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UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

OAKLAND DIVISION

KARUK TRIBE OF CALIFORNIA, Plaintiff, v. UNITED STATES FOREST SERVICE, *et al.*, Defendants.	Case No. 04-4275 (SBA) **DECLARATION OF JOSEPH C. GREENE IN OPPOSITION TO PLAINTIFF'S MOTION FOR SUMMARY JUDGMENT** Date: June 21, 2005 Time: 1:00 p.m. Ctrm: 3, 3d Floor Judge: Hon. Saundra B. Armstrong

I, Joseph C. Greene, declare as follows:

1. I am a research biologist. I live in Philomath, Oregon. I worked for about 32 years as a research biologist for the United States Environmental Protection Agency, starting when that agency was known as the Federal Water Quality Agency, and I retired from the E.P.A. in 2002. Among other assignments, I measured and evaluated water soluble toxicants from Superfund sites. I spent about four years during my career with the E.P.A. serving as a faculty member at Oregon State University in Corvallis, Oregon on an intergovernmental exchange program and developed a program and a laboratory for the practice of ecotoxicology, the science of determining the toxicity

of samples of effluents and other materials by measuring the reaction of living organism assemblages to such samples. I have served as a chairman of testing committees for the American Society for Testing and Materials. I have chaired a number of international symposia, workshops, and congresses in my field as well as been an invited speaker to numerous national and international professional scientific meetings in my field. My full resume, which also lists my publications, is fourteen pages long.

2. I have reviewed the declaration of Toz Soto filed in support of the plaintiff's summary judgment in the above-captioned lawsuit as well as the "Summary of Fishery Issues Concerning Suction Dredge Mining" prepared by Jon Grunbaum and dated April 20, 2005.

3. The papers authored by Mr. Grunbaum and Mr. Soto are rife with qualifying statements. Examples are, "could", "could be", "appear to be", "are quite possible", "assume", "may not be", and "should be." These are not scientific statements and in general represent subjective opinions. I will try to provide answers to many of the comments that they expressed using scientific data from the literature and information from State and Federal Agencies involved with regulating mining practices and protecting elements in the freshwater environment.

4. **Geographical Scale of Small-Scale Suction Dredging** I would like to begin my discussion of the effects of small-scale mining, using suction dredging techniques, by emphasizing the scale of the activities. It has been observed that environmentalists opposing suction dredging use data gleaned from reports that studied effects of environmental perturbations that are occurring on a system-wide basis. For example, they would characterize the affects of turbidity from a suction dredge as if it would impact downstream organisms in a manner that system-wide high water flow events might. This approach is entirely inconsistent with the way in which suction dredges operate or generally impact their downstream environment.

5. The California Department of Fish and Game (1997) described typical dredging activities as follows' "An individual suction dredge operation **affects a relatively small portion of a stream or river**. A recreational suction dredger (representing 90-percent of all dredgers) may spend a total of *four to eight hours per day* in the water dredging an area of 1 to 10 square meters. *The average number of hours is 5.6 hours per day*. The remaining time is spent working on equipment and

processing dredged material. The area or length of river or streambed worked by a single suction dredger, as compared to total river length, is relatively small compared to the total available area." Exhibit 1 to this declaration is the bibliography or list of the studies and other documents cited in my declaration.

6. Mr. Grunbaum cited a report by a USFS Technical team. I am not certain if it is the same study, but I have one that is an Oregon Siskiyou National Forest Dredge Study. In chapter 4, Environmental Consequences, some perspective is given to small-scale mining. "The average claim size is 20 acres. The total acreage of all analyzed claims related to the total acres of watershed is about *0.2 percent*. The average stream width reflected in the analysis is about 20 feet or less and the average mining claim is 1320 feet in length. The percentage of land area within riparian zones on the Siskiyou National Forest occupied by mining claims is estimated to be only *0.1 percent*." The report goes on to say, "Over the past 10 years, approximately 200 suction dredge operators per season operate on the Siskiyou National Forest" (SNF, 2001).

7. A report from the U.S. Forest Service, Siskiyou National Forest (Cooley, 1995) answered the frequently asked question, "How much material is moved by annual mining suction dredge activities and how much does this figure compare with the natural movement of such materials by surface erosion and mass movement?" The answer was that suction dredges moved a total of 2,413 cubic yards for the season. Cooley (1995) <u>used the most conservative values</u> and estimated that the Siskiyou National Forest would move 331,000 cubic yards of material each year from natural causes. Compared to the 2413 (in-stream) cubic yards re-located by suction mining operations the movement rate by suction dredge mining would equal *about 0.7% of natural rates*.

8. **<u>Clearwater National Forest, Final Biological Opinion and Magnuson-Stevens Act Essential Fish Habitat Consultation for the 2003.</u>** Mr. Grunbaum stated that, "The Siskiyou NF over the hill in S. Oregon and the Clearwater NF in Idaho have both determined that there are significant issues associated with dredging – and have embarked on EIS processes to analyze suction dredging effects." I have previously mentioned some comments from the Siskiyou National Forest. Now let us examine what was determined and published in the Final Biological Opinion and Magnuson-Stevens Act Essential Fish Habitat Consultation for the 2003 Recreational Suction

Dredging in Lolo Creek (NOAA, 2003). "The reviewers (including NOAA, Idaho Fisheries, and USFWS) observed that the dredge mining *had little physical effect on the stream channel beyond the immediate areas where gravels were either dredged or deposited.*" The report made the following additional comments:

9. *Comment: The best areas for locating gold are generally* ***not*** *the best salmonid habitat*. For example, miners prefer to dredge in the upstream end of pools, in seams and pockets of exposed bedrock, and sometimes on the inside of river bends where the current begins to slow and heavier materials accumulate;

10. *Comment*: Ocean conditions are a key factor in the productivity of Northwest salmonid populations, and appear to have been in a low phase of the cycle for some time and are likely an important contributor to the decline in many stocks;

11. *Comment*: When considered in the context of a stream with spawning areas spread over several miles, the amount of the habitat temporarily altered by *the activity is* ***small***;

12. *Comment*: Griffith and Andrews (1981) observed high mortality of rainbow trout eggs and fry that were intentionally passed through a suction dredge. Old style suction dredges that were used in earlier studies had a crash box or header box at the head of the sluice to slow and spread the suctioned material before it went through the slice box. New dredges don't have this feature (NOAA, 2003). The crash box has been removed. Water now arrives at the head of the sluice where the hose diameter flares (widens) to about 3 to 4-times the width of the suction hose. This causes the water velocity to drop and flow directly over the riffles and off the end of the sluice box;

13. *Comment*: Juvenile steelhead could be attracted to the outfall from the suction dredges if benthic invertebrates are dislodged and passed through the dredge. If this were to occur the likelihood of entrainment is not likely to increase, since juveniles would congregate on the downstream side of the outfall, which is too far from suction nozzle for fish to become entrained;

14. *Comment*: When intentionally passed through a suction dredge juvenile and adult rainbow trout *all survived* (Griffith and Andrew, 1981);

15. *Comment:* Dredges are generally operated in environments where the stream energy is too high for steelhead fry or fingerlings (which seek to conserve energy in slower water), and the substrate is too coarse for redds;

16. *Comment:* There have been no reported incidents of juvenile steelhead or salmon being sucked into a dredge nozzle; and

17. *Comment:* It does ***not*** appear that food availability would appreciably change as a result of dredging (NOAA, 2003).

18. Research has found the feeding ability and health of sculpin and salmonids are not significantly impaired by the increased turbidity of suction dredging (Hassler T.J., W.L. Somer and G.R. Stern, 1986).

19. While significant increases in turbidity can stress juvenile salmonids, especially through gill irritation, it would not likely cause mortality (Bash, J., C. Berman and S. Bolton, 2001).

20. Short-term impacts to juvenile steelhead trout could occur (in Lolo Creek, Idaho) during the dredging season from fish being displaced away from dredging activity and from localized reductions in macroinvertebrate food availability. There could also be a temporary food abundance due to displacement of aquatic invertebrates out of the substrate.

21. The Biological Opinion for suction dredging in Lolo Creek (USFWS, 2003) stated that the 18 projects proposed for 2003 suction dredging would not likely jeopardize the continued existence of the Snake River steelhead. The potential even for cumulative impacts from many years of small-scale suction dredge operations is minimal.

22. Occasional fish may be killed (i.e., "eggs, larvae, immature fish, salmonid alevins, juvenile salmonids"). The Forest Service in consultation with regulatory agencies has determined that **this mortality would not threaten the survival of any threatened or endangered species** (CNF, 2004).

23. **Causes of the Declines in Aquatic Animal Populations.** It is implicit in statements found in Grunbaum's paper, such as: "Considering the *uncertainty surrounding dredging effects*, the declines in many aquatic animal populations, and increasing public scrutiny of management decisions, the cost of assuming that human activities such as suction dredging cause no harm

deserves strong consideration by decision makers”, that small-scale suction dredgers are an important contribution to the decline in “aquatic animal populations”.

24. These inferences ignore current scientific knowledge. For example, it was stated in the NOAA Idaho Suction Dredge Study (NOAA, 2003) that, “Ocean conditions are a key factor in the productivity of Northwest salmonid populations, and appear to have been in a low phase of the cycle for some time and are likely an important contributor to the decline of many stocks”.

25. A study representing the first paleolimnological analysis of past sockeye salmon population dynamics (approximately 500 years) was performed in a stained nursery lake (Packer Lake, Alaska). Result of the investigation “suggest that the number of sockeye salmon spawners fluctuated widely. *Comparison of temporal shifts in inferred sockeye salmon abundance from Packer Lake with other Clearwater nursery lakes reveals a broadly consistent pattern,* ***likely influenced by past climatic changes*** (Gregory-Eaves, Finney, Douglas and Smol, 2004).

26. A report out of the National Center for Public Policy Research (Carlisle, 1999) further addresses the issues of salmonid population declines and steps taken to restore them.

27. “Until recently, fish biologists assumed that only changes in the freshwater habitat of salmon could explain the variability in the salmon population. Scientists were thus quick to conclude that human modification of this habitat was the reason for the salmon population decline. Forestry practices have changed in recent years to protect salmon from harm. Buffers mandate that no construction or other development take place within a specified distance from a stream bank to prevent harm to breeding pools or other vital habitat. Other land-use laws have also been implemented to severely restrict development near rivers and wetlands. This is the reason why there have been no new dams built in Washington in the past 35 years. Citizen groups have also organized to clean many streams while agricultural land-use practices and wastewater treatment have steadily improved over the last 25 years (Kaczynski, V., 1998). Together these efforts have helped Pacific Northwest streams become significantly cleaner than they were in the 1970s and thus more ecologically amenable to salmon. A federally funded 1991 study by the Battelle Marine Science's Laboratory, for example, concluded that Puget Sound - home of the Puget Sound chinook

salmon that was recently listed by the NMFS - is the cleanest it has been since before World War II (Anderson, R., 1999). *Nevertheless, the salmon has not rebounded.*

28. Despite billions of dollars in expenditures, widespread implementation of policies to aid the salmon and a cleaner environment, the salmon population continues to decline. The NMFS and environmental activists insist that more stringent regulations and more restrictions on development and additional spending are needed. *This turned out to be incorrect*.

29. *The marked decline in the salmon catch beginning in the mid-1970s corresponded to an increase in the temperature of the Pacific Ocean off the coasts of Washington, Oregon and California.* ***This warming has had a most detrimental impact on salmon survival rates.***

30. Dr. Victor Kaczynski (1998), a fish biologist and consultant on fishing issues in the Pacific Northwest, says that "per classical ecological theory, a 70% decline in zooplankton biomass results in a 70% reduction in predators dependent on zooplankton directly and in their food chain (such as coho salmon) while an 80% reduction would result in a food supply that could only support 20% of the prior predator biomass (such as coho salmon)." With a reduction in zooplankton levels by more than 70% in the past two decades, West Coast salmon have declined by at least 70% as well.

31. In addition, the salmon numbers are further reduced because the warmer water attracts predators such as mackerel and Pacific hake. These fish doubly threaten the salmon by consuming the reduced zooplankton food supply and by eating the salmon themselves. A report on this subject is attached as Exhibit 2 to this declaration.

32. **Lamprey Ammocetes Mortality.** Mr. Soto states that, "Lamprey ammocetes could be entrained by suction dredges and cause direct mortality or indirect mortality from exposure to predators" (emphasis added). It has been reported that "Research on entrainment mortality of lamprey ammocetes has not been published. However, based on field observations, it is not likely they would suffer direct mortality because of their tough skin and flexible body" (SNF, 2001).

33. **Benthic Invertebrate Populations.** Mr. Grunbaum states, "The majority of the studies showed that suction dredging can adversely affect aquatic habitats and biota. Most of the researchers warn that adverse affects to aquatic habitats and organisms are *quite possible*." Mr.

Soto, following the same line of reasoning stated, “Benthic invertebrate populations are impacted from suction dredging which are important food sources for rearing salmonids.”

34. There are published reports referring to the direct impact of suction dredging on aquatic invertebrates. It is important to note that the studies took place in: California (3 streams; Stern, 1988; Harvey, 1986; Somer and Hassler, 1992); Montana (Thomas, 1983); Idaho (4 streams; Griffith and Andrews, 1981); and, Alaska (2 streams; Royer, Prussian and Minshall, 1999; Huber and Blanchet, 1992). All reached the same conclusion, ***the impacts on benthic invertebrates are highly localized and that re-colonization occurs rapidly****.*

35. Harvey (1986) reported that’ “Dredging significantly affected some insect taxa when substrate was altered. A re-colonization experiment showed that numerical recovery of insects at dredged sites was rapid. *Local turbidity increases below active dredging probably did not affect invertebrates and fish*.”

36. In Gold Creek, Montana Thomas (1985) found, “Significant changes in aquatic insect abundance were restricted to the area dredged; downstream areas were not affected. *Re-colonization was substantially complete 1 month after dredging*.”

37. Four Idaho streams were used to evaluate some of the effects on aquatic organisms that may result from the use of small suction gold-dredges. The results showed that, “fewer than 1% of the 3,623 invertebrates entrained showed injury or died within 24-hours. Most of the dead were *Centroptilum* mayflies that were undergoing emergence at the time of dredging. *Most of the re-colonization of dredged plots by benthic invertebrates was completed after 38 days*” (Griffith and Andrews, 1981).

38. Somer and Hassler (1992) found that in a California creek, “The effects of dredging on invertebrates varied with taxa and were site-specific at the level of dredging during the study. Total numbers of invertebrates that colonized samplers and their diversity indices did not differ significantly above and below the dredges.”

39. The U.S. Environmental Protection Agency funded a study in Fortymile River and Resurrection Creek, Alaska (Royer, Prussian and Minshall, 1999), where the larger 8-inch and 10-inch dredge nozzles were used. Results from the study concluded that, “The abundance and

diversity of macroinvertebrates was greatly reduced in the first 10 meters below the dredges at Site 1, relative to the upstream reference site. For example, macroinvertebrate abundance was reduced by 97% and the number of taxa by 88% immediately below the dredge. The abundance and diversity of macroinvertebrates returned to values seen at the reference site by 80 to 100 meters downstream of the dredge. A similar decline in macroinvertebrate abundance and diversity was observed in Site 2. *One year after dredging at both Site 1 and Site 2, recovery of the macroinvertebrate diversity appeared to be substantial.*

40. The second component of this project was to examine the effects of recreational suction dredging on a smaller stream in Alaska. The results from Resurrection Creek indicated that there was no difference in the macroinvertebrate community between the mining area and the locations downstream of the mining area, in terms of macroinvertebrate density, taxa richness, and EPT richness. In general, *our results are in agreement with other studies that found only localized reductions in macroinvertebrate abundance in relation to recreational suction mining*" (Royer, Prussian and Minshall, 1999).

41. The California Department of Fish and Game (CDFG, 1997) concluded, "Suction dredging can have significant short-term and localized adverse impacts on local benthic invertebrate abundance and community composition. However, *over the long-term, the impacts appear to be less than significant.* Colonies of invertebrates generally recolonize areas disturbed by suction dredges within a relatively short period of time ranging from one to two months." "*Impacts to benthic invertebrate communities of suction dredging with 6 inch or smaller sized nozzles appear to be less than significant*." "*Effects to benthic and/or invertebrate communities, turbidity and water quality appear to be less than significant*. They are usually localized and temporary in duration."

42. **Cumulative Effects from the Operation of Multiple Dredges.** It has been suggested that a single operating suction dredge may not pose a problem but the operation of multiple dredges would produce a cumulative effect that could cause harm to aquatic organisms. However, "No additive effects were detected on the Yuba River from 40 active dredges on a 6.8 mile (11 km) stretch. The area most impacted was from the dredge to about 98 feet (30 meters) downstream, for most turbidity and settleable solids (Harvey, B.C., K. McCleneghan, J.D. Linn, and C.L. Langley,

1982). In another study, "Six small dredges (<6 inch dredge nozzle) on a 1.2 mile (2 km) stretch had no additive effect (Harvey, B.C., 1986). *Water quality was typically temporally and spatially restricted to the time and immediate vicinity of the dredge* (North, P.A., 1993).

43. A report on the water quality cumulative effects of placer mining on the Chugach National Forest, Alaska found that, "The results from water quality sampling do not indicate any strong cumulative effects from multiple placer mining operations within the sampled drainages." "Several suction dredges probably operated simultaneously on the same drainage, but did not affect water quality as evidenced by above and below water sample results. *In the recreational mining area of Resurrection Creek, five and six dredges would be operating and not produce any water quality changes* (Huber and Blanchet, 1992).

44. A survey was conducted in the Siskiyou National Forest, Illinois sub-basin in 2002. Bayley (2003) assessed potential cumulative effects of suction dredge mining using fish response data from 59 stream reaches. A copy of the report of this survey is attached as Exhibit 3 to this declaration. Responses utilized were pool densities of salmonids over one-year-old, of young-of-the-year salmonids, and a stream habitat measure, width-to-depth ratio. Intensity of suction dredge mining was estimated from a direct survey. *Cumulative suction dredge mining was found to be non-significant for each of the three response variables tested in a general linear model* (Bayley, 2003). Bayley concluded that "**Given that this analysis could not detect an effect averaged over good and bad miners and that a more powerful study would be very expensive, it would seem that public money would be better spent on encouraging compliance with current guidelines than on further study.**"

45. Furthermore, individuals that have not, in fact, operated suction dredges may not realize that it is a self-limiting operation. The dredge operator must be able to see his work area to operate safely and manage the intake of the dredge nozzle. *If high levels of turbidity were to flood the dredger's work area and render him "blind" he would have to move the operation to another location*.

46. The California Department of Fish and Game stated in its Draft Environmental Impact Report that "Department regulations do not currently limit dredger densities but the activity itself is

somewhat self-regulating. Suction dredge operators must space themselves apart from each other to avoid working in the turbidity plume of the next operator working upstream. *Suction Dredging requires relatively clear water to successfully harvest gold* " (CDFG, 1997).

47. **The Effects of Elevated Turbidity and Suspended Sediment.** *Suction dredging causes less than significant effects to water quality*. The impacts include increased turbidity levels caused by re-suspended streambed sediment and pollution caused by spilling of gas and oil used to operate suction dredges (CDFG, 1997).

48. The impact of turbidities on water quality caused by suction dredging can vary considerably depending on many factors. Factors which appear to influence the degree and impact of turbidity include the amount and type of fines (fine sediment) in the substrate, the size and number of suction dredges relative to stream flow and reach of stream, and background turbidities (CDFG, 1997).

49. Because of low ambient levels of turbidity on Butte Creek and the North Fork American River, California, Harvey (1986) easily observed increases of 4 to 5 NTU from suction dredging. Turbidity plumes created by suction dredging in Big East Fork Creek were visible in Canyon Creek 403 feet (123 meters) downstream from the dredges (Somer and Hassler, 1992).

50. In contrast, Thomas (1985), using a dredge with a 2.5-inch diameter nozzle on Gold Creek, Montana, found that suspended sediment levels returned to ambient levels 100 feet below the dredge. Gold Creek is a relatively undisturbed third order stream with flows of 14 cubic feet per second. A turbidity tail from a 5-inch (12.7 cm) dredge on Clear Creek, California was observable for only 200 feet downstream. Water velocity at the site was about 1 foot per second (Lewis, 1962).

51. Turbidity below a 2.5 inch suction dredge in two Idaho streams was nearly undetectable even though fine sediment, less than 0.5 mm in diameter, made up 13 to 18 percent, by weight, of the substrate in the two streams (Griffith and Andrews, 1981).

52. "Effects from elevated levels of turbidity and suspended sediment normally associated with *suction dredging as regulated in the past in California appear to be less than significant with regard to impacts to fish and other river resources* because of the level of turbidity created and the short distance downstream of a suction dredge where turbidity levels return to normal" (CDFG, 1997).

53. "Suction dredges, powered by internal combustion engines of various sizes, operate while floating on the surface of streams and rivers. As such, oil and gas may leak or spill onto the water's surface. *There have not been any observed or reported cases of harm to plant or wildlife as a result of oil or gas spills associated with suction dredging*" (CDFG, 1997).

54. Furthermore, individuals that have not, in fact, operated suction dredges may not realize that it is a self-limiting operation. The dredge operator must be able to see his work area to operate safely and manage the intake of the dredge nozzle. *If high levels of turbidity were to flood the dredger's work area and render him "blind" he would have to move the operation to another location.*

55. **The Effects of Dredging on Fish Movement.** Grunbaum stated "Synergistic effects of high water temperatures and the disturbance and/or turbidity and/or pollution and/or decrease in food base and/or loss of cover associated with suction dredging has the potential to reduce the juvenile fish carrying capacity in the vicinity of the recently dredged area. Displaced juvenile salmon and trout *are likely to be* displaced to a less optimal location where overall fitness and survival odds are also less.

56. Let us begin by removing the, "loss of cover associated with suction dredging." Dredgers are not loggers. Responsible suction dredge miners do not dredge stream banks (it is illegal). Dredging occurs only in the wetted perimeter of the stream. Therefore, it is unlikely suction dredging will cause a loss of cover.

57. Solar radiation is the single most important energy source for the heating of streams during daytime conditions. The loss or removal of riparian vegetation can increase solar radiation input to a stream increasing stream temperature. *Suction dredge operations are confined to the existing stream channel and do not affect riparian vegetation or stream shade (SNF, 2001).*

58. **Suction dredges do not add pollution to the aquatic environment. They merely re-suspend and re-locate the bottom materials (overburden) within the river or stream**.

59. It has been clearly shown through the scientific research stated in the section on benthic invertebrate populations that there would not be a decrease in the food base for fish and that the impacts on benthic invertebrates are highly localized and that re-colonization occurs rapidly. The

NOAA Idaho Dredge Study (NOAA, 2003) "found qualitative differences in invertebrate species above and below the dredging, but no significant differences in numbers of invertebrates or diversity indices. *Given the relatively small area where dredging would occur in the proposed action, it does not appear that food availability would appreciably change as a result of dredging*."

60. Furthermore displacement of fish may not occur or be only temporary. It has been demonstrated that, "Tagged rainbow trout moved very little in either the dredged or control areas." No tagged fish moved further than from a pool to one of the adjacent riffles or vice versa in any 2-week period. Although the total amount of movement by fish in the dredged and control areas at Butte Creek, CA. was not significantly different overall, some tagged fish clearly responded to dredging. Some of the physical change caused by small dredging operations caused movement of fish from areas where pool volume was reduced or water velocity altered. Three of six small fish in one small pool moved into the downstream riffle when dredging added sand that reduced the volume of the pool by 25%. After the sand was flushed out by a temporary high flow, two of those three fish returned to the pool. In contrast, during low flows in late summer, all eight fish in one riffle occupied a hole created by dredging. Commonly, dredging occurred in pools and caused no major change in volume but increased embeddedness of cobbles and boulders. Rainbow trout generally remained in place in these pools (Harvey, 1986)."

61. Stern (1988) found that, "A high level of suction dredging was evident in Canyon Creek, but adverse effects on anadromous fish habitat were minimal to moderate. Excavated holes, gravel tailings, and fine sediment deposition, which affected over 1000 m^2 of streambed each season, were obliterated by peak flows during the course of a normal water year". *High stream turbidity and total suspended solids levels immediately below dredges were localized and never reached concentrations that would directly cause physiological harm to Salmonids* (Cordone and Kelley, 1961).

62. Suction dredging could alter pool dimensions through excavation, deposition of tailings, or by triggering adjustments in channel morphology. Excavating pools could substantially increase their depth and increase cool groundwater inflow. This could reduce pool temperature. If pools were excavated to a depth greater than three feet, salmonid pool habitat could be improved. In addition, *if excavated pools reduce pool temperatures, they could provide important coldwater habitats for salmonids living in streams with elevated temperatures (SNF, 2001).*

63. Suction dredging would increase frequency where dredging excavates pools. An increase in pool frequency could temporarily improve stream channel diversity, a condition beneficial to many fishes and aquatic organisms. Deepened pools would usually return to their original depths following the high flow events *(SNF, 2001).*

64. **<u>The Effects of Dredging on Water Temperature and Channel Morphology</u>.** Dredge mining had little, if any, impact on water temperature (Hassler, T.J., W.L. Somer and G.R. Stern, 1986). However, the Oregon Siskiyou Dredge Study states, "There is no evidence that suction dredging affects stream temperature" *(SNF, 2001).*

65. Solar radiation is the single most important energy source for the heating of streams during daytime conditions. The loss or removal of riparian vegetation can increase solar radiation input to a stream increasing stream temperature. *Suction dredge operations are confined to the existing stream channel and do not affect riparian vegetation or stream shade (SNF, 2001).*

66. Increases in sediment loading to a stream can result in the stream aggrading causing the width of the stream to increase. This width increase can increase the surface area of the water resulting in higher solar radiation absorption and increased stream temperatures. *Suction dredge operations are again confined to the existing stream channel and do not affect stream width (SNF, 2001).*

67. Stream temperature can also increase from increasing the stream's width to depth ratio. The suction dredge operation creates piles in the stream channel as the miner digs down into the streambed. The stream flow may split and flow around the pile decreasing or increasing the wetted surface for a few feet. However, within the stream reach that the miner is working in, the change is so minor that the overall wetted surface area can be assumed to be the same so the total solar radiation absorption remains unchanged *(SNF, 2001).* ***Suction Dredging results in no measurable increase in stream temperature*** *(SNF, 2001).*

68. "Small streams with low flows may be significantly affected by suction dredging, particularly when dredged by larger dredges (Larger than 6 inches) (Stern, 1988). However, the

California Department of Fish and Game concluded, "current regulations *restrict the maximum nozzle size to 6 inches on most rivers and streams which, in conjunction with riparian habitat protective measures, results in a less than significant impact to channel morphology*" (CDFG, 1997).

69. **Other Impacts.** "Many people want outdoor settings to be left in a natural condition for quiet enjoyment. Thus dredging is perceived as a conflict with these activities. The noise of the suction dredge engines and exhaust fumes and the presence of the suction dredge activities may be the very thing many people go outdoors to escape. However, recreational suction dredgers also enjoy the outdoors.

70. It should be noted that suction dredging is considered a legitimate activity on California's streams and suction dredge operators have as much right as any other river user to enjoy and utilize streams as long as their activities are in compliance with the laws and regulations of the State of California". (CDFG, 1997).

71. The issue of localized conflict with suction dredgers and other outdoor recreational activities can be put into a more reasonable perspective using the data provided in Section I of this report. For example, the total acreage of all analyzed claims related to the total acres of watershed is about *0.2 percent*. The percentage of land area within riparian zones on the Siskiyou National Forest occupied by mining claims is estimated to be only *0.1 percent*." The report goes on to say, "Over the past 10 years, approximately 200 suction dredge operators per season operate on the Siskiyou National Forest (SNF, 2001). The issue against suction dredge operations in the streams of the United States appears to be less an issue of environmental protection and more of an issue of certain organized individuals and groups being unwilling to share the outdoors with others without like interests.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

DATED: This 17th day of May, 2005.

/S/ Joseph C. Greene________
Joseph C. Greene

CERTIFICATE OF SERVICE

I certify that on May 17, 2005, I electronically filed the foregoing DECLARATION OF JOSEPH C. GREENE IN OPPOSITION TO PLAINTIFF'S MOTION FOR SUMMARY JUDGMENT, with the Clerk of the Court, using the CM/ECF system, which will send notification of such filing to the following:

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s/_James L. Buchal ___
JAMES L. BUCHAL
Attorney for The New 49'ers, Inc. and Raymond W. Koons

ATTESTATION OF SIGNATURE

I hereby attest that I have on file all holograph signatures for any signatures indicated by a "conformed" signature (/S/) within this efiled document.

Executed this 17th day of May, 2005.

s/_James L. Buchal ___
JAMES L. BUCHAL