconsistent with federal water quality standards.

#### Oregon Department of Geology and Mineral Industries (DOGAMI)

- DOGAMI maintains responsibility for commercial mining operations in the state and has no regulatory authority over recreational placer mining.

DOGAMI is the agency that maintains regulatory responsibility for all commercial mining in the state of Oregon. The agency deals only with commercial operations and is prohibited by law from regulating recreational mining. Recreational mining occurs on a much smaller scale and thus it falls below the threshold established for determining DOGAMI's regulatory authority.

The agency did note that while a distinction is made among size of activities because bigger operations have bigger impacts and smaller operations have smaller impacts, this is not always the case. DOGAMI maintains strict requirements for commercial operations in order to minimize the impact of mining on the surrounding environment, but small-scale recreational miners do have the capacity to have significant impacts if the activity is not done properly and according to permitting requirements.

#### National Marine Fisheries Service (NMFS) and US Fish and Wildlife Service (FWS)

- NMFS and FWS maintain responsibility for protecting fish and wildlife – especially threatened or endangered species – as applicable under federal law.
- These agencies have very little interaction with the Oregon Scenic Waterways program, but have at times considered the impacts of suction dredge mining.
- Compliance with regulations will significantly mitigate environmental impacts, however, there is concern over long-term cumulative effects, which have not been addressed by scientists to date.

These federal agencies cooperate with Oregon state agencies in managing and protecting fish and wildlife resources where federal law or money is involved. Usually

their involvement stems from issues arising over the Clean Water Act or Endangered Species Act, or if federal funding goes to the state to administer rules or a program. These agencies are not involved with the Oregon Scenic Waterways Program, but they do address recreational placer mining in their responsibilities. The views they expressed were similar to others: compliance with appropriate regulations minimizes impact, but there are concerns and uncertainty. Even when following the permitting rules, individuals have the capacity to do harm if they are not careful stewards of the land.

FWS did point out two related additional concerns. First, while the scientific literature often echoes the conventional wisdom about the efficacy of effective regulations, it also tends to focus on short-term impacts, not long-term effects, and so the science may be overlooking important developments in the rivers. Second, there is some concern about the long-term homogenization of waterways and the loss of complexity in an ecosystem where suction dredging takes place. It will be extremely difficult to study this and attribute exact causes to particular effects. Cumulative effects result from a mix of activities, but mining is a significant part of the mix as it entails the movement of rocks, logs, and boulders, holes being filled, vegetation being cut. The result may be that the idiosyncrasies of a stream get washed away, while uniformity increases.

### Oregon State Police

- The State Police patrol Scenic Waterways, though they generally are not involved in enforcing DSL and DEQ regulations pertaining to recreational placer mining.

The Oregon State Police maintain a significant presence on Oregon Scenic Waterways. Like many agencies, the police make no distinction between Scenic Waterways and others in carrying out their enforcement responsibilities, as the laws and regulations they enforce are not so narrowly applicable, but rather are applicable statewide. The State Police point out that a significant part of enforcement consists of education so that river users know the rules that they need to comply with, and monitoring to make sure those in compliance stay that way.

The State Police keep reports on their activities on Oregon rivers, though they do not keep a systematic database regarding enforcement actions. To provide one example, however, the State Police reported that in 2001 officers spent about 1000 hours on the Rogue River from the mouth up to the town of Galice. Out of more than 1500 contacts with river users, 130 people were found to be in non-compliance with some type of law, regulation, or permit. Of these 1000 hours spent on the Rogue, approximately five hours were spent on activities that would involve DSL, and monitoring suction dredgers would be included in this number. Considering that DSL and DEQ do not monitor compliance with their permits, this indicates that there is very little attention paid to recreational placer mining on Scenic Waterways, though BLM, USFS and the police noted that if there were serious violations by suction dredgers, they would most likely hear about it and respond.

## Other Agencies

The Oregon Department of Agriculture, the Oregon Department of Forestry, the Oregon Marine Board, and the Department of Land Conservation and Development all maintain some interest in or responsibility for some aspect of the Scenic Waterways Program. None of these interests and responsibilities, however, involves recreational placer mining and the questions at issue in this report. (See “The Oregon Scenic Waterways System: A Program Review and Assessment,” for a discussion of these agencies and those mentioned above with respect to the Oregon Scenic Waterways Program.)

## **WHAT THE RESEARCHERS SAY**

A considerable amount of research has been conducted in both social science and physical science fields that bears on issues associated with Oregon Scenic Waterways and recreational suction dredge mining. We reviewed relevant academic literature in order to summarize the current state of knowledge and assess how research findings might assist in decision-making. A review of relevant research on wildland recreation conflict, crowding and visitor capacity is discussed first, followed by a review of scientific literature pertaining to suction dredging.

### Social/Recreational Impacts: Wildland Recreation Conflict, Crowding and Capacity

- Conflict between recreationists can arise from interference with visitor goals for participating in a recreation activity, or from differences in social values.
- Conflict between motorized and non-motorized use is the most pervasive conflict found in recreation settings.
- Perceptions of recreation areas as crowded are influenced by expectations, prior experiences, and the number, similarity and behavior of other visitors encountered.
- A single “conflict” encounter can have more pervasive negative effects than a larger number of “non-conflict” encounters.
- Available space, ecological impacts and the activities and behavior of different visitors all influence the capacity of a recreation setting to support visitation.
- Visitor capacity may be reduced if managers are trying to accommodate recreation activities that are incompatible.
- Dredge mining is likely to be in conflict with non-motorized recreation, decreasing the quality of these experiences. Because these conflicts are probably asymmetric, miners are not negatively affected in a like manner and may be unaware of their impact on other recreationists.

Prompted by problems associated with rapidly rising and diversifying outdoor recreation in the 1970's, researchers responded with studies designed to help public land managers better understand and manage factors that affect recreation settings and experience quality. Among these factors are *conflict* among recreationists, *crowding* at heavily used sites, and the *capacity* of wildland recreation areas to accommodate visitation. These topics are interdependent to some degree, but distinctions between them can help in understanding recreation management challenges, and considerable literature exists on each. This section presents a review of relevant studies and discusses how the research applies to issues facing managers of Oregon Scenic Waterways. It concludes with a brief note on socioeconomic impacts of recreational mining in the state.

### *Recreation Conflict*

Recreation conflict is one of the most pervasive problems faced by public land recreation managers. There is evidence that conflicts may be increasing as wildland recreation continues to increase (Manning 1999). Conflicts typically arise when individuals or groups attempt to use the same recreation area for different activities, but can also be an issue when conditions for visitors engaging in the same activity become crowded. Most simply, conflict occurs when the recreation experience of a person or group is negatively impacted by the presence or activities of another person or group. Conflict may or may not be outwardly manifested. In fact, most instances of conflict do not result in negative verbal or physical exchanges between recreationists, although these can sometimes result.

Recreation conflict is an important issue for land managers, so it has been studied to identify potential causes and mitigation strategies. Recreation conflict can be difficult to differentiate as a separate construct from crowding and personal norm violations (Schneider 2000), but research has provided a better understanding of the issue. Based on the assumption that people recreate to meet various goals, recreation conflict is defined as *goal interference attributed to another's behavior*, with four principal contributing factors. These are activity style – the various personal meanings assigned to an activity; resource specificity – the significance attached to using a specific recreation resource for a given recreation experience; mode of experience – varying expectations of how the natural environment will be perceived, and lifestyle tolerance – the tendency to accept or reject lifestyles different from one's own (Jacob and Schreyer 1980). Several propositions concerning contextual factors make conflict more likely, including:

- The more specific the expectations of what constitutes a quality experience, the greater the potential for conflict.
- Conflict results when users with a possessive attitude toward the resource confront users perceived as disrupting traditional uses and behavioral norms.
- When a person who views a recreation place as unequalled confronts behaviors indicating a lower evaluation, conflict results.

Recent research has refined this definition of conflict, adding the distinction between *interpersonal conflict* and *social values conflict* (Vaske, Donnelly, Wittman and Laidlaw 1995). Interpersonal conflict occurs when the physical presence or activities of a group interferes with the goals of another group, such as problematic encounters between snowmobilers and cross-country skiers, or mountain bikers and equestrians on the same trail. Interpersonal conflict can also occur among groups engaged in the same activity, although this is less common.

Social values conflict arises between individuals or parties of recreationists that do not share the same norms and values, and can occur independently of actual contact between groups. This type of conflict is rooted in differences of lifestyle and opinion about the kinds of activities and behavior that are appropriate in wildland recreation areas. A tent camper may have plenty of space, but have a worse experience because of proximity to RV campers. Similarly, a recreational suction dredge miner might not be physically impeding a person flyfishing fifty yards upriver, but that person could still be affected. In these instances, visitors may not be physically interfering with each other, but conflict occurs because one sees or hears the other engaged in some activity they did not expect and do not like. This in turn can degrade recreation experience quality.

A study summarizing 30 years of conflict research reports some consistent findings (Manning 1999). It is well established that the degree to which recreationists see themselves as like or different from those encountered is often related to conflict. Variation in motives for participating in a recreation activity has also been found to influence conflict. For example, a rafting party may seek excitement and adventure while a person fishing may seek undisturbed river conditions that enhance the likelihood of catching fish. These motives differ, which increases the chances for conflict when the rafting group encounters an angler. Research has also shown that conflict can result from both direct and indirect contact between recreationists. Indirect contact includes the mere presence of undesirable groups or even simply evidence of such groups, including environmental impacts.

Use of motorized recreation equipment is an issue that often divides outdoor recreationists into two distinct ideological camps and causes significant conflict in a broad range of contexts. Conflict between motorized and non-motorized recreationists is rising in the Pacific Northwest, and outdoor recreation continues to increase while the amount of available public land does not (Robinson 2001). These trends are expected to intensify as population and recreation use in western Oregon and Washington continue to grow. Discord between motorized and non-motorized recreationists has long been an issue for public land managers, and nearly half of the conflict studies reviewed by Manning involved conflict between these groups. Many such conflicts are asymmetrical, i.e., motorized recreation affects non-motorized recreation more than the reverse. Such conflicts may result from actual encounters as well as social value differences, making them particularly difficult to address.

Differences also exist in views toward resource development and preservation among participants in three types of outdoor recreation: “appreciative” activities (cross-country skiing, hiking, and canoeing); “consumptive” activities (fishing and hunting); and “mechanized” activities (motorboating, snowmobiling and trail biking) (Jackson 1987). A strong preservationist orientation is exhibited among participants in appreciative activities, while generally stronger pro-development views are found among participants in consumptive and mechanized activities. The main differences occurred between people who partake in human-powered activities and those who prefer motorized activities.

When asked why they recreate in wildlands, people commonly cite the restorative or regenerative effects of experiencing esthetically pleasing natural environments. They also note that it helps them recover from stresses of modern life. Natural environments do appear to possess intrinsic mental restoration capacities (Kaplan 1995; Kaplan and Kaplan 1989; Ulrich 1993). Scholars frequently point out that nature-based experiences and their restorative effects may be impacted by factors that affect the perceived naturalness of outdoor settings (Bacon 1996; Gobster 1996; Kaplan 1987; Kaplan 1995; Parsons, Daniel and Tassinary 1994). Ulrich (1983) notes that although scenes described as natural are not restricted to wilderness, people are more likely to respond to a scene as natural if human built features are absent or not prominent. McCool (1979) notes that motorized use may disrupt other recreation experiences and interfere with human-powered activities. Wohlwill and Harris (1980) showed that people find human elements in a predominantly natural landscape more acceptable if these elements are perceived to “fit” into the setting.

Conflict between motorized and non-motorized recreationists appears to result primarily from impacts on human-powered visitors’ ability to experience solitude and natural quiet. Conflict occurs when natural esthetic conditions that many visitors expect in wildland recreation areas are not available or are degraded by concurrent motorized use. The effect of motor noise on esthetic attributes of recreation settings seems obvious, but has rarely been studied by means other than field observation and visitor surveys. However, Mace, Bell and Loomis (1999) studied how helicopter noise affects perceptions of natural landscapes in a controlled laboratory simulation. Subjects viewed 68 slides of scenic vistas and assessed them for naturalness, preference, and scenic beauty and evaluated dimensions of freedom, annoyance, solitude and tranquility. When the slides were viewed with helicopter noise in the background (as opposed to sounds of birds or streams), the assessments of these scenes suffered. The finding was that noise interferes with experience quality and even affects the perceived esthetic quality of landscapes. Similar findings could be inferred in situations involving other motorized recreation equipment.

Hammit and Patterson (1991) investigated coping behaviors that wildland recreationists use to avoid conflict and achieve or maintain privacy and solitude. They note three kinds of responses described by research. Displacement occurs when those who are dissatisfied with encounter levels or activities of other recreationists move to less

crowded areas or choose not to visit in the first place. Product shift involves redefining the encounter (and broader recreation) experience. For example, a rafter may expect a wilderness experience, but upon visiting an area, decide that maybe this was an unreasonable expectation on a busy summer weekend, and rather than leave the area, re-evaluate her expectations. Rationalization occurs when a person voluntarily selects an area, then rationalizes conditions found as satisfactory.

Shindler and Shelby (1995) explain how product shift can confound the ability of managers to detect impacts on recreation experience quality. Visitors become tolerant of declining environmental or social conditions in order to obtain any experience at all, especially in scarce recreation settings like wild and scenic rivers. Over time the most tolerant visitors come to define acceptable resource conditions. Managers may become complacent, or simply not realize conditions are declining because changes in experience quality occur over time. Managers may also have difficulty gaining support for management actions to mitigate factors that are degrading experience quality because visitors are apparently still satisfied.

### *Recreation Crowding*

Crowding is an important and widely studied social variable that affects recreation experience quality. It has often been assumed that increases in density equal increases in crowding, but Shelby, Vaske and Heberlein (1989) conclude that this is overly simplistic. Density and crowding are separate constructs. Density is a numerical description of the actual number of people in an area, and is thus objectively neither good nor bad. Crowding, on the other hand, is explicitly defined as a negative evaluation of a particular level of density (Shelby and Heberlein 1986).

Social norms – widely shared standards for what constitutes crowded conditions – can be identified using visitor surveys and are strongly affected by context (Shelby and Heberlein 1986). People are less likely to feel crowded by other people in an urban park than by the same number of people in a wildland area. People are also less likely to feel crowded by others perceived as similar to themselves, and engaged in similar activities (Manning 1999). Visitor preferences, prior expectations and experience in the area, commitment to the activity, characteristics of other visitors encountered, and an array of situational variables can all influence how crowded people feel (Graefe, Vaske and Kuss 1984; Manning 1999).

Notwithstanding this complexity, use level is a practical, easily measured, and to some extent manageable indicator of recreation quality, particularly at sites where activity types are relatively homogeneous. The causes of crowding can be harder to identify when different activities occur concurrently. In any case, however, density and crowding are related to the concept of visitor capacity, an idea borrowed from the biological sciences and expanded to include (in addition to physical constraints) the psychological dimension of perceived crowding (Manning, Lime and Hof 1996).

### *Visitor Capacity*

Two fundamental responsibilities of public land recreation managers are to protect lands under their charge from unacceptable impacts resulting from overuse or misuse, and to maintain and enhance the quality of recreation experiences for visitors. How these responsibilities are met varies greatly because of the diverse landscapes, management goals, and activity types available on public lands. In all cases, however, balancing resource protection with public access and recreation requires managers to understand something about the capacity of the area to support visitation.

Visitor capacity is defined as "...a prescribed number and type of [recreationists] that an area will accommodate given the desired natural/cultural resource conditions, visitor experiences, and management program" (Haas 2002). Biophysical aspects of visitor capacity include cumulative ecological impacts and physical space available. These categories are referred to as ecological capacity, such as plant, animal, soil or water impacts, and physical capacity, such as number of sites available at a campground (Shelby and Heberlein 1986).

Visitor capacity also has social components, for example, the number of people visible, the number of encounters with other parties per hour or day, or encounters with parties of a different type or size (Shelby and Heberlein 1986). Social variables such as the activities and behavior of other visitors can influence perceptions of crowding and conflict, so they are important to consider when assessing visitor capacity. This is especially true in wildland settings, where interaction with nature and solitude are essential attributes of many visitors' experiences, and contacts with other people can affect experience quality as much or more than biophysical factors.

When developing visitor capacity guidelines in areas with heavy demand, managers must first define types of activities and experiences that are appropriate there. This is a critical step, because biophysical and social aspects of visitor capacity, and strategies to manage them, will vary widely with the type of visitor experience being targeted. Moreover, overall capacity may be lower if managers are trying to accommodate recreationists with diverging goals or a history of incompatibility and thus more likely to conflict than visitors who generally share similar goals and activities.

Defining appropriate experiences and setting visitor capacity standards are difficult because of the variable and contextual nature of how humans perceive and experience the natural environment. This is contentious because these decisions directly affect who gets to do what, when and where. These recreation allocation issues can be value laden and controversial, so experts consistently stress the importance of explicitly spelling out the types of recreation opportunities the area in question will be managed for, and why. Professional judgment is an appropriate basis for making visitor capacity determinations, but such decisions must be principled and reasoned (Haas 2002).

### *Recreation Conflict, Crowding and Capacity in Oregon Scenic Waterways*

Academic distinctions between conflict, crowding and capacity help us understand them, but in the real world these issues are closely related and often interdependent. The crux of the matter for managers of popular waterways is how to accommodate heavy visitation while meeting goals for resource protection and experience quality. This usually means allowing visitors as much freedom as possible while mitigating the factors that exacerbate conflict, crowding and resource degradation which (other than being denied access to a site) are the most common the most common factors that degrade recreation experience quality.

Conflict arising from the presence of recreational placer mining in Oregon Scenic Waterways seems to be based on both goal interference and social value differences. The goal of non-motorized recreationists to experience the natural characteristics of a waterway may be compromised by motor noise, turbidity or visible evidence of mining or miners' campsites. But there is also considerable evidence that divergence of social values seems to play a significant role in these conflicts. Actual blockage of boaters' routes downstream does occur and is a potentially serious safety issue, but this is not the source of most boater-miner conflicts.

Differences between miners' and other river recreationists' views about "appropriate" recreation were consistent with Jackson's typology. Many visitors seem to fit the category of "appreciative" recreationists, while miners have characteristics of both "consumptive" and "mechanized" recreationists and held more utilitarian views about human-environment relationships. Thus miners saw nothing wrong with recreational mining, while other visitors often held that recreation activities with a lighter "ecological footprint" are most appropriate in waterways protected for their natural qualities.

People are more likely to feel crowded and perhaps also more likely to experience conflict when they encounter other visitors engaged in a different activity. This is especially true if they feel the activity is inconsistent with the primary recognized attributes and qualities of the area. Thus, overall visitor capacity may be affected if an agency is trying to accommodate an activity that some groups feel is inappropriate and is leading to conflict.

For example, visitors to popular Oregon Scenic Waterways such as the Rogue may perceive conditions as crowded at lower visitor densities when use includes recreational placer mining than if such use did not occur. A single miner may be encountered by several boaters, who might reasonably have expected natural conditions and thus may find the activity inappropriate and intrusive. This increases perceptions of crowding more than an additional boater or riverside hiker might. When setting visitor capacity, managers must consider a range of factors, any one of which might limit capacity in a different situation. Capacity for overall use will depend on how well individual uses co-exist, and how much impact they have on biophysical resources.

Heavy recreation use is an increasingly important issue on several Oregon Scenic Waterways, and managers believe rivers such as the Rogue and Deschutes may be reaching visitor capacity. This places pressure on managers to look critically at recreation activities with the highest potential to impact other river visitors and riparian conditions. Recreational suction dredgers are not a large group, and many recreationists contacted statewide indicated they had never encountered the activity. However, where mining and non-motorized recreation occur together, conflict attributed to the presence and actions of miners is fairly common. Safety can be an issue for boaters, but most conflicts relate to noise, level of development, degraded ecological conditions, and differences in social values.

For various reasons, these types of social conflicts usually do not lead to official complaints, but miners do appear to have a larger impact on other visitors, rather than vice versa. Managers report few complaints on rivers where recreational mining occurs with boating, but as described previously, this is somewhat inconsistent with what boaters reported, as would be expected with an asymmetric conflict. Staff and budgetary realities limits consistent monitoring of recreation conditions, and product shift hinders managers' ability to detect changes in experience quality over time. For these reasons, manager perceptions do not necessarily indicate that boater-miner conflicts are inconsequential.

There is a good probability that some level of conflict will occur when boaters, hikers or other non-motorized recreationists encounter a recreational suction dredge miner. Because of the disproportionate effects that one miner can have on other recreationists, such conflicts may increase if current trends of rapid growth in recreational rafting and kayaking continue, even if mining itself does not grow.

### *Socioeconomics*

One additional item to be briefly mentioned involves socioeconomic impacts of recreational mining. Oregon mining organizations have suggested that one of the impacts of recreational mining is significant economic activity in particular parts of the state. This was discussed earlier in this report, and while this claim is often made, there is no solidly reliable data available to say with certainty what the economic impact of recreational placer mining is in the state of Oregon. As mentioned previously, a 1994 State of California environmental impact report on suction dredging estimated that a typical dredger spends around \$9,000 per person per year on equipment, gasoline, repairs and maintenance, motels, groceries and restaurants, other forms of recreation and occasionally on medical services. The Waldo Mining District in southwest Oregon surveyed its members in 2001, and came up with similar results. These estimates, however, are not considered to be hard statistical data regarding exactly how much economic activity recreational placer mining generates for local communities.

## Biological and Ecological Impacts

The scientific literature reviewed here consists of academic journals and government reports, including environmental impact statements. The literature covers biological and ecological impacts that can result from small-scale suction dredging (studies looking at larger operations were excluded because of their inapplicability to the issue at hand), and the effects of various mining practices in different types of stream conditions. This does not imply that all of these impacts always occur in every mining area.

Different levels of compliance with regulations, varying degrees of land stewardship, and other contingencies that depend on individual behavior determine exactly what will occur in a given case. These contingencies, however, are not what the scientific literature is supposed to reveal -- that is the purpose of monitoring. Highlights of the scientific literature on environmental affects of dredging include the following:

- There are only a small number of peer-reviewed scientific studies that directly address the impacts of suction dredge mining. However, there are several environmental impact statements, government reports and articles (both peer-reviewed and non-peer reviewed) that address the issue, either directly or indirectly.
- The long-term impacts of suction dredging, tested over large areas and large populations of fish and wildlife, have yet to be systematically addressed, partly because of cost and partly because of the limitations in designing and executing controlled experiments over large times and spaces. Therefore, knowledge regarding total impacts, especially cumulative impacts, is very limited.
- Scientific literature suggests that there is a high likelihood of some damage from suction dredging, but it also concludes that with proper regulation and adoption of certain best management practices, harmful effects can largely, though not entirely, be mitigated.
- In rivers and streams with high natural fluctuation of waterflows, most evidence of suction dredging is washed away. Rivers and streams in the region are typified by high natural, seasonal waterflows. Therefore, most effects of suction dredging are short term because these high winter flows recruit and redistribute sediment, recreating natural habitats.

It is important to note that the scientific studies and assessments that have been done to date, especially peer-reviewed scientific studies, are relatively small in number. The work that has been done has been generally well-received and well-regarded, but in spite of the this, scientists in this field are quick to point out that with respect to the impact of suction dredging, they are much more in a state of ignorance than they are in a state of knowledge. This is because the studies done to date have looked only at a small part of what scientists and policymakers may wish to know. They have thus far looked at

impacts over the short-term in localized areas. This is an important area of research, but it represents only a segment of the possible areas of study. The longer-term impacts over larger areas and larger fish and wildlife populations have yet to be systematically addressed, partly because of cost and partly because of the limitations in designing and executing controlled experiments at large temporal and spatial scales.

Due to the fact that there have not been numerous studies on suction dredging done in Oregon waterways, and because the characteristics of each river and stream can be different, this report cannot conclusively state what impacts will be found in Oregon waterways. However, conditions in streams and rivers throughout much of the northwestern United States are considered by researchers to be sufficiently similar to conclude that their results are generally applicable to other waterways.

The literature does suggest, based on studies and assessments done throughout various parts of the western United States, that there is a high likelihood of some damage from suction dredging, but it also concludes that with regulation and adoption of certain best management practices, these harmful effects can largely, though not entirely, be mitigated.

The scientific literature looks at several aspects of suction dredging and a variety of potential impacts the practice may have. There are several steps in the process that may impact the rivers and surrounding areas. They include:

- Access – in order to gain entry to a site, miners may need to drive or walk into an area without established roads or trails. Also, in order to access a particular spot in the riverbed to mine, it may be preferable for miners to move large boulders or logs, or cut or remove vegetation.
- Entrainment – when operating a suction dredge, fish, eggs, fry, or invertebrate may be sucked into the dredge. This is referred to as entrainment of the organisms.
- Turbidity – suction dredges, in the process of pulling gravel and sediment up from the riverbed, may cause a plume that clouds the water, sometimes over a great distance as water is moved downstream by the current.
- Tailings – during the operation of a dredge, the gravel pile that is formed, called a tailings pile, can consist of a pile of loose gravel that is not stable and/or diverts waters from their natural course in the river.
- Sedimentation – fine particles released into the stream by a suction dredge will not immediately fall to the riverbed and are likely instead to be deposited elsewhere in the stream in calmer areas where currents are light. This can potentially cause a buildup of sedimentation in areas where this would otherwise not have occurred.

Each of these parts of the process may have effects on various aspects of the ecology and health of the stream and the organisms living in it. The scientific literature reviewed discusses this and potential cumulative effects of several operations with respect to fish, invertebrates, riparian habitat, water quality, and cumulative impacts.

Three studies in particular have included a substantial review of other work done on the question of suction dredge mining. Harvey and Lisle (1998) looked at other peer-reviewed investigations of suction dredging to evaluate the literature and propose strategies for further study and management of streams and rivers. This study concluded that the effects of dredging commonly appear to be minor and local, but that effects can actually vary widely among stream systems and reaches within systems. It is therefore very important for natural resource managers to take into account the life cycles of fish and other organisms to tailor regulations to mitigate potentially serious effects. The authors also noted that there has been relatively little peer-reviewed work done on the effects of dredging, and the result is that a great deal of uncertainty about its effects remains, especially long-term effects. Given the current state of knowledge, the authors suggest that “fisheries managers would be prudent to suspect that dredging is harmful to aquatic resources.” They further concluded from their review that additional study and management of streams and rivers was necessary.

A second study was the State of California’s Final Environmental Impact Report for the Adoption of Regulations for Suction Dredge Mining (California FEIR), issued in 1994 and revised in 1997 to account for some amendments to the regulations. This report reviewed the relevant literature and discussed several harmful impacts from unregulated suction dredge mining. The report recommended that proposed regulations would be sufficient to mitigate these impacts.

A third study, a Draft Environmental Impact Statement (DEIS) completed by the US Forest Service in 2001, reviewed the relevant literature completed to date for the purpose of assessing suction dredging activities in the Siskiyou National Forest in southwest Oregon. The DEIS looked at three alternatives involving varying degrees of restrictions on suction dredging. It found that the alternative proposed in the draft – which is generally consistent with the types of regulations currently in effect – would provide considerable protection to fish, wildlife and habitat through proper regulation, and that more stringent regulation would offer increased protection.

These and other studies will be addressed below in discussing the potential impacts on fish, invertebrates, riparian habitat and water quality, as well as cumulative impacts.

### *Fish*

- Destruction of habitat, entrainment of fish, fry and eggs, loose tailings piles, and sedimentation can all significantly impact fish populations.

- Activities of miners must be limited by regulation in order to reduce or eliminate these impacts.

Suction dredging can affect fish in several ways. Regulations in Oregon allow mining to occur only in defined in-water work periods, generally in the summer months, to limit the direct effects of mining on spawning fish, eggs, or embryos. This type of limitation has a significant effect on preventing harmful impact to fish (California 1994; USFS DEIS 2001; Harvey and Lisle 1998). In some places, salmonids and non-salmonids have spawning and incubation periods that extend into the summer months, so there is often some overlap and thus potential for impacts (Harvey and Lisle 1998). With respect to impacts from entrainment, effects are greatest on eggs and fry (Griffith and Andrews 1981; USFS DEIS 2001; Harvey and Lisle 1998; California 1994).

One study in particular tested this and found that mortality among the eggs of cutthroat trout sucked through a dredge ranged from 29% to 100% (Griffith and Andrews 1981). The same study also found that sac fry of rainbow trout suffered greater than 80% mortality resulting from entrainment. Mortality rates among sac fry not passed through a dredge were only 9% (Griffith and Andrews 1981). Other fish that produce equally small larvae are likely to suffer the same mortality rate from being passed through a dredge, and eggs from all types of fish would have high mortality rates as well – resulting not only from the mechanical disturbance, but also predation after passing through a dredge and other physical/chemical conditions. The State of California's FEIR suggested that mortality would be close to 100% for all eggs and fry. Once they were removed from their protective in-gravel environment they would be available and attractive food sources that would not be likely to survive for long. By contrast, most juvenile and adult fish would be likely to avoid being sucked into a dredge, and those that were would be likely to survive (Harvey and Lisle 1999; Griffith and Andrews 1981; California 1994).

Suction dredge tailings piles are also believed to have potential impacts on the survivability of fish eggs, or redds (Harvey and Lisle 1998; USFS DEIS 2001; California, 1994). This may not consistently be the case, as some evidence suggests that gold dredging in certain streams and rivers increases the availability of spawning gravel by loosening up compacted gravels (Badali 1988; Hassler et al. 1986). However, impacts from tailings piles are often considered to be significant. Impacts can result even outside the work period when miners are permitted to dredge. Dredging does not usually occur when most fish species of special concern tend to spawn. And many fish spawn in the spring after dredge tailings from summer and fall mining activities have been moved by currents resulting from high water flows in the winter. However, dredging during the summer can affect the reproductive success of fish that spawn in the fall such as chinook salmon and coho salmon because some of these fish choose tailings as their spawning habitat, and these piles are typically less stable during high winter flows (Harvey and Lisle 1999).

The reasons are as follows. During the summer and fall, there is generally low streamflow. Tailings piles that were created in the summer months are more likely to retain their original form through the fall, just when chinook and coho are spawning. Tailings often contain the materials appropriate for redds, although the extent to which they will be used depends on the amount of suction dredging in an area and the availability of other suitable sites for spawning. These piles tend to be less stable than the rest of the riverbed, so when high water flows occur, tailings piles are more likely to be washed away, resulting in the death of the eggs. Consequently these sites are considered undesirable spawning grounds (Hassler et al. 1986). The literature suggests that natural resource managers could reduce or eliminate these potential harmful effects through regulations that require tailings piles to be redistributed (flattened) in order to restore the riverbed to conditions more like they were before dredging occurred.

Sedimentation can also pose a problem for fish populations. This can occur during the period when sediments are suspended in the water and moving downstream – the problem of turbidity in the water – and after the sediments have resettled in the riverbed. The impacts of suspended sediment vary with the amount of time sediments are in the water and the size of the particles. While extremely high levels of sediment can be lethal, or at least very harmful, it is believed that lethal concentrations of suspended sediments will rarely be produced by small suction dredges because fish can usually avoid those concentrations (Newcombe and Jensen 1996; Harvey 1986). Research has also found that when water is made turbid by dredges, this does not appear to affect the feeding abilities of many species (Hassler et al. 1986; USFS DEIS 2001). Moreover, suspended sediments are usually quick to resettle to the riverbed allowing the water to return to normal levels of turbidity. Dredging is done during low flow periods, usually in areas where the ability of the stream to carry sediment is low, thus silt is usually deposited nearby dredging activities. By way of comparison, it has been noted that as long as multiple dredges are not operating simultaneously, suction dredging cannot mobilize nearly as much sediment as naturally occurring high water flows (Harvey and Lisle 1998).

Sediment may also have an impact once it resettles. The concern is that since suspended sediments tend to fall to the riverbed in areas where waterflow is comparatively slow, they tend to accumulate in the same places (Keller 1971). When pools and other habitat are present in these areas, they can be filled in by the sediment, which has the effect of removing sites fish may normally use (Thomas 1985; Harvey 1986; Harvey et al. 1982). The effects of sediment deposition can also suffocate eggs and reduce the production of important invertebrates, which are part of the food chain. However, in streams with larger flushing flows, fish are less likely to be highly sensitive to dredging, most likely because these same variations in sediment levels occur naturally (Harvey 1986). The state of California and the US Forest Service concluded that the effects related to turbidity and sedimentation appear to be measurable at the site level, but they are localized and temporary in most cases, especially in areas with large natural fluctuations in stream flow (California 1994; USFS DEIS 2001).

Other impacts can result from movement of boulders and woody debris to permit access to mine a particular spot. Large items such as these create pools; they also block the force of the flow, creating feeding and resting areas. Dislodging them can result in adverse impacts (California 1994, Harvey and Lisle 1998; USFS DEIS 2001). However, it is also the case that such effects will generally be localized when they do occur. Better still, they can be mitigated through strict regulation prohibiting the movement of boulders and woody debris, although the Forest Service has acknowledged that educational efforts would be required to make sure these efforts were successful (California 1994; Harvey and Lisle 1998; USFS DEIS 2001).

Some positive impacts of suction dredging have also been noted. In streams carrying significant amounts of sediment, the riverbed can become embedded and compacted, providing fish with poor spawning ground. Suction dredging may be able to break up compacted gravel, particularly on reaches below dams where there are no high flushing flows (Badali 1988; California 1994). Also, deeper areas left by dredgers may be occupied by fish once dredging has been completed (Harvey and Lisle 1998; California 1994).

### *Invertebrates*

- Invertebrate colonies situated in the riverbeds are almost entirely destroyed by suction dredging.
- The effects of dredging are localized – they do not extend beyond the immediate area dredged. In addition they are temporary – most invertebrates recolonize dredged areas within 1-2 months after dredging has occurred.

Invertebrates in streams consist of various types of insects and other organisms than live in the sediment of the riverbed (these organisms are also referred to as benthic invertebrates, the benthic zone being the bottom sediment). Several studies have examined the impacts of suction dredging on invertebrates, investigating whether or not they are substantially impacted while dredging occurs, and the extent to which benthic communities recover over time. These studies have shown that the impacts on invertebrates are significant, destroying invertebrate populations in immediate dredging area. However, it has also been found that these impacts are generally localized to the specific dredging area and short-term, with recovery taking place within 1-2 months (Harvey 1986; Thomas 1985; Hassler et al. 1986; Harvey et al. 1982; EPA 1999).

Griffith and Andrews (1981) found that while fish eggs and fry suffered from high mortality rates upon passage through a suction dredge, mortality (and injury) rates for insects were less than 1%. Lewis (1962) found mortality rates of more than 7%, which is still considered a small number. These results, however, may represent a low estimate of survival. Observations by both scientific investigators and recreational miners confirm that fish tend to readily feed on invertebrates dislodged by a suction

dredge, so survival from entrainment may not mean survival through the normal life-cycle (Thomas 1985; California 1994).

Thomas (1985) found that after dredging, the abundance of insects and other species at the site was significantly reduced, though these effects were localized. The numbers of invertebrates downstream were not affected. In addition, recolonization by insects and other species at the dredge sites were “substantially complete” one month after dredging. This was determined by comparing numbers of insects at sites that were dredged with numbers at sites not dredged. Only one type of insect had not fully recovered in that time. Harvey (1986) looked at sites that had been dredged multiple times for purposes of his study. He reached similar conclusions to Thomas, noting that the effects were highly localized, and that insects tended to fully recolonize dredged areas 45 days after dredging took place. He also found that there were no cumulative effects on invertebrate populations. Similar recolonization took place after each instance of dredging.

### *Riparian Habitat*

- Riparian habitat can be impacted by three types of practices: by suction dredging outside permitted areas, such as under the edge of the riverbank and outside the wet perimeter of the waterway; by cutting or removing vegetation to gain access to mining sites; and by activities associated with placer mining, such as camping and blazing trails.
- If these practices are neither prohibited nor mitigated by regulation and good stewardship, the impacts can last for years before natural processes erase them.

The condition of riparian zones and riverbanks are closely linked to the quality of habitat for both fish and wildlife. When damage is done to these resources, it can take a very long time for natural processes to make the needed repairs (Harvey and Lisle 1998; California 1994). Streambeds and riparian habitat can be most significantly affected in three ways. The first occurs when suction dredges are used outside the wet perimeter of the stream, or are used underneath the edge of the stream bank. In these instances miners can cause significant long-term damage to riparian areas that can last several years. Suction dredging outside the wet perimeter in the riparian zone impacts habitat used by many species, large and small. In addition, observations by stakeholders and the scientific literature both make the point that high water flows remove much of the evidence that suction dredging has occurred, redistributing gravel, filling or reestablishing pools. Therefore, areas outside the wet perimeter are not nearly as likely to be “flushed” by high streamflows when the winter rains arrive, leaving behind a lasting impact.

When suction dredges are used under the edge of a stream bank, it can undercut the bank, destabilizing it and sometimes causing it to collapse into the water (Hassler et al. 1986; McClenaghan and Johnson 1983; California 1994). This destroys habitat for

invertebrates and other organisms that depend on habitat at the water's edge, and it removes cover used by some fish species. Undercutting banks also changes the structure and shape of the waterway, which affects waterflows (Harvey and Lisle 1998; California 1994; Badali 1988). Three assessments done in California found that even though compliance with regulations was relatively high, some suction dredgers were undercutting banks in various areas, and the impacts from these violations could be quite significant (Hassler et al. 1986; Stern, 1988, McCleneghan and Johnson 1983). Though it is unclear what the compliance rates are throughout Oregon, these results suggest that significant impacts may be occurring.

Second, cutting or removing vegetation or large woody debris to provide better access to a particular spot to be mined can have a large impact on the ability of the riparian zone and streambanks to support fish and wildlife dependent on these areas. The roots of riparian plants provide banks with stability against flowing water and allow for non-uniform surfaces along the wet perimeter. Overhanging banks and other irregular features along the bank can also provide important cover for fish (California 1994; USFS DEIS 2001; Harvey and Lisle 1998). In addition, vegetation that blocks sunlight from the river may help maintain cooler water temperatures during the summer, providing better habitat for salmonid species.

Third, riparian areas can suffer degradation independently of the actual suction dredging process. Other activities associated with suction dredging such as camping, blazing trails to dredging sites, and anchoring equipment may impact riparian zones. Dredge operators camp in areas adjacent to streams and rivers, with campsites sometimes occupied by families or small groups, and some sites are often camped at for extended periods (California 1994; USFS DEIS 2001; Harvey and Lisle 1998). In addition, miners will often camp at sites that are not maintained by land management or resource agencies. Therefore responsibility for keeping up the site or removing garbage or other traces of use is left entirely to the miners (Harvey and Lisle 1998). When miners engage in these practices, which may be a necessary part of getting access to a site or remaining there, they can cause damage to the riparian zone, which may be home to many species of plants and animals (McCleneghan and Johnson 1983; Harvey and Lisle 1998; California 1994; USFS DEIS 2001; EPA 1999).

Impacts to riparian areas are thought to be considerable if there is not adequate control and/or stewardship. In fact, in several instances it was surmised that the destruction or removal of vegetation and boulders – whether for suction dredge mining or associated activities – can present a more serious potential environmental threat than the operation of suction dredges.

### *Water Quality*

- Turbidity is often thought to cause significant impacts to water quality, but this is not usually the case.

- Suction dredging is more likely to harm water quality from gasoline and oil spills, from runoff out of adjacent campsites or, to a lesser extent, from mobilization of heavy metals left by historical mining activities.
- Removal of heavy metals such as lead and mercury by recreational miners can improve water quality, but may also simply mobilize toxins and reintroduce them into the water and the riverbed surface.

Water quality is usually unlikely to be significantly affected for a long period of time by turbidity, which is affected by factors such as the volume of water in a waterway, rate of waterflow, and the number of dredgers in an area. Turbidity is often thought to be a significant contributor to diminished water quality. However, larger particles quickly return to the riverbed, and turbidity caused by fine sediments usually lasts for only a short time before sediments resettle (Harvey 1986; Badali 1988; USFS DEIS 2001). In Alaska, the US Geological Survey found on the Fortymile River that turbidity from dredging causes no significant changes to water quality (USGS 1997). However, the applicability of assessments on this river to Oregon conditions has been questioned because of differences in the physical conditions in the river systems.

The water quality of a stream or river may be most significantly affected by suction dredging as a result of two things in particular. The first of these is that dredges require gasoline to operate. They also require oil and grease to lubricate parts and keep the engine in proper working order. Since fuel sources are most likely to be kept within close range of the dredge, it is likely that there will be periodic spillage of gasoline, oil or grease into the water and that the impact would be detectable at the site level (USFS DEIS 2001). With dredges that use 2-stroke engines, this type of spillage into the river is likely to be even greater. The state of California differs with this conclusion, noting that while some spillage would be likely to occur, the environmental impacts would not be significant (California 1994).

Suction dredging can benefit the environment by removing lead and mercury from waterways (California 1994). As was pointed out previously, Oregon miners recently turned in ten pounds of mercury. However, suction dredging does not only result in the removal of these heavy metals. Sometimes it only dislodges them and moves them around. This mobilization of heavy metals, which reintroduces them into the water and the riverbed surface, may be toxic to aquatic species (California 1994).

#### *Cumulative Impacts*

- Cumulative impacts from multiple dredges operating at once, or from dredging in the same spot year after year have not been adequately studied.
- This absence represents a significant gap in the literature, and leaves scientists unsure about the long-term impacts of suction dredging. In the absence of evidence, scientists advise caution to regulators and land managers.

Cumulative impacts are those that result from either a) multiple dredges operating in the same area, or b) the same segments of streams and rivers being dredged year after year. A number of people contacted for this review conveyed their sense that the cumulative impacts from either of these circumstances may be significant, but also noted that some cumulative impacts can be subtle and generally undetectable in the short-term. Harvey and Lisle (1998) have pointed out that no research has been done involving the impacts of multiple dredges that are closely spaced and operating at the same time, and that this is likely to be an important consideration, especially in reaches that are dredged year after year. Badali (1988) suggests differently, however. Using data gleaned from previous studies not specifically designed to observe cumulative impacts, he notes that the effects of multiple dredges operating over a relatively limited area of 11 to 15 kilometers are insignificant.

It is also the case that no research has been done looking at the long-term cumulative impacts of suction dredge mining on areas that are worked every year. (This may have some relevance for the state of Oregon, where some stretches are mined year after year with multiple dredges simultaneously. Some mining organizations sponsor group trips to particular areas, and so more than one dredge may in operation at a time. This circumstance, however, appears to be more common in areas where an organization has a mining claim, and less common on specifically designated Scenic Waterways.)

The lack of studies addressing cumulative impacts of multiple dredges and cumulative impacts over long periods of time represents a significant gap in the literature about what the impacts and potential impacts suction dredging may be. The unknowns contributing to such a state are many: the intensity of use on particular waterways, effects from mining conducted decades ago vs. those resulting from current practices, the difficulty in tracking whole fish populations, and the difficulty of attributing particular effects to suction dredging when waterways are subject to multiple uses, to name a few. Moreover, the cost of turning these elements of ignorance into useful knowledge can be prohibitive.

### *Summary of Findings*

The scientific literature supports the assertion that small-scale suction dredging has the potential to significantly impact the overall health of waterways by impacting fish, wildlife, habitat, and water quality, both in the short and long-term. Scientists can speak with much greater authority about short-term, localized impacts, as that has been the focus of most studies. However, with respect to riparian areas, the threat of potential long lasting impacts is better understood.

While it is the case that significant impacts can and do occur, the literature has pointed out that most observed impacts are local and temporary. However, this is partly a function of observation bias, that is, the studies done thus far have not systematically addressed long-term effects of dredging. Moreover, impacts can be substantially mitigated, according to the literature, if regulations are implemented (and enforced) that

address those practices that can do serious harm. This part is essential, because only if best management practices are followed can the impacts be significantly mitigated. This is dependent upon the good stewardship of individual miners and effective enforcement of compliance with regulations. The US Forest Service and the State of California found, in their respective environmental assessments, that regulations are not consistently followed, and so it is sometimes the case that the impacts that scientific researchers have concluded can occur, actually do occur.

In the event that regulators and land managers can achieve high rates of compliance with regulation, then the chances that nature will be better able to repair itself are greatly increased. Harvey pointed this out, stating that in streams where there is a natural and substantial fluctuation in water levels, then winter water flows are likely to flush the system and reduce the long-term impacts of dredging. By contrast, streambed alterations will be more long-lived on rivers and streams with controlled flows (Harvey 1986; Harvey et al. 1982), but these streams are already impacted because their natural disturbance patterns have been affected.

Finally, the question of multiple impacts from different activities should be addressed. There are no studies that compare biological and ecological impacts from various uses on waterways – recreational mining, camping, hiking, boating. A number of stakeholders, regulators, land managers and scientists did point out that suction dredging can cause significantly less impact than campers, or jet boats, or other activities in which river users do not practice good stewardship of the land. By the same token, a single miner who acts without regard for nature can cause a great deal of harm that takes years to repair through natural processes. Therefore, it is difficult to say with assurance which activities are best or worst for fish, wildlife and habitat. In looking at ecology, so many variables come into play, all activities have to be taken in the context of understanding the physical setting and the practices of the river user. This is why so many of the questions posed by scientists yield an answer of “it all depends.”

#### **GOALS AND USES: ARE THEY COMPATIBLE?**

There are two types of issues to consider when discussing the compatibility of suction dredge mining with the goals and objectives of the Scenic Waterways Program. These are environmental/biological, and social/recreational considerations.

##### Environmental and Biological Considerations

The first of these – environmental and biological considerations – are the easier to address. Peer-reviewed scientific literature that speaks to the subject, though to some extent limited, suggests that most impacts can be kept at a level that does not do widespread or long-term harm to fish, wildlife, habitat, or water quality. The environmental impact statements from Oregon and California suggest the same thing. In all cases, however, these determinations are based upon the understanding that suction dredge mining is strictly regulated, with rules developed that take into account the

specific conditions of each river and stream, and most importantly, that miners carefully observe all regulations and best management practices. This is key to interpreting the literature, as the science also claims, again and again, that unregulated, unimpeded dredging practices can and will be very harmful.

The government agencies dealing with recreational mining generally have come to conclusions similar to and often based upon the scientific literature: that proper regulation of mining activities can keep the environmental impacts at an acceptable level. The definition of acceptable is certainly subject to dispute, but among the various agencies involved, acceptable environmental impacts do not require that there be no evidence of impact. Instead they tend to focus on practices that are abusive, destructive and/or have the potential to cause long-term environmental damage.

What appears to be very clear from addressing the literature, the stakeholders, and the government agencies is that the most effective control to be placed on suction dredge miners is self-control. If individual miners refuse to follow regulations, then any suggestions of compatibility are not applicable. A handful of suction dredgers, or even a single person, who refuses to respect the law and to make the effort to protect his or her surroundings can do more short-term and long-term damage than dozens of suction dredge miners (or other river recreationists for that matter) who practice good stewardship of the land and natural resources.

The scientific considerations then, while concluding that suction dredging does not, by definition, cause irreparable harm to natural resources, comes with a big if: that is, these conclusions can only be true if the practitioners of suction dredge mining play a significant role in making them true.

### Social and Recreational Considerations

The issues surrounding recreational conflict, multiple uses, and the clash of competing social values present a more varied picture than the science does in considering the compatibility of recreational placer mining with the goals and objectives of the Scenic Waterways Program.

The most serious incompatibilities are those that reflect a sharp difference in the values attached to the state's natural resources. Among individuals and organizations that maintain a clear preference for activities, uses, and non-uses that enhance resource preservation and protection, there is a strong understanding that mining for gold with a motorized dredge is entirely incompatible with the Scenic Waterways Program. (This view would also hold true for other parts of the state as well.) The argument is that at a time when pressures on natural resources are increasing, when the damage done from historic mining operations has not been completely repaired by natural processes, and when social values have shifted in recent decades from favoring resource extraction to resource conservation, there can be no accommodation for an activity such as suction dredge mining, even on a small-scale, recreational basis.

Among river recreationists throughout the state of Oregon, the issue is not so clear-cut. There appears to be recurring recreational conflict between miners and other river users. Motor noise, turbidity and the condition of miners' camps interfere with goals of non-motorized boaters, hikers and campers to enjoy an experience in a quiet, natural river setting. Recreationists also reported being intimidated and displaced by encamped miners who seemed to believe they had certain rights to occupy the area. Conflict can also be partially attributed to differences in social values about what constitutes "appropriate" recreation in Scenic Waterways and perceptions that any form of mining is inconsistent with the attributes scenic rivers were protected for.

At the same time, boaters and other recreationists reported seeing few dredgers on Scenic Waterways, and especially less now than in years past. Miners indicated there is some correlation between number of miners and gold prices, which are currently low. If this is accurate and represents a general trend, recreation conflict might be expected to decrease because boaters would encounter fewer miners. However, the overall number of boater-miner contacts might also actually increase because non-motorized boating is growing so rapidly in popularity. Boaters might see fewer individual miners on a given day, but many more boaters may encounter the miners that are still active.

In spite of reports of significant recreational conflict, state and federal land managers who administer recreation in Scenic Waterways indicated that the impact of recreational mining on other recreationists was not serious and did not warrant taking action. Based on this assessment, it would be reasonable to conclude that recreational conflict between recreational miners and other river users is widespread but perhaps not tremendously serious.

However, some recreationists often described the situation differently, arguing that managers downplay the impact of recreational mining because they are understaffed and the issue is complicated and controversial. Conflicts between recreational miners and other visitors are viewed as less pressing than recreation access, crowding, site maintenance, and capacity issues. Several boaters stated that they disapproved of recreational suction dredging and thought it should not be allowed, but they had not made this case to river managers. Taking time to voice complaints was viewed by some as "a waste of time" because mining was still legal, and river managers were seen as uninterested or unable to really do anything about it.

Perceptions that recreational mining causes conflict are also not pronounced among most state and federal agencies responsible for permitting the practice. OPRD, as a recreation-oriented department, expressed a concern that recreational mining is fundamentally different from other types of recreation and is therefore not appropriate in Scenic Waterways. However, most other state agencies did not share this view. The suite of agencies with a significant role in dealing with Scenic Waterways do so from a regulatory and often utilitarian standpoint. Each of them focuses on a particular resource

– riverbeds, fish and wildlife, water quality or quantity – and the effects on it from a particular activity.

The net effect of each agencies' focused efforts is accommodation of a range of uses and activities on the state's rivers and streams. Federal agencies with significant interests in recreational mining, the BLM and the US Forest Service, tend to have a multiple use focus to begin with. Although the federal Wild and Scenic and state Scenic Waterways programs share similar goals, agencies responsible for administering Wild and Scenic rivers have a history of facilitating several uses, including resource extraction. Thus the dominant philosophy that affects Scenic Waterway management is that multiple uses, including recreational mining, can and should be accommodated unless significant harm is shown. To they extent that harm is done, an activity must be banned or controlled so that impacts are acceptable, but these agencies may be disinclined to monitor rigorously with a focus on fish, wildlife and human-powered "appreciative" forms of recreation.

## **OPTIONS**

All permits for recreational placer mining in Scenic Waterways are set to expire under current law on December 31, 2003. The State Legislature has placed similar sunset dates on this practice in the past, only to extend them. Unless the Legislature wishes to further extend the deadline by another two years (or some other limited timeframe), it has a few options to consider.

- Option 1 is to continue to allow recreational placer mining on Scenic Waterways. This would provide for recreational mining to continue as it has for many years, with the crucial difference that there would be no sunset date at which time all recreational placer mining would have to cease on Scenic Waterways.
- Option 2 is to allow the sunset date on recreational placer mining, as provided for in Senate Bill 606, to go into effect. This will have the effect of banning the activity on Scenic Waterways by declaring all permits issued by DSL for recreational placer mining on Scenic Waterways invalid after December 31, 2003.
- Option 3 is to further refine the situation and adopt a watershed-specific approach to regulation of recreational placer mining. This would be similar to the type of limitations currently embodied by ODFW's in-water work periods tailored to particular waterways. A decision tree that considers relevant parameters such as stream size, value as fish habitat, natural fluctuation in water levels, mining use levels, cumulative impacts, and demand from other recreationists could aid in decisions about where recreational mining is likely to entail relatively higher or lower risks of ecological and social impacts. Such an approach could serve to reduce these risks and conflicts short of an outright ban on recreational mining. This option would also necessarily entail greater data collection, monitoring and enforcement than is currently employed in order to be effective.

## Impacts

The impacts of the legislature's decision may very well be small, no matter how the legislature decides this matter. The issue most directly involves a small number of people (about 125 permits are currently in effect in Scenic Waterways), in limited areas of the state (Oregon Scenic Waterways comprise 1% of all Oregon river miles, and comparatively few of these sites are mined), with regulations stipulating when and how recreational mining can take place. The number of people and total area under consideration are not sizable portions of the state's population or territory.

However, those people and places that are impacted by this decision face real gains or losses. Recreational miners can potentially be affected more directly and immediately than other stakeholders may be. And while the direct impacts are not likely to be as significant to other stakeholders, any changes will be noticed, even if such changes impact them only indirectly. By the same token, a portion of the state's natural resources will be affected, either in the form of continued mining impacts or their elimination, and impacts will vary by river conditions and the behavior of individual miners.

Moreover, the value of precedent may bring about additional impacts as well. Scenic Waterways comprise only a small part of the state's waterways, but the decision to be rendered by the State Legislature could be significant in that Scenic Waterways are considered to be some of the most highly prized rivers in the state for their scenic, ecological and recreational values. Therefore, policies set for them may be likely to have added significance for establishing new statewide priorities or reaffirming current practices.

Option 1: Continuing to allow recreational suction dredging will impact fish, wildlife, habitat and water quality adversely, but perhaps not significantly or in measurable ways. A suction dredge simply cannot be operated without causing some disturbance to the natural environment, and the scientific literature and environmental organizations have pointed out these impacts. At the same time, these impacts are mitigated in several ways: recreational miners are subject to multiple regulations; they do not generally move large amounts of gravel because of the size of their equipment; in-water work periods are limited; some mining organizations try to ensure that their members obey all regulations; and winter rains tend to flush most rivers and get rid of most evidence of suction dredging. To the extent that long-term and cumulative impacts may be occurring but cannot be easily determined, Option 1 disregards this consideration and shows a preference for addressing any future unacceptable impacts after they occur rather than taking a precautionary approach.

Recreational miners will, of course, not be adversely impacted and thus would strongly prefer this option, while interests most concerned with resource protection and non-motorized river recreation would likely oppose it. Boaters, campers and sportfishers are not likely to be significantly impacted unless they happen to encounter recreational

placer mining, which seems to happen less frequently now than in years past. River users do occasionally come into contact with recreational miners. Only a small portion of these visitors voice complaints about recreational mining, but this may not represent an accurate measure of conflicts. Future encounters between miners and boaters may increase if the trend of rapid growth in non-commercial river floating continues, but this may be counterbalanced if the apparent gradual decline in recreational mining continues.

Option 2: A ban on recreational suction dredging would have the greatest impact on miners, because several gold-bearing sites would be made off-limits to dredging. The vast majority of such sites in Oregon are not on Scenic Waterways, and even some mining organizations admit that a ban would not stifle all recreational mining in the state. Many available sites that can be visited are not on Scenic Waterways, and some organizations have mining claims that their members or tourists can use. Nonetheless, this would represent a curtailment of where recreational miners can operate. While far from a death-blow to the practice, it would be an inconvenience, especially to miners who have come to expect access to mining areas in Scenic Waterways. A ban might force people to drive further to engage in suction dredging, or discourage some people altogether who may not wish to drive farther to access mining areas other than their preferred locations. The extent to which either of these scenarios would occur is uncertain.

Fish, wildlife, habitat and water quality would likely benefit from a ban on suction dredging on Scenic Waterways. While regulation and natural flushing of waterways can mitigate the potential harmful impacts of suction dredging, they cannot completely eliminate all impacts, especially when best management practices are not followed. Since the absence of unnatural disturbance to the natural environment is considered to be better than some disturbance, even a small one, this option would be best for protecting natural resources. At the same time, this ban would cover only a small percentage of waterways, enhancing protections for only a small proportion of the state's fish and other natural resources.

Environmental interests would, of course, be pleased with a ban on recreational mining, because it would provide additional legal restrictions on human activities for some of the state's most valued waterways. Recreationists other than miners could benefit, though in many cases not significantly. To the extent that boaters, campers and hikers do come into contact with recreational miners on Scenic Waterways, these encounters would be eliminated. Any recreational conflicts that result from noise, turbidity, miners' behavior and campsites, or other aspects of suction dredging would cease.

Option 3: Expanding the parameters of a context and watershed-specific management approach to recreational placer mining, including greater data collection and monitoring, could serve to balance multiple interests, taking into account competing values, uses, and benefits. It would also, however, require additional agency resources. Tracking where and when miners and other river recreationists go, monitoring their

activities, and ensuring compliance with regulations can be labor intensive and time-consuming. This option would address concerns that suction-dredge regulations are not being consistently followed, and increased monitoring in the late 1990's apparently enhanced compliance considerably. However, in light of current limitations in Oregon's state budget, as well as the fact that there are only 125 permitted miners on Scenic Waterways, refining regulations and increasing monitoring of the relatively small number of currently active miners may not be economically sensible. In addition, regulations more specific to conditions in each waterway would probably not be well received by miners, who often call for a simpler, more consistent permitting process.

#### **ADDITIONAL STAKEHOLDER RECOMMENDATIONS**

While the purpose of this report is to inform the State Legislature to assist it in making a determination on recreational placer mining in Scenic Waterways, two additional recommendations, pertaining to the entire state, were made by several respondents, and these suggestions deserve mention.

##### *Monitoring and Enforcement.*

Several individuals and organizations suggested that no matter what is decided on Scenic Waterways, the state should make a stronger effort at monitoring compliance with regulations and enforcing DSL and DEQ permits on all Oregon Scenic Waterways and Essential Salmon Habitat. DSL did do this for a few years and found that its efforts resulted in greater adoption of best management practices among suction dredge miners. Currently DSL and DEQ devote little attention to monitoring compliance with their own permits. BLM and the Forest Service do monitor all kinds of activities on their lands, and mining is included in this. So some monitoring and enforcement does take place, though it can be inconsistent and uneven throughout the state.

In spite of these federal efforts, previous DSL efforts, and of the efforts of mining organizations to encourage compliance, state and federal agencies, mining organizations, and most of all, environmental organizations have stated that there are a number of people around the state who do not fully comply with regulations, and therefore are more likely to have an adverse impact as a result of their activities. Increased monitoring and enforcement can help to further mitigate such impacts, not only through the coercive power of government, but also through educational efforts. This practice does not have to be pervasive and time consuming to be effective, as DSL has demonstrated in the past. Getting state personnel out on some rivers sometimes can have a significant effect. Perhaps members of the state's mining organizations can accompany DSL in these efforts to help reinforce the idea that it is important to comply with regulations and that miners themselves are supportive of this.

*Uniform Regulation and Enforcement Practices Throughout the State.*

Miners and staff from several different agencies commented on the fact that depending upon where one was in the state, he or she could be subject to different regulations with respect to placer mining. BLM may allow one type of activity but not others, but the Forest Service may require different practices, even in different National Forests in Oregon. Each agency has a degree of control over its lands that allow it to set certain conditions for suction dredging or other mining activities. These conditions may be more stringent than standards set by the State of Oregon, which has led to complaints of inconsistency and confusion.

One recommendation is to bring together all the different land managers and regulators from around the state – both federal and state agencies – and ask them to come to an agreement on a set of acceptable practices for recreational and small-scale mining that would be applicable throughout the state. It may be the case that one set of standards may need to be applied for small streams and tributaries, while slightly different practices can be permitted on larger bodies of water. The lack of consistency has been described as frustrating – individuals may not differentiate among different levels of governmental jurisdiction when they are outdoors, and it should not be made difficult to determine if one is in violation or in compliance with regulations. Intergovernmental cooperation should not be insurmountable to accomplish this task.

## APPENDIX A

### Oregon Scenic Waterways

The following lakes and rivers, or segments of rivers, and related adjacent lands are designated as Scenic Waterways:

1. **Clackamas River**
  - North Fork (12 miles)
  - South Fork (4 miles)
  - Main stem from Ollalie Lake Scenic Area to North Reservoir (54 miles)
  - River Mill Dam to Carver (12 miles)
2. **Deschutes River**
  - Upper Deschutes: parts from Little Lava Lake to Lake Billy Chinook (99 miles)
  - Lower Deschutes: Pelton Dam to Columbia River (100 miles)
3. **Elk River**
  - North Fork (5 miles)
  - South Fork (5 miles)
  - Main stem from confluence of N. and S. Forks to Elk River Hatchery (11 miles)
4. **Grand Ronde River**
  - Confluence with Willowa River to Washington border (42 miles)
5. **Illinois River**
  - Deer Creek to Rogue River (46 miles)
6. **John Day River**
  - North Fork from North Fork John Day Wilderness to River Mile 20.2 (56 miles)
  - South Fork from Post-Paulina Road to Murderers' Creek Wildlife Area (29 miles)
  - Middle Fork from Crawford Bridge to confluence with North Fork (71 miles)
  - Main stem from Parrish Creek to Tumwater Falls (160 miles)
7. **Klamath River**
  - John Boyle Dam powerhouse to California border
8. **McKenzie River**
  - South Fork from Three Sisters Wilderness to main stem (21 miles)
  - Main stem to Paradise National Forest Service Campground (16 miles)
9. **Metolius River**
  - Metolius Springs to Candle Creek (14 miles)
10. **Minam River**
  - Minam Lake to Willowa River (45 miles)
11. **Nestucca River**
  - Main stem from McGuire Dam to Blaine (23 miles)
12. **North Fork of Middle Fork of Willamette River**
  - Waldo Lake to River Mile 1.5 near Westfir (43 miles)
13. **Owyhee River**
  - Crooked Creek to Birch Creek at the boundary of Rogue River National Forest
  - Idaho border to Three Forks (25 miles)

- 14. Rogue River**
  - Upper Rogue: Crater Lake National Park to River Mile 172.8
  - Lower Rogue: Applegate River to Lobster Creek (88 miles)
- 15. Sandy River**
  - Bull Run River to Stark Street Bridge (12 miles)
- 16. North Santiam River**
  - Little North Fork: Battle Ax Creek to Willamette NF boundary (7 miles)
- 17. North Umpqua River**
  - Mt. Thielsen Wilderness boundary to Lemolo Reservoir (6 miles)
  - Soda Springs Dam powerhouse to Rock Creek (34 miles)
- 18. Walker Creek**
  - Source to confluence with Nestucca River (3 miles)
- 19. Wallowa River**
  - Confluence with Minam to confluence with Grande Ronde (10 miles)
- 20. Waldo Lake**
  - 6,672 acres

## APPENDIX B

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**APPENDIX C**Organizations Contacted

Oregon State Senate	Conservation Biology Institute
Oregon State House	Rogue Flyfishers
Oregon Parks and Recreation Department	Southern Oregon Flyfishers
Division of State Lands	Oregon Trout
Department of Environmental Quality	Northwest Steelheaders
Oregon Department of Fish and Wildlife	Central Oregon Flyfishers
Oregon Watershed Enhancement Board	For the Sake of the Salmon
Water Resources Department	American Rivers
Oregon Department of Forestry	Northwest Rafters Association
Oregon Department of Agriculture	Willamette Kayak and Canoe Club
Oregon Marine Board	Oregon Whitewater Association
Oregon State Police	Cascade Canoe Club
Department of Land Conservation and Development	Rogue Wilderness Adventures
Oregon Department of Geology and Mineral Industries	Orange Torpedoes, Inc.
Commission on Indian Affairs	Oregon Guides and Packers
Bureau of Land Management	OSU Fisheries and Wildlife Department
US Forest Service	OSU Forest Science Department
National Marine Fisheries Service	Deschutes County
US Fish and Wildlife Service	Josephine County
US Army Corps of Engineers	Wallowa County
Oregon Independent Miners	City of Maupin
Waldo Mining District	City of Redmond
Eastern Oregon Mining Association	City of Grants Pass
Willamette Valley Miners	City of Gold Beach
Armadillo Mining Shop	City of Bend
Defenders of Wildlife	City of Wallowa
Native Fish Society	Confederated Tribes of Warm Springs
Siskiyou Regional Education Project.	Confederated Tribes of Umatilla
Willamette River Keepers	Burns Paiute Tribe
Oregon Environmental Council	Confederated Tribes of Siletz
Pacific Rivers Council	Coquille Indian Tribe
Nature Conservancy	Confederated Tribes of Coos, Lower Umpqua, and Suislaw
Sierra Club	Cow Creek Band of Umpqua Indians
World Wildlife Fund	Klamath Tribe
Blue Mountains Biodiversity Project	Lower Rogue Watershed Council
1000 Friends of Oregon	McKenzie Watershed Council
Oregon Natural Resources Council	Umpqua Watershed Council
Audubon Society	Upper Rogue Watershed Council
Water Watch of Oregon	Elk/Sixes River Watershed Council
	Mid Deschutes Watershed Council

Mid Rogue Watershed Council  
North Fork John Day Watershed Council  
Upper South Fork John Day Basin  
Upper Deschutes Watershed Council  
Oregon Farm Bureau  
Water for Life

Oregon Cattlemen's Association  
Oregon Water Resources Bureau  
Oregon Forest Industries Council  
Oregon Small Woodlands Association  
Associated Oregon Loggers  
Individual Landowners

**APPENDIX D**Interview Topics/Questions

What is the case for permitting mining in Scenic Waterways?

What is the case against permitting mining in Scenic Waterways?

Does placer mining, as it is currently practiced, cause harm to fish, wildlife, habitat or water quality?

Does placer mining interfere with other recreational activities by other river users?

Do you suspect (or is there evidence) some miners don't obtain permits and/or operate in violation of regulations?

Which waterways are most frequently used for mining/other activities?

How much payoff of gold is there in Scenic Waterways?

Do permitting requirements sufficiently protect the waterways; do they need to be strengthened; do they go too far and impose an excessive burden?

Does recreational placer mining contribute to recreational conflict?

Are there reported instances of river user conflict or complaints about placer mining?

Why engage in placer mining?

What steps are necessary to obtain a permit to mine?

Much less than 1% of Oregon river miles are at stake here? Why not just ban/allow the practice on this small area?

Do you know of any studies relevant to the placer mining issue that we should know about?

Do you know of any people we should talk to about placer mining or about the Scenic Waterways Program?

**APPENDIX E**Photograph of a Suction Dredge

**APPENDIX F**About the Authors

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