UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
2003/01665

August 6, 2004

Lawrence C. Evans
Chief, Regulatory Branch
Department of the Army
Portland District, Corps of Engineers
Post Office Box 2946
Portland, Oregon 97208-2946

Re: Endangered Species Act Section 7 Formal Conference Opinion on the LTM, Inc. Instream Sand and Gravel Mining Project, Umpqua River, Douglas County, Oregon (Corps No. 200200828)

Dear Mr. Evans:

Enclosed is a conference opinion (Opinion), dated August 5, 2004, prepared by NOAA's National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects of issuing a permit under section 10 of the Rivers and Harbors Act and section 404 of the Clean Water Act for the LTM, Inc., Instream Sand and Gravel Mining Project, Douglas County, Oregon. NOAA Fisheries concludes in this Opinion that the action, as originially proposed, is likely to jeopardize Oregon Coast (OC) coho salmon (*Oncorhynchus kisutch*), which are currently proposed for listing under the ESA as threatened. Pursuant to section 7(b)(3)(A) of the ESA, NOAA Fisheries has included reasonable and prudent alternatives (RPAs) that NOAA Fisheries believes will avoid jeopardy. Also included is an incidental take statement associated with RPA #3. Neither the RPAs nor the incidental take statement become effective until NOAA Fisheries adopts this conference opinion as a biological opinion, after the listing is final. Until the time that the species is listed, the prohibitions of the ESA do not apply.

This Opinion also includes conservation recommendations to the Corps of Engineers (Corps) suggesting the development of a database of all existing permits issued by the Department of the Army that have resulted in sand and gravel mining in Oregon. For consistency, this database should include all river basins in Oregon and consist of information describing the location of each operation, the type of mining authorized (*e.g.*, floodplain, bar scalping, in-water), a description of any permit condition that calls for compensatory mitigation or a reclamation plan, and the volume of mining authorized. Once completed, the Corps, in conjunction with NOAA Fisheries, can use this permit database to assess which ongoing permits are subject to ESA consultations based on their permit expiration date and proximity to listed salmon habitat.

These conservation recommendations are not intended to be included as a permit condition for the proposed action. NOAA Fisheries believes they are necessary to make progress toward salmon recovery in Oregon and to expedite the consultation process on these complex actions.

An essential fish habitat (EFH) consultation was previously completed on March 15, 2004, for this proposed action pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and its implementing regulations (50 CFR Part 600) (NOAA Fisheries No.: 2003/00364). The EFH conservation recommendations provided to the Corps on March 15, 2004, to avoid, minimize, mitigate, or otherwise offset adverse effects on EFH resulting from the proposed action are consistent with the conservation measures included in this Opinion. NOAA Fisheries has not received the Corps' written response required under 305(b)(4)(B) of the MSA.

Please direct any comments you may have regarding this Opinion to Chuck Wheeler, at 541.957.3379, or Anne Mullan, at 503.231.6267.

Sincerely,

D. Robert Lohn
Regional Administrator

cc: Teena Monical, Corps
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Endangered Species Act - Section 7 Consultation
Conference Opinion

LTM, Inc. Instream Sand and Gravel Mining Project,
Umpqua River, Douglas County, Oregon
(Corps No. 200200828)

Agency: U.S. Army Corps of Engineers

Consultation
Conducted By: NOAA Fisheries,
Northwest Region

Date Issued: August 6, 2004

Issued by: _____
D. Robert Lohn
Regional Administrator

Refer to: **2003/01665**

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1. INTRODUCTION

1.1 Background

On March 18, 2003, NOAA's National Marine Fisheries Service (NOAA Fisheries) received a letter from the Portland District of the U.S. Army Corps of Engineers (Corps) requesting formal consultation on the effects of issuing a permit under section 404 of the Clean Water Act. The request was made pursuant to section 7(a)(2) of the Endangered Species Act (ESA). The proposed permit would authorize LTM, Inc. (LTM), the permit applicant, to mine up to 400,000 cubic yards (CY) of sand and gravel annually for a total of 2.4 million CY over a 6-year period. The material would be removed from the bed of the Umpqua River using a barge-mounted clamshell dredge and placed on the barge for initial processing. The dredged material would be washed and sorted onsite, off-loaded to another barge, and transported daily to land-based facilities for final processing and sale. The slurry from the wash plant would be discharged back into the river from a pipe placed below the stream surface. The mining would occur between river miles (RM) 18 and 25, in Douglas County, Oregon. Besides describing the proposed operation and its likely effects on aquatic resources, the Corps found that instream mining is likely to adversely affect Oregon Coast (OC) coho salmon (*Oncorhynchus kisutch*), an ESA-listed species.

Gravel has been mined in the proposed action area since 1918. LTM renovated the barge and monitoring equipment in 2002, partly in response to third-party complaints regarding mining operations outside approved locations, excessive turbidity, and other violations of permit operating conditions. LTM has not mined any sand and gravel in the proposed action area since the previous Corps permit expired on December 31, 2002.

1.2 Consultation History

A biological opinion was issued on June 26, 1998, by NOAA Fisheries for effects of proposed instream sand and gravel mining on Umpqua River (UR) cutthroat trout (*O. clarki clarki*) through the year 2002. NOAA Fisheries determined that, based on available information, the proposed mining would not likely jeopardize the continued existence of UR cutthroat trout. In 2000, after a comprehensive, coast-wide reassessment of the status of coastal cutthroat trout, NOAA Fisheries delisted the UR cutthroat trout under the ESA, and transferred future ESA jurisdiction to the U.S. Fish and Wildlife Service.[1] Therefore, UR cutthroat trout will not be considered any further as part of this analysis.

A draft biological assessment (BA) for the proposed sand and gravel mining operation considered in this consultation was prepared by LTM and sent to the Corps and NOAA Fisheries during the week of February 3, 2003. An initial meeting between the Corps, LTM and NOAA

[1] See, 65 FR 20195 (April 19, 2000) (NOAA Fisheries, Final rule to delist UR cutthroat trout under the ESA), 65 FR 2136 (April 21, 2000) (NOAA Fisheries and USFWS, Notice of change of jurisdiction for UR cutthroat trout), and 65 FR 24420 (April 26, 2000) (USFWS, Final rule to delist UR cutthroat trout under the ESA).

Fisheries took place on February 13, 2003, at the Corps' Eugene Field Office. The purpose of this meeting was to review the BA and the informational needs of NOAA Fisheries, and to discuss the consultation process. Following this meeting, on February 21, 2003, NOAA Fisheries sent a letter to LTM asking for clarifications of the BA and requesting further information about project design features. LTM responded with a letter on March 1, 2003. NOAA Fisheries received a new BA from the Corps on March 20, 2003, along with a written request initiating formal consultation.

NOAA Fisheries prepared a letter under the authority of the Fish and Wildlife Coordination Act (48 stat. 401, as amended; 16 U.S.C. 661 *et seq.*) on March 26, 2003, recommending that the Corps deny the CWA permit application. NOAA Fisheries cited the probable adverse effects of instream gravel mining, the lack of mitigation, and the lack of an analysis of practical alternatives as the basis for these recommendations.

On June 26, 2003, a conference call was held between Corps, LTM, and NOAA Fisheries. The primary topic of discussion was identification of the information and analyses necessary to evaluate the effects of the proposed mining on channel morphology, sediment transport processes, and listed species in the project area. LTM hosted NOAA Fisheries staff on a field trip to the action area and processing equipment on July 2, 2003. Some participants cruised the shorelines to familiarize themselves with the action area, others went to the processing barge to see how it is operated.

On July 15, 2003, NOAA Fisheries met with LTM in Portland to discuss the ongoing consultation, and provided a set of suggested conservation practices to help avoid or minimize the adverse effects of the proposed mining operations. At this time, LTM delivered a letter titled "List of Conditions Acceptable to LTM." The Corps accepted this list of modifications to the application as the proposed action. The U.S. Fish and Wildlife Service (USFWS) met with the applicant and NOAA Fisheries on July 28, 2003, after receiving documents shortly before the meeting related to the proposed modifications in the "Response of Applicant to Public Comments." On August 15, 2003, NOAA Fisheries, USFWS, and the Corps discussed the modified proposal with several state agencies including, the Oregon Department of Fish and Wildlife (ODFW), Oregon Division of State Lands (ODSL), and Oregon Department of Environmental Quality (ODEQ).

A draft biological opinion and essential fish habitat (EFH) consultation for the effects of proposed mining was transmitted to the Corps on October 27, 2003. In that draft opinion, NOAA Fisheries determined that, based on available information, the LTM, Inc. sand and gravel mining operation in the Umpqua River, as proposed, was likely to jeopardize the continued existence of OC coho salmon and adversely affect EFH designated for groundfish, coastal pelagics, and Pacific salmon. Pursuant to section 7(b)(3)(A) of the ESA, NOAA Fisheries included reasonable and prudent alternatives in the draft opinion that NOAA Fisheries believed would not jeopardize OC coho salmon, and reasonable and prudent measures with nondiscretionary terms and conditions that NOAA Fisheries believed were necessary to minimize incidental take associated with this action. Further, the EFH consultation included

conservation recommendations that NOAA Fisheries believed were necessary to minimize those adverse effects.

On December 8, 2003, NOAA Fisheries received a hand-delivered, written response to the draft opinion from LTM. That response is included in the administrative record for this consultation and information and analyses in the response was considered during the preparation of this final conference opinion.

On March 15, 2004, an EFH consultation was completed for this proposed action pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and its implementing regulations (50 CFR Part 600) (NOAA Fisheries No.: 2003/00364). The EFH conservation recommendations provided to the Corps on March 15, 2004, to avoid, minimize, mitigate, or otherwise offset adverse effects on EFH resulting from the proposed action are consistent with the conservation measures included in this ESA conference opinion.

On June 16, 2004, following denial of the initial permit application by the Corps, NOAA Fisheries participated in a meeting with the Corps and Applicant to discuss possible alternatives that would allow some continued gravel mining while protecting Federal trust resources. The Corps and Applicant tentatively agreed to incorporate the conservation measures from RPA #3 in this conference opinion into a modified permit proposal.

1.3 Proposed Action

As described by LTM on July 15, 2003, the proposed action is to mine and wash 1.1 million CY of sand and gravel in the Umpqua River between RM 19 and 25. The mining would take place over a 6-year period at a rate of 181,000 CY per year. The sand and gravel would be excavated from the river channel using a barge-mounted clamshell dredge between the hours of 7:00 a.m. and 10:00 p.m., up to six days a week, and continue year-round without restriction, including seasons when vulnerable life stages of OC coho salmon are migrating and rearing in the action area.

Channel depths after mining would not exceed 40 feet below National Geodetic Vertical Datum (NGVD),[2] and would average 35 feet below NGVD. Bedrock shorelines would have a 50-foot setback, and alluvial shorelines and islands would have a minimum setback of 150 feet. At the confluences of Charlotte Creek, Franklin Creek, Harvey Creek, Indian Charlie Creek, Mill Creek, and Luder Creek, LTM would leave setbacks of 200 feet from the shoreline, and 300 feet upstream and 300 feet downstream. After mining, the channel side slope would range from 0.5:1 (horizontal to vertical) near bedrock shores to 3:1 near alluvial shores.

[2] NGVD, also called 'NGVD 29' and the '1929 mean sea level datum,' is a vertical geodetic datum established by the National Ocean Service. This datum is calculated by averaging the sea level over many years at tide stations along the coasts of the U.S. and Canada. Because NGVD is an average, it does not represent the local mean sea level for the action area, or for any other particular place.

The clamshell dredge would scoop and load sand and gravel onto a barge where it would be washed and sorted. Wash water would be drawn from the Umpqua River at a rate of 600 gallons per minute. Intake pipe screens would have 3/32-inch mesh size. The wash water would be discharged below the river surface at a depth of 5 to 15 feet. A cyclone separator would be installed on the product-washing barge to release only sediments that would pass through a 200 mesh sieve (0.0029-inch). The turbidity monitoring program would be expanded to include salinity and temperature measurements to evaluate seasonal salinity changes within the project area. The measurements would be made along fixed, cross-section transects established between RM 19 and RM 25.

Actions interrelated with the mining include the transfer of sand and gravel from the clamshell to the processing barge where it is washed, then to a transport barge that moves the sand and gravel each day to onshore facilities in Reedsport at approximately RM 10. There, the sand and gravel are separated, part of the gravel is crushed, and all products are stored until sold. The onshore facility consists of several buildings and a storage yard covering 17 acres of land within the Umpqua River floodplain.

1.4 Description of the Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area (project area) involved in the proposed action (50 CFR 402.02). The direct effects occur at or beyond the project site based on the potential for upstream or downstream effects (*e.g.*, alteration of channel, loss of sediment supply to downstream gravel bars, alteration of stream channel morphology, increases in total suspended solids (TSS), and displacement, injury to, or killing of coho salmon) in the action area. Indirect effects may occur at or beyond the project site when the proposed action leads to additional activities that contribute to aquatic habitat degradation. For this consultation, the action area is the Umpqua River from RM 0 to RM 27. The streambed of the Umpqua River is alluvial up to RM 27, where it becomes bedrock. Gravel excavation could initiate headcutting that would affect the alluvial streambed upstream (OWRRI 1995). Taking gravel out of the system means that less gravel would be available to downstream areas. According to Ratti (1979), winter floods can deposit sediments and gravels as far as the mouth of the estuary, but high flows tend to scour the navigational channel.

Since gravel mining can initiate headcutting, the action area also extends into tributaries of the Umpqua River near the project site. This includes the tidally-influenced portions of Harvey Creek (0.8 miles), Indian Charlie Creek (0.1 miles), Franklin Creek (0.4 miles), Mill Creek (0.4 miles), Charlotte Creek (0.2 miles) and Luder Creek (0.2 miles). The action area also includes the channel migration zones of these waterways.

The culverts where Highway 138 crosses Charlotte Creek and Luder Creek control the stream grade for these two streams. This eliminates the potential for effects to travel from the Umpqua River upstream into Charlotte Creek and Luder Creek. However, these perched culverts are scheduled to be replaced with bridges in 2005, within the time frame of this proposed action. In

the cases of Charlotte Creek and Luder Creek, the action area extends up to the point that should become the tidally-influenced channel once the culverts are replaced.

2. ENDANGERED SPECIES ACT

2.1 Conference Opinion

This conference opinion (Opinion) considers the potential effects of the proposed action on OC coho salmon, which occur in the proposed action area. OC coho salmon were listed as threatened under the ESA on August 10, 1998 (63 FR 42587) and protective regulations were issued on July 10, 2000 (65 FR 42422). In September 2001, in the case *Alsea Valley Alliance v. Evans*, U.S. District Court Judge Michael Hogan struck down the 1998 ESA listing of OC coho salmon and remanded the listing decision to NOAA Fisheries for further consideration. In November 2001, the Oregon Natural Resources Council appealed the District Court's ruling. Pending resolution of the appeal in December 2001, the Ninth Circuit Court of Appeals stayed the District Court's order that voided the OC coho listing. While the stay was in place, the OC coho evolutionarily significant unit (ESU) was again afforded the protections of the ESA.

On February 24, 2004, the Ninth Circuit dismissed the appeal in *Alsea*. On June 15, 2004, the Ninth Circuit returned the case to Judge Hogan and ended its stay. Judge Hogan's order invalidating the OC coho listing is back in force. Accordingly, OC coho are now not listed, and ESA provisions for listed species, such as the consultation requirement and take prohibitions, do not apply to OC coho.

In response to the *Alsea* ruling, NOAA Fisheries released its revised policy for considering hatchery stocks when making listing decisions on June 3, 2004 (69 FR 31354). NOAA Fisheries completed a new review of the biological status of OC coho salmon, and applying the new hatchery listing policy, proposed to list OC coho salmon as a threatened species on June 14, 2004 (69 FR 33102). NOAA Fisheries must make a final decision on the proposed OC coho salmon listing by June 14, 2005.

The objective of this Opinion is to determine whether the proposed action is likely to jeopardize the continued existence of OC coho salmon. This consultation is conducted pursuant to section 7(a)(2) of the ESA and its implementing regulations, 50 CFR 402.

2.1.1 Biological Information

Although limited data are available to assess population numbers or trends, NOAA Fisheries believes that coho salmon stocks comprising the OC coho salmon ESU are depressed relative to past abundance. The OC coho salmon ESU is identified as all naturally-spawned populations of coho salmon in coastal streams south of the Columbia River and north of Cape Blanco (60 FR 38011, July 25, 1995). Biological information for OC coho salmon can be found in species

status assessments by NOAA Fisheries (Weitkamp *et al.* 1995) and by the ODFW (Nickelson *et al.* 1992).

Abundance of wild coho salmon spawners in Oregon coastal streams declined from roughly 1965 to 1975, and has fluctuated at a low level since then (Nickelson *et al.* 1992). Spawning escapements for this ESU may be less than 5% of that in the early 1900s. Contemporary production of coho salmon may be less than 10% of the historic production (Nickelson *et al.*1992). Average spawner abundance has been relatively constant since the late 1970s, but preharvest abundance has declined. Average recruits-per-spawner may also be declining. The OC coho salmon ESU, although not at immediate danger of extinction, may become endangered in the future if present trends continue (Weitkamp *et al.* 1995). Preliminary findings of the Biological Review Team (BRT 2003) indicate that recent increases in spawner escapement levels are likely due to good ocean productivity while freshwater productivity continues to decline. Continued degradation of freshwater habitat that results in decreased productivity may lead to localized extinction during the next low ocean productivity cycle (BRT 2003).

The Umpqua River drains 4,900 square miles, of which about 4,100 are above the project area. The Umpqua River is unique within the OC coho salmon ESU because it has headwaters in the Cascade Mountains, runs through the Coast Range and then enters the Pacific Ocean. No other OC coho salmon river traverses the coast range to the Cascade Mountains. Four populations of coho salmon occur within the Umpqua River (Kostow 1995). They are the Smith River, the mainstem Umpqua River, the North Umpqua River, and the South Umpqua River. Fish from the Smith River do not pass through the action area, but fish from the other three populations do. The abundance of OC coho salmon in the Umpqua River basin varies by month and life history stage (Table 1).

Table 1. OC Coho Salmon Life History Events for the Umpqua River Basin (Weitkamp 1995, Steelquist 1992). Light shading represents low-level abundance, dark shading represents peak abundance.

	J	F	M	A	M	J	J	A	S	O	N	D
River Entry												
Spawning												
Intragravel Development												
Juvenile Rearing												
Juvenile Out-migration												

Adult OC coho salmon enter the Umpqua River from September through February and migrate through the action area, up the system to the tributaries. Spawning typically occurs from late November through early February. Juvenile coho salmon spend one year in freshwater before

smoltification. During the summer, juveniles typically seek thermal refugia and cover in smaller tributary streams, but may be forced into larger streams and rivers due to declining water discharge in August and September.

Returning Adults and Spawning

No spawning occurs in the action area because it is tidally-influenced, but adults from three out of the four populations of OC coho salmon in the Umpqua must migrate through the action area (Kostow 1995). ODFW counts all of the OC coho salmon returning to the North Umpqua at a counting station in Winchester dam. Escapement estimates are made for the rest of the Umpqua River basin. ODFW combines the Umpqua River below Elkton (RM 57) with Smith River when making estimates. This makes it difficult to determine how many adult coho salmon migrated through the project area because fish returning to Smith River do not enter the project area, while fish that return to tributaries between RM 19 and Elkton do enter the action area. Only estimates for the areas above Elkton were used, as all of these fish migrate through the project area. In 2002, approximately 19,303 wild adults migrated through the action area to tributaries above Elkton, but outside the North Umpqua River, and 3,069 more returned to the North Umpqua River for a total of 22,372 wild adult OC coho salmon migrating through the action area (Table 2).

Table 2. Counts and Estimates of Wild Adult OC Coho Salmon Returning Through the Project Area.[3]

Year:	1994	1995	1996	1997	1998	1999	2000	2001	2002
North Umpqua River count:	1,012	1,162	1,570	1,329	909	1,065	1,506	2,449	3,069
Basin above Elkton estimate:	2,796	4,546	4,845	1,298	3,306	4,143	6,699	23,901	19,303
Total:	3,808	5,708	6,415	2,627	4,217	5,208	8,205	26,350	22,372

Juvenile Rearing

The action area is designated as rearing habitat (ODFW 2003a). It is difficult to estimate the number of juvenile OC coho salmon rearing in the action area throughout the year. During the wet season (November through April), water quality and habitat parameters are adequate to allow juveniles to rear in the action area. Salinities are less than 10 parts per thousand upstream from approximately RM 4 (Ratti 1979), low enough to not limit use by OC coho salmon juveniles (Bruce Miller, fisheries biologist for ODFW, personal communication, September 27, 2002). Fish are likely to be concentrated near shorelines where habitat is more complex, more food is available, and the current is slower. During the dry season (May through September),

[3] Adapted from ODFW, Annual estimates of wild coho spawner abundance in coastal river basins within the Oregon Coastal ESU, 1990-2002, available online at: http://oregonstate.edu/Dept/ODFW/spawn/coho.htm

water temperatures rise. The Umpqua River from RM 11.8 to 25.9 is listed on the ODEQ 303(d) List of Water Quality Limited Water Bodies for temperature. The seven-day average of daily maximums was 80.5 and 79.1 degrees Fahrenheit in 1990 and 1992, respectively. This likely limits the number of juvenile OC coho salmon during the summer months. Individuals that are present likely use thermal refuges where cool interstitial flows occur in the substrate.

Juvenile Outmigration and Acclimation

The Umpqua River estuary plays a critical role in the survival and recovery of listed or proposed salmon, by providing refuge, nutrients, and conditions in which juvenile salmon change physiologically from a freshwater to a saltwater organism. Outmigrating OC coho salmon smolts from the mainstem Umpqua, North Umpqua, and South Umpqua River populations use the action area to acclimate to saltwater conditions. In the Umpqua River during juvenile outmigration time, this interface occurs between RM 4 and the head of tide at RM 27. The Umpqua estuary has not been studied with respect to coho salmon use, but in a study of OC coho salmon on a tributary to Coos Bay, Miller (2003) found that smolts resided in the saltwater interface area for an average of 14 days. While in this transitional habitat, the juveniles seek out cover, such as large woody debris, boulders, vegetation, or overhanging banks (McMahon and Holtby 1992). During this time they undergo rapid growth (Holtby *et al.* 1990).

It is difficult to estimate the number of OC coho salmon smolts outmigrating through the action area. In 2000, the Bureau of Land Management (BLM) operated rotary screw traps in five watersheds of the Umpqua River drainage. These watersheds cover a considerable range of habitat conditions and OC coho salmon population levels, but only account for approximately 12.5% of the Umpqua River drainage above the project area. While it is typically not appropriate to extrapolate under these circumstances, the following calculation represents the best available data and will only be used as a very rough estimate. In 2000, the BLM estimated 61,588 OC coho salmon smolts left for the ocean from the five streams they sampled. Extrapolating that number of smolts to the rest of the basin gives an estimate of 500,000 OC coho salmon smolts. This is the best approximation of the population level of outmigrating smolts in the action area.

2.1.2 Evaluating the Proposed Action

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR 402.02 (the consultation regulations). In conducting analyses of habitat-altering actions under section 7 of the ESA, NOAA Fisheries uses the five steps of the consultation regulations and when appropriate combines them with the Habitat Approach (NOAA Fisheries 1999). The steps are as follows: (1) Consider the biological requirements of the listed species; (2) evaluate the relevance of the environmental baseline in the action area to the species' current status; (3) determine the effects of the proposed or continuing action on the species; and (4) determine whether the species can be expected to survive with an adequate potential for recovery under the effects of the proposed or continuing action, the effects of the environmental baseline, and any cumulative effects, and considering measures for survival and recovery specific to other life stages. In completing this step of the analysis, NOAA Fisheries determines whether the action

under consultation, together with all cumulative effects when added to the environmental baseline, is likely to jeopardize the ESA-listed species. If jeopardy is the appropriate determination, then NOAA Fisheries proceeds with step 5. In step 5, NOAA Fisheries may identify reasonable and prudent alternatives (RPAs) for the action that avoid jeopardy, if any exists.

The fourth step above requires a two-part analysis. The first part focuses on the action area and defines the proposed action's effects in terms of the species' biological requirements in that area (*i.e.*, effects on essential habitat features). The second part focuses on the species itself. It describes the action's effects on individual fish, or populations, or both, and places these effects in the context of the ESU as a whole. Ultimately, the analysis seeks to answer the question of whether the proposed action is likely to jeopardize a listed species' continued existence.

2.1.3 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA section 7(a)(2) to listed salmon is to define the species' biological requirements that are most relevant to each consultation. NOAA Fisheries also considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. The biological requirements are population characteristics necessary for OC coho salmon to survive and recover to naturally-reproducing population levels, at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance its capacity to adapt to various environmental conditions, and allow it to become self-sustaining in the natural environment.

For actions that affect habitat, NOAA Fisheries usually describes the habitat portion of a species' biological requirements in terms of a concept called properly functioning condition (PFC). PFC is defined as the sustained presence of natural, habitat-forming processes in a watershed that are necessary for the long-term survival of the species through the full range of environmental variation (NOAA Fisheries 1999). PFC, then, constitutes the habitat component of a species' biological requirements. OC coho salmon survival in the wild depends on the proper functioning of ecosystem processes, including habitat formation and maintenance. Restoring functional habitats depends largely on allowing natural processes to increase their ecological function, while at the same time removing adverse effects of current practices. For this consultation, the biological requirements are improved habitat characteristics that would function to support successful adult holding and migration, and juvenile rearing, smoltification and outmigration.

2.1.4 Environmental Baseline

In step two of NOAA Fisheries' analysis, we evaluate the relevance of the environmental baseline in the action area. Regulations implementing section 7 of the ESA (50 CFR 402.02) define the environmental baseline as the past and present effects of all Federal, state, or private actions and other human activities in the action area. The environmental baseline also includes the anticipated effects of all proposed Federal projects in the action area that have undergone

section 7 consultation, and the effects of state and private actions that are contemporaneous with the consultation in progress.

Land uses in the action area include rural, residential, agricultural, commercial, industrial, and forestry. Riparian areas and stream channels in the action area have been damaged by development activities related to these land uses, as well as by the use of splash dams, and instream gravel mining throughout the watershed (FEMAT 1993, Botkin *et al.* 1995, OCSRI 1997).

Habitat changes that have contributed to the decline of OC coho salmon in the action area include: (1) Reduced biological, chemical, and physical connectivity between streams, riparian areas, floodplains, and uplands; (2) elevated fine sediment yields; (3) reduced instream large woody debris; (4) loss or degradation of riparian vegetation; (5) altered stream channel morphology; (6) altered base and peak stream flows; and (7) fish passage impediments (OCSRI 1997). The Umpqua River is on the ODEQ 303(d) List of Water Quality Limited Water Bodies for temperature.

The channel of the Umpqua River within the action area has significantly deepened during the last 85 years. Low water soundings recorded by the Corps in 1921 averaged 7.4 feet between RM 20 and 21.5, with no soundings of depths greater than 13 feet (USACE 1921). The soundings map also shows large gravel deposits in water up to 3 feet deep at the upstream end of Brandy Island (now know as Brandy Bar Island) near RM 20.5 where the thalweg depth is now 30 feet. Modern river depths between RM 20 and 21.5 show an average thalweg depth of 30.4 feet.[4]

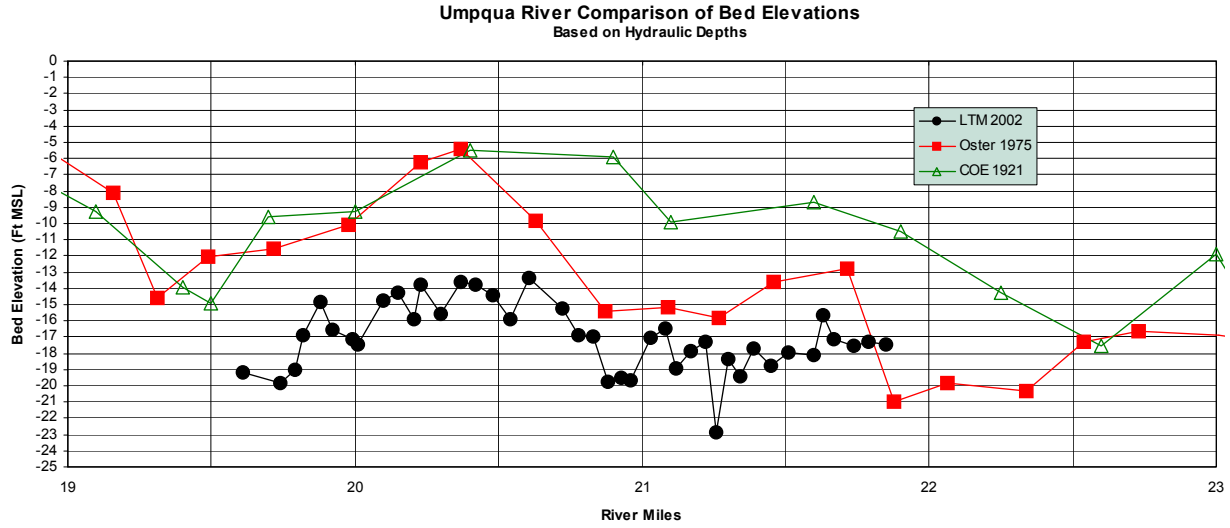
A comparison of average bed elevations based on calculated hydraulic depths shows a large change from 1921 to 1975, and again after 1975, in the reach for which cross-sections were provided in 2002 (Figure 1). This masks the greater changes in thalweg depth, but shows the downward shift of approximately 8 to 10 feet in average bed elevation between 2002 and 1921, and 2 to 10 feet lowering between 1975 and 2002. Had recruitment of material filled the pits dug during these intervals, it would have reduced the change in bed depth, but if it were less than the mined volumes, lowered average bed elevations would remain throughout the mined reach.

Mining at the upstream end of Brandy Bar Island (approximately RM 20 to 20.3) shows the same lack of recruitment in cross sections provided by LTM from 1988 to 2001. On all the river stations for which cross-sections were provided but one, the thalweg deepened, in some areas as much as 40 feet. While average bed elevations were not calculated, the clearly visible shift is

[4] Letter from R. Vaughn, LTM, Inc., to L. Evans, U.S. Army Corp of Engineers (July 22, 2003) (transmitting report titled 'Responses of applicant to public comments on application to renew Umpqua River dredging permit, Corps #2002-0828 & DSL No. RP 43) (See, especially, Attachment 3 to Attachment VII, Memorandum from C. Lidstone, Lidstone Associates, to John Phelan, LTM-Coast Division, July 21, 2003). Because water depths provided in this appendix were measured relative to NGVD, an approximation of local mean sea level, they appear three feet deeper than comparable water depths measured relative to low water that reported on the 1921. Thus, a depth of 0.0 on the 1921 map would appear as a depth of 3.0 on the 2002 map.

toward a deep trench morphology. These cross-sections were made by the previous owners, and the LTM geologic consultant did not use these for analysis of channel change, stating that they lacked information about the cross-section timing relative to the mining activities. However, as an approximate set of data they are remarkably consistent with the changes seen across longer time periods.

Figure 1. The average bed elevation profiles from 1921, 1975, and 2002, based on calculated hydraulic depths. The 1921 soundings data were converted to mean sea level (MSL) by subtracting 3.9 feet from the soundings, as the low water value for the mouth of the Umpqua River is -3.9 feet. Sources: USACE (1921) low water soundings, USGS (Oster 1975), and Knife-River/LTM cross-sections (2002).



Evidence of channel morphology changes downstream is provided by the disappearance of Echo Island in the 1970s (BA, at p.21). Brandy Bar Island has also shrunk in size, and a gravel bar that extended from the mouth of Franklin Creek to Brandy Bar island was reported to have disappeared since 1962.[5] Ratti (1979), and literature cited therein, notes that sediment at frequently mined sites now consist of fine-grained sands, a condition interpreted as meaning that gravel was not being recruited at a rate that would sustain mining in these areas.

Other activities in the Umpqua River basin upstream from the proposed action area have also reduced gravel recruitment to the lower river reaches. The ODSL has issued permits to mine

[5] Letter from Randy Richmond, landowner adjacent to mined reach, to Chuck Wheeler, NOAA Fisheries (January 11, 2003) (describing the conditions of the Umpqua River reach from Franklin Creek to Brandy Bar Island).

approximately 198,000 CY of sand and gravel annually,[6] although the amount permitted is usually 30 to 50% more than the mined amount (OWRRI 1995). Hydroelectric and irrigation impoundments have eliminated gravel recruitment from 524 square miles or 12.8% of the total watershed upstream from the action area. The North Umpqua Hydroelectric Project accounts for 450 square miles and consists of eight dams, the lowest of which is Soda Springs Dam. A total of 5.9 million CY of sediment has been deposited behind North Umpqua Hydroelectric Project impoundments since 1950 (NOAA Fisheries 2002a). Galesville Dam, on Cow Creek, was built in 1985 and blocks 74 square miles of watershed from delivering bedload to the action area. Other impoundments in the Umpqua River drainage trap sediment, but they affect a small area compared to the two previously mentioned impoundments.

Estimates vary for bedload recruited each year to the action area downstream from these mines and dams.[7] However, the only estimate based on long-term measurements of suspended sediments made by U.S. Geological Survey at the Elkton stream gage suggests that the average annual recruitment is only 73,000 CY per year.[8] These data were collected shortly after the North Umpqua Hydroelectric project was built, but before construction of Galesville Dam on Cow Creek, a structure that may have reduced this figure even further. Conversely, the average volume of sand and gravel mined from the proposed action area was 176,000 CY per year between 1971 and 2002 (BA, at p.3). If mining occurred at a similar rate between 1918 and 1970, a total of 15.0 million CY of sand and gravel were mined from the proposed action area, an amount that was 8.8 million CY in excess of recruitment between 1918 and 2002.

NOAA Fisheries concludes that not all of the biological requirements of the listed species within the action area are being met under current conditions. Based on the best available information on the status of OC coho salmon, including population status, trends, and genetics, and the environmental baseline conditions within the action area, significant improvement in habitat conditions is needed to meet the biological requirements of OC coho salmon for survival and recovery.

2.1.5 Analysis of Effects

The proposed action consists of mining sand and gravel from the river channel using a clamshell dredge. The dredge will be operated from a barge that will be moved between mining areas. Actions that are interrelated and interdependent with the proposed action include transferring the sand and gravel to a transport barge, moving the sand and gravel to the upland processing area near Reedsport at RM 10, then processing the material for sale and off-site use. Together, these

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[6] Email from J. Castro, U.S. Fish and Wildlife Service, to Anne Mullan, NOAA Fisheries (September 9, 2003) (describing state permits for gravel mining in the Umpqua River).

[7] See, Lidstone, at note 4 (Attachment VII, beginning at p.3), and Letter from K. McMaster, U.S. Fish and Wildlife Service, to M. Hanson, U.S. Army Corps of Engineers (August 15, 2003) (reply to the LTM response to public comments).

[8] McMaster, at note 6, citing Curtiss (1975).

actions will produce a sequence of direct effects that will begin immediately at the project site, and will eventually be felt as a chain of indirect effects that will occur later in time and spread across a much larger upstream and downstream area. The most important habitat effects would be channel modification, altered sediment transport balance, water quality degradation, and loss of riparian function. The most important biological effects would be reduction of macroinvertebrate production, pollution effects, and impairment of essential biological behaviors related to rearing, migrating, feeding and sheltering, in the action area.

The effects analysis presented in this section is based on information in the BA and supplementary material, and the effects summarized in NOAA Fisheries (1996) and Cluer (2003). Each of these documents were developed using a combination of analyses of existing data and best professional scientific judgement. Together with the literature cited therein, they provide a comprehensive review of the effects of instream gravel mining on habitat conditions necessary to sustain all life stages of anadromous fish and aquatic habitats.

Channel Modification

The proposed mining volume of 181,000 CY per year exceeds the average estimated bedload recruitment 73,000 CY per year (USFWS 2003) by 108,000 CY per year. Comparing records of present thalweg depths and Corps soundings from 1921 show that the bed is getting lower in the vicinity of Brandy Bar Island (USACE 1921). The difference is approximately 20 feet, or an average of 1 foot per 4-year period. As the thalweg is lowered, areas nearby become more vulnerable to erosion. This pattern is consistent with channel adjustments caused by instream mining (Kondolf 2002), a problem that becomes worse as mining levels exceed supply.

Three cross-sections in the vicinity of two spawning tributaries were provided in exhibit G of the LTM comments dated December 8, 2003. The cross-section for RM 20.8 shows 2002 pre-dredging depths of -30 feet on the south side and -20 feet on the north side. In the middle, the bed depth averages around -15 feet. An area of aggregate removal is designated as approximately 300 feet wide and ranging from 0 to 10 feet in height. The area shown is upstream from Brandy Bar Island, and falls approximately1500 feet downstream from the Franklin Creek confluence on the north bank. This is prime shallow water habitat with the confluence providing nutrients, ideally an area in which to minimize disturbance of rearing habitat, or spawners holding before moving into the tributary. If the mining area along the south side is dug with a trench up to 10 feet deep as shown in the cross-section, the change in riverbed should be monitored for its effect on the adjacent habitat area of the channel. Similarly the cross-section provided for the area near RM 19.2, below the Harvey Creek confluence on the north bank, shows depths of -10 feet or less. This suggests that without deepening the thalweg, the remaining area would deepened to -10 feet. The river is 1600 feet wide at this point, and a width of at least 1000 feet would be mined with setbacks of 150 feet on each side.

Channel deepening reduces the available low velocity, shallow water habitats, which appear to be especially important to salmon in the estuary (Bottom and Jones1990, Dawley *et al.*, 1986), by providing areas for refuge and feeding. McMahon and Holtby (1992) found coho smolts sought cover as they migrated through the estuary. Gravel mining results in a deeper and less

complex streambed which would not provide refuge areas like shallow complex habitat. Structural and biological features of estuarine habitats that provide refugia from predators and off-channel areas protected from strong tidal and river currents are important to salmon survival. Important features that can minimize effects of predators and strong flows include: (1) Complex dendritic tidal channel systems and other landforms (islands, peninsulas, *etc.*); (2) wood, emergent vegetation, or other structural components; and (3) connections between mainstem channels and floodplains. Channel deepening alters salmonid food webs by eliminating shallow water estuarine habitat, where food webs are based on emergent marsh vegetation and infauna (Bottom and Jones, 1990; Dawley *et al.*, 1986). These food webs are more likely to directly support salmonid productivity than ones in large open channels (Bottom *et al.*, 1984; Salo, 1991). Holtby *et al.* (1990) states that rapid growth during estuary rearing may reduce vulnerability to nearshore predators, which are believed to be a major source of ocean mortality for coho salmon.

Deep gravel deposits and complex bedforms induce hyporheic flows that cool stream temperatures. Removing gravel and filling the interstitial spaces with silt reduces hyporheic flow and causes the loss of this cool water refugia by eliminating or reducing cool water flow. Since stream temperatures during the summer limit the number of rearing juvenile OC coho salmon in the action area, any reduction in cool water will reduce those numbers. This is due to the individuals that are present likely utilize thermal refuges where cool interstitial flows come out of the substrate.

Altered Sediment Transport Balance

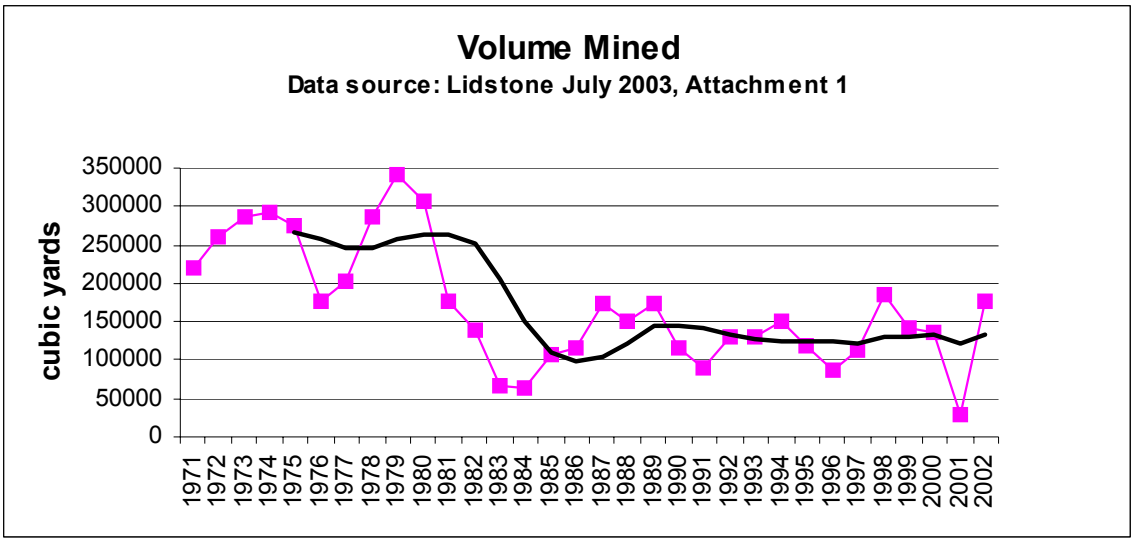
Excavation of the riverbed also alters the relationship between sediment load and shear stress forces and increases bank and channel erosion. This not only disrupts channel form, it also disrupts the processes of channel formation and habitat development (Lagasse *et al.* 1980, Newport and Moyer 1974, Waters 1995). At the upstream end of the excavation, a knickpoint forms where higher velocity at the locally steeper gradient starts a 'headcut' that migrates upstream and may enter tributaries (Kondolf 1997, Kondolf *et al.* 2002). As the mined area traps bedload sediment, the flows retain the capacity to transport sediment downstream but require a source of replacement sediment to establish a new equilibrium. These "hungry" flows lead to erosion and an incised streambed below the excavation area (Kondolf 1997, Kondolf *et al.* 2002).

At high flows the complex streambed is replaced with trench-like extensions from the excavation area, without the roughness elements to provide velocity refugia to upstream and downstream migrants. Pool-riffle complexes are modified or lost from reaches with extensive changes in channel profile. When the volume mined exceeds the recruitment level, the dynamic formation of bars and islands is reduced due to the lack of material.

Flows in the vicinity and downstream from the mined area can erode channel features, such as shoals, bars, and islands. The vegetation destroyed on the mid-channel Echo Island at RM 18 in the 1964 flood may not have been unusual, given the magnitude of the flood flows. However, the complete disappearance of the shoals and the island, and the lack of rebuilding via

depositional processes, are indicative of sediment-starved waters. Similar reduction in shallow water habitat area is seen at Brandy Bar Island, the shoal upstream, and the nearby alluvial mouth of Franklin Creek. USGS cross sections near Franklin Creek show thalweg depths of 30 feet MSL (Oster 1975). Maps prepared by the Corps in 1921 for this same area showed low water soundings no deeper than 11 feet, with shallower depths of 3 feet downstream between Franklin Creek and Brandy Bar Island. The limited recruitment in the area is corroborated by the 25-foot thalweg depths provided by LTM for 2002. Limited recruitment can also be inferred from the declining volumes mined with 5-year running averages of annual volumes averaging 169,000 over the whole period, but only 126,000 CY from 1981 to 2002 (Figure 2).

Figure 2. Annual Volumes Mined by Umpqua River Navigation 1971 to 2002



Water Quality Degradation

Instream gravel mining, including transport by barge, creates a turbidity plume with effects on migrating and rearing fish. Increased turbidity will likely displace fish in the project area and disrupt normal behavior. The direct physical and chemical effects of dredging and spoil disposal activities include increased turbidity and bottom siltation with fine sediments (Darnell 1976, NOAA Fisheries 2002b).

Excavated material will be washed onboard with discharge of wash water at 15 feet below the water surface. The cyclone separator will capture sand, but will release fines less than .074 millimeters (0.0029 inches) in the wash water. Turbidity will also come from suspension of material as the dredge bucket is lifted through the water column. In a study comparing the sediment resuspension characteristics of different dredge bucket configurations, Welp *et al.* (2001) found that enclosed buckets reduce sediment resuspension through the water column by up to 79% compared to conventional open buckets such as the proposed project. This fine sediment, placed in suspension by the mining and washing, could settle into areas near the

mining operation but will re-mobilize at low flow levels. In the areas where fines settle, interstitial space is decreased. Due to tidal influences extending into tributaries, the fines may increase embeddedness of spawning reaches.

The clamshell digging disturbs the armor layer, and releases sediment as the bucket travels through the water column to the barge surface. Suspended material will redistribute and settle to the bottom, reducing the particle size of surface sediments. Sediment may scour, smother or bury primary producers (diatoms, aquatic vegetation) and consumers (epibenthic organisms) reducing their availability as coho salmon food. Turbidity will reduce light penetration and interfere with photosynthetic production of oxygen. Chronic turbid conditions also reduce the depth that macrophytes may colonize. Extraction during low flow periods suspends fine sediment when concentrations are normally low and the river is less able to assimilate suspended sediment (Weigand 1991).

Collins and Dunne (1990) noted that scoured bed gravels expose underlying substrates, and that pool-riffle structures are destroyed, leaving unsuitable fish habitat. Finer sediment is released, leading to increases in suspended sediment. The modified morphology and reduced overall sediment supply propagate the habitat effects beyond the immediate extraction area. Because sediment 'armors' the bed and stabilizes banks and bars, removing this armor layer causes excessive scour and sediment movement after the mining operation (Lagasse *et al.* 1980; OWRRI, 1995). The more easily transported particles eroded by the 'sediment-starved' water will increase both the background turbidity level and the embeddedness of downstream substrate, while coarsening the scoured areas (Kondolf 1993, Dietrich 1989). Given the tidally-influenced nature of the reach, sediments disturbed by mining activities are likely to settle near the mining area until re-suspended by winter storms.

At moderate levels, turbidity can adversely affect primary and secondary productivity. At high levels, turbidity can injure and kill adult and juvenile fish. Turbidity might also interfere with feeding (Spence *et al.* 1996). Behavioral effects on fish, such as gill flaring and feeding changes, have been observed in response to pulses of suspended sediment (Berg and Northcote 1985). Rivier and Seguier (1985) examined extraction of alluvial material from riverbeds, and noted the increase in fines silting up the channel, as well as the related effects on fish by the suspended sediment. These effects include problems caused to fish breathing mechanisms and increased abrasions leading to penetration of pathogenic agents due to high concentrations of suspended sediments.

Exposure duration is a critical determinant of the occurrence and magnitude of turbidity caused physical or behavioral turbidity effects (Newcombe and MacDonald 1991, Newcombe and Jensen 1996). Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such seasonal high pulse exposures. Adult and larger juvenile salmonids appear to be little affected by the high concentrations of suspended sediments that occur during storm and snowmelt runoff episodes (Bjornn and Reiser 1991). However, research indicates that chronic exposure can cause physiological stress responses that can increase maintenance energy and

reduce feeding and growth (Redding *et al.* 1987, Lloyd 1987, Servizi and Martens 1991). In a meta-analysis and review of 80 published reports of fish responses to suspended sediment in streams and estuaries, Newcombe and Jensen (1996) documented increasing severity of ill effects with increases in dose (concentration multiplied by exposure duration). They used the results to model empirical log-linear equations for different life history stages of salmonids to predict severity of ill effects from exposure concentration and duration. For events between extremes of no effect and 100% mortality, they scored qualitative response data with a semi-quantitative ranking scale of severity ranging from 1 - 3 for behavioral, 4 - 8 for sublethal and 9 - 14 for lethal and paralethal.

One model for juvenile and adult salmonids exposed to sediments from fine to coarse size, provided the following equation:

(1) $\text{Severity} = 1.0642 + .6068 * \log_e(\text{time}) + .7384 * \log_e(\text{concentration})$

where time is in hours and concentration is measured in milligrams of suspended solids per liter (mg SS/L). This would result in a range of severity values with either increasing time or increasing concentration, such as shown for these values:

Duration (hours)	**Concentration** (mg SS/ L)	**Severity**	**Effects description**
1	88	2	Alarm reaction
12	54	5.5	Minor physiological stress (increased coughing or respiration)
36	9400	10.0	0 -20% mortality
96	488	8.4	Major physiological stress (reduced feeding rate or success)

Elevated TSS conditions were reported to cause physiological stress, reduce growth, and adversely affect survival. Of key importance in considering the detrimental effects of TSS on fish are the season, frequency and the duration of the exposure. Behavioral avoidance of turbid waters may be one of the most important effects of suspended sediments (Scannell 1988). Salmonids have been observed to move laterally and downstream to avoid turbid plumes (Scannell 1988, Servizi and Martens 1991).

Fish that remain in turbid, or elevated TSS, waters can experience a reduction in predation from piscivorous fish and birds (Gregory and Levings 1998). In systems with intense predation pressure, this provides a beneficial trade-off as enhanced survival at the cost of potential physical effects, like reduced growth. Turbidity levels of about 23 Nephalometric Turbidity Units (NTU) have been found to minimize bird and fish predation risks (Gregory 1993).

Macroinvertebrate Production

Interstitial spaces and aquatic vegetation provide habitat for the invertebrate communities that are a major food source for all age classes of salmon. Macroinvertebrates move, rest, find

shelter, and feed on the substrate and vegetation. Stability of the substrate is affected by changes in size, sorting, roundness, and shape (Rice *et al.* 2001). Spatial variations in bed material are reflected by macroinvertebrate responses at various scales.

For substrate-oriented macroinvertebrates, the highest abundance is produced by well-graded mixtures of gravel and cobble, with poorly-graded mixtures of sands and silts or boulders and bedrock producing the lowest abundance (Reiser 1998). In particular, the significant taxonomic groups for salmonid food sources, including orders Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichopetera (caddisflies), collectively designated EPT organisms, show preferences for small to large-sized gravels rather than coarse or fine sands. Reiser (1998) described studies which showed an association between stonefly abundance and the volume of interstitial space, suggesting excessive deposition of fine sediments can reduce pore space and result in less invertebrate production. Sediment intrusion into interstitial spaces decreases the habitable areas for EPT species (Bjornn *et al.* 1977). Reduced food sources, particularly when combined with higher temperatures, will result in decreased growth rates or reduced survival (Brett *et al.* 1982, Rich 1987), as fish need higher food intakes to maintain homeostasis at higher temperatures due to reduced conversion efficiencies (Smith and Li 1983).

Brown *et al.* (1998) sampled within and upstream and downstream from an instream gravel mining project, and observed significant alterations in all components of biotic communities, biomass, invertebrates, and fish. The biomass and density of small invertebrates and density of large invertebrates were reduced at smaller, frequently mined sites, and density of fish in pools were reduced at large mines. Brown *et al.* (1998) suggested that the alteration of normal riffle-pool morphology, flow patterns, and fine sediment transport explained the communities' response to the mining disturbance. Rivier and Seguier (1985) found that not only was biomass of benthic invertebrates found to decrease downstream, but the groups represented shifted from the EPT organisms to those suitable to finer material in the substrate, such as Chironomids and Oligochaetes. With macroinvertebrate habitat reduced by fines deposited in interstitial spaces during and after mining and by increased bed depth, macroinvertebrate food sources are reduced, and lower growth rates would be expected. An accompanying reduction or elimination of food, or a change in invertebrate prey species may displace OC coho salmon from rearing habitat. Decreases in growth and consequent decreases in smolt size will result in decreased smolt to adult survival.

Vegetation-oriented macroinvertebrates are affected either by physical destruction of vegetation, turbidity concentrations, or by bed elevation lowering, which reduces the shallow water estuarine habitat where vegetation can grow. Food webs based on vegetation are more likely to directly support salmonid productivity than ones in large open channels (Bottom *et al.*, 1984; Salo, 1991).

Pollution Effects

Operation of the excavator and processing equipment requires the use of fuel, lubricants, and other petroleum products, which, if spilled into the bed or channel or into the riparian zone of a waterbody during construction could injure or kill aquatic organisms. Petroleum-based

contaminants, such as fuel, oil, and some hydraulic fluids, contain polycyclic aromatic hydrocarbons (PAHs) which can cause acute toxicity to salmonids at high levels of exposure, and can also cause chronic lethal as well as acute and chronic sublethal effects to aquatic organisms (Neff 1985).

Dredging and excavation activities have the potential to resuspended bedded contaminants or unearth buried contaminants adhered to sediment and soil particles. Discharge of barge water during transit can carry sediments and a variety of contaminants to the riparian area and stream. Once delivered into the waterbody, those contaminants act as new contaminant sources to benthic invertebrates and fish. The suspended, contaminated particles can re-settle onto a new site, affecting a previously undisturbed benthic population, or be taken up directly or indirectly by fish. Upland contained areas can also produce contaminated runoff. To ensure that spills will be prevented, a pollution control plan will be prepared and carried out.

Loss of Riparian Function

Transfer of sand and gravel from barges to onshore facilities and subsequent processing and storage that takes place within the Umpqua River riparian area and floodplain result in loss of riparian function. Associated access roads, buildings, staging areas, and movements of machines and personnel over the action area contribute to these adverse effects. These structures and activities remove riparian vegetation and topsoil, expose deeper soil layers, extend operations into the active channel, and reshape banks as necessary for operational considerations.

To the extent that these areas were providing riparian habitat function, such as delivery of large wood, particulate organic matter or shade to a riparian area and stream, root strength for slope and bank stability, and sediment filtering and nutrient absorption from runoff, maintaining these areas in an unvegetated condition will reduce or eliminate those habitat values (Darnell 1976, Spence *et al.* 1996). Denuded areas lose organic matter and dissolved minerals, such as nitrates and phosphates. Microclimate can become drier and warmer with corresponding increases in wind speed, and soil and water temperature. Water tables and spring flow can be reduced. Loose soil can temporarily accumulate in the processing and storage areas. In dry weather, this soil can be dispersed as dust. In wet weather, loose soil is transported to streams by erosion and runoff, particularly in steep areas. Erosion and runoff increase the supply of soil to lowland drainage areas and eventually to aquatic habitats where they increase water turbidity and sedimentation. This combination of erosion and mineral loss can reduce soil quality and site fertility in riparian and floodplain areas. Concurrent in-water work can compact or dislodge channel sediments, thus increasing turbidity and allowing currents to transport sediment downstream where it is eventually redeposited. Continued operations when the processing and storage sites are saturated can significantly increase the likelihood of severe erosion and contamination.

Use of heavy equipment during processing and storage creates the opportunity for accidental spills of fuel, lubricants, hydraulic fluid, and similar contaminants into the riparian zone or water where they can injure or kill aquatic organisms. Discharge of water used for processing, vehicle washing, and other purposes can carry sediments and a variety of contaminants to the riparian

area and stream. Similarly, use of treated wood in or over flowing water to build any type of structure in the processing or storage sites can introduce toxic compounds directly into the stream during cutting or abrasion, or by leaching (Poston, 2001). Heavy equipment can also cause soil compaction, thus reducing soil permeability and infiltration. Construction of pavement, buildings, and other permanent soil coverings or structures also reduce site permeability and infiltration. Permeability and infiltration are inversely related to the rate and volume of runoff. During and after wet weather, increased runoff can suspend and transport more sediment to receiving waters. This increases turbidity and stream fertility. Increased runoff also increases the frequency and duration of high stream flows and wetland inundation in processing and storage areas. Higher stream flows increase stream energy that can scour stream bottoms and transport greater sediment loads farther downstream that would otherwise occur. Sediments in the water column reduce light penetration, increase water temperature, and modify water chemistry. Once deposited, sediments can alter the distribution and abundance of important instream habitats, such as pool and riffle areas. During dry weather, the physical effects of increased runoff appear as reduced ground water storage, lowered stream flows, and lowered wetland water levels. The effects of reduced soil permeability and infiltration are most significant in upland areas where runoff processes and the overall storm hydrograph are controlled mainly by groundwater recharge and subsurface flows.

An indirect effect that is reasonably certain to occur because of the processing and storage activities is intentional or opportunistic human access to riparian or instream areas. Once in the riparian zone or instream area, people may walk or hike, thus trampling soils and channel materials, and disturbing vegetation in ways that can increase runoff and reduce plant growth. They may also start fires, dump trash, or otherwise adversely alter environmental conditions. However, the commercial nature of activities at this site makes it unlikely that environmental changes caused by these indirect effects will cause chronic trampling or vegetation removal over a large habitat area sufficient to cause more than transitory indirect effects to OC coho.

Impairment of Essential Biological Behaviors

The proposed gravel mining operations would substantially reduce physical and chemical habitat quality in the action area. These changes affect individual OC coho by impairing behaviors related to migration, rearing, feeding, and transition to adulthood. Young salmon are generally able to avoid adverse habitat conditions if those circumstances are limited to areas that are small compared with the total habitat area. Thus, juvenile salmon compensate for increased fine sediment in the channel and temporary loss of productive shallow-water habitats by displacing themselves to other areas. Those juveniles may be forced to leave freshwater prematurely. Alternatively, they may continue to survive in the system, if a suitable alternative habitat can be found, but the energetic price of displacement can be substantial if it results in greater competition, overcrowding, or movement to a less productive area. The proposed action would take place in an area that serves multiple critical functions in the life history of juvenile OC coho salmon. One of these function is unique to the transition zone between fresh and salt water, where juvenile OC coho salmon spend an extended time each spring while their bodies adjust to higher salinities. This is a unique resource for individuals in these subpopulations. Thus,

individual salmon cannot compensate for loss or degradation of tidally-influenced habitats in the Umpqua River by simply traveling to another area.

The project, as proposed, contemplates continuous gravel mining during each year of the 6-year life of the project. This would impose a disturbance regime that, unlike natural conditions, lacks long periods of recovery between brief and irregular disturbances. Chronic and unavoidable exposure to this type of disturbance further heightens physiological stress experienced by juvenile salmon, and increases maintenance energy demands (Redding *et al.* 1987, Servizi and Martens 1991). This further reduces juvenile feeding and growth rates, and can interfere with juvenile migration, rearing, growth to maturity in estuaries, and adult escapements.

At the population level, the effects to the environment are understood to be the integrated response of individual organisms to environmental change. Instantaneous measures of population characteristics, such as population size, growth rate, spatial structure, and diversity, are the sums of individual characteristics within a particular area, while measures of population change, such as a population growth rate, are measured as the productivity of individuals over the entire life cycle (McElhany *et al.* 2000). A persistent change in the environmental conditions affecting a population, for better or worse, can lead to a similar change in each of these population characteristics.

Coho salmon spawning in some North Umpqua River tributaries have much longer migrations (~200 mi) than those in most other Oregon populations (Kostow 1995), extending into the Cascade Mountains. The Umpqua River supports approximately 24% of the total OC coho salmon population (ODFW 2003b). Of the four subpopulations of OC coho salmon occurring in the Umpqua River basin (Kostow 1995), three must migrate through the action area to spawning areas in the upper tributaries. It is very likely that these fish are distinct from those in all other coastal drainages (BRT 2003; McElheny *et al.* 2000). Thus, the proposed mining would affect every adult and, especially, every individual juvenile in these populations by requiring them to endure long-term exposure to persistently degraded habitat conditions. Those conditions interfere with juvenile behaviors related to growth and development, and reduce or cut off opportunities for recovery of demographic characteristics such as population size, growth rate, spatial distribution, and diversity.

At the ESU level, biological effects of the proposed action include the combined demographic responses of all subpopulations (McElhany *et al.* 2000). As described above, it is likely that the proposed action would have chronic and unavoidable habitat effects that will be felt by all juvenile OC coho salmon passing through the action area. This will significantly reduce the ability of the affected subpopulations to survive and recover in the Umpqua River basin. Lacking specific recovery criteria for OC coho, it is important that management actions not reduce the potential for all populations in the ESU to achieve viable status (McElhany *et al.* 2000). Thus, by reducing the survival of juvenile OC coho spawned in the upper tributaries, the proposed mining would jeopardize the demographic characteristics of all affected subpopulations, and reduce the likelihood of OC coho survival and recovery at the ESU level.

2.1.6 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Other activities within the watershed have the potential to impact fish and habitat within the action area.

NOAA Fisheries is not aware of any specific future non-federal activities within the action area that would cause greater effects to listed species than presently occurs. The action area includes significant tracts of private lands. Land use on these non-federal lands include rural development, agricultural, and commercial forestry. Chemical fertilizers or pesticides are used on many of these lands, but no specific information is available regarding their use. NOAA Fisheries does not consider the rules governing timber harvests, agricultural practices, and rural development on non-federal lands within Oregon to be sufficiently protective of watershed, riparian, and stream habitat functions to support the survival and recovery of listed species. Therefore, these habitat functions likely are at risk due to future activities on non-federal forest lands within the basin.

Between 1990 and 2000, the human population in Douglas County increased by 6.1%.[9] Thus, NOAA Fisheries assumes that future private and state actions will continue within the action area, increasing as population density rises. In some cases, this will result in higher density population areas, which could lower the per capita demand for sand and gravel products (Whelan 1995). In other cases, increased sprawl could increase demand for such products. While some of this will come from the DSL-permitted mining, possibly lacking Corps jurisdiction, the adverse effects will continue to hinder the recovery of habitat and populations.

2.1.7 Conclusion

The fourth step in NOAA Fisheries' jeopardy analysis is to decide whether the proposed action, considering the above factors, is likely to appreciably reduce the likelihood of the species' survival and recovery in the wild. For the jeopardy determination, NOAA Fisheries uses the consultation regulations and the Habitat Approach (NOAA Fisheries 1999) to come to a conclusion about whether actions would further degrade the environmental baseline or hinder attainment of proper functioning conditions at a spatial scale relevant to the listed ESU.

After reviewing the current status of OC coho salmon, the environmental baseline for the action area, the effects of the proposed action and its cumulative effects, NOAA Fisheries has determined that the LTM, Inc. Instream Sand and Gravel Mining Project, as initially proposed, is likely to jeopardize the continued existence of OC coho salmon. This finding is based on the following considerations: (1) The proposed action would occur when maximum numbers of

[9] U.S. Census Bureau, State and County Quickfacts: Douglas County, Oregon. Available online at http://quickfacts.census.gov/qfd/states/41/41019.html

juvenile OC coho are trying to complete essential biological behaviors related to rearing, migrating, feeding and sheltering, in the action areas; (2) the baseline conditions are significantly degraded, specifically bed elevation lowering has eliminated large areas of the shallow water habitats that are most important to juvenile OC coho salmon and their invertebrate food sources; (3) the annual volume of sand and gravel proposed for mining far exceeds the best estimate of annual recruitment in the action area, and will cause further streambed lowering; and (4) other long-term effects of the proposed project, such as turbidity, chemical contamination, and disruption of riparian habitats are also expected to further degrade the baseline conditions. Therefore, the proposed action is expected to appreciably reduce the functioning of already impaired habitats, and prevent long-term progress of impaired habitats toward properly functioning habitat conditions essential to long-term survival and recovery at the population or ESU scale.

2.1.8 Reasonable and Prudent Alternatives

A reasonable and prudent alternative (RPA) is an action, identified during formal consultation, that can be carried out consistent with the purpose of the proposed action, is within the scope of the action agency's legal authority, is economically and technologically feasible, and would, NOAA Fisheries believes, avoid jeopardy to listed species and the destruction or adverse modification of critical habitats (50 CFR 402.02). This Opinion presents the Corps with three RPAs, any of which may be accomplished to prevent the proposed action from jeopardizing the continued existence of OC coho salmon. Until the time that the species is listed, the prohibitions of the ESA do not apply. Likewise, the RPAs do not become effective until after the listing is final and NOAA Fisheries adopts this conference opinion as a biological opinion.

RPA #1
Before mining may begin under this permit, the Corps will cooperate with NOAA Fisheries, the USFWS, and the U.S. Geological Survey, and other interested parties, to complete analyses necessary to construct a sediment budget for the Umpqua River basin and Winchester Bay, including the following considerations: (1) The combined effects of all dams, sand and gravel mining, and navigational dredging; (2) the ecological role of those sediments in salmonid life history; (3) appropriate levels of statistical confidence and power to resolve concerns related to risk assessment and the assignment of burden of proof in favor of resource conservation; (4) application of the Corps' compensatory mitigation policy to sand and gravel mining, and (5) practical alternatives to the proposed action that would have fewer adverse effects to aquatic ecosystems. Further, the Corps will cooperate with the applicant and other parties as necessary to complete surveys of channel morphology in the specific areas proposed for mining, as described below in monitoring requirements, to support development of site-specific conservation measures related to the place and volume of mining to occur. Based on the sediment budget, pre-mining surveys, and other information developed using this process, the Corps should reinitiate consultation on this project based on a proposed project that will ensure that degraded OC coho slamon populations and aquatic habitats in the Umpqua River basin can begin to recover.

RPA #2
This RPA uses the current knowledge of sediment recruitment, coho salmon biology and stream dynamics to supply a sustainable yield of sand and gravel from the project area. Under this RPA the subject permit, if issued, shall be conditioned as follows to restrict the time, place, and methods of mining, and the volume of mined material.

1. Time. All in-water work involving sand and gravel excavation will take place between July 1 and August 31.

2. Place. All mining pits will have a horizontal set back of 150 feet or more from the nearest shoreline, measured as NGVD, and 0.5 miles or more from the mouth of fish bearing tributaries. Further, pits will be restricted to beds of sand and gravel whose surface before mining is 20 feet or more below NGVD. The maximum depth of any pit may not exceed the depth of the thalweg in that cross section.

3. Mining methods. The clamshell will be equipped with an enclosed bucket to reduce resuspension of sediment throughout the water column. Sand and gravel will be dropped from the clamshell onto a watertight barge for transfer to onshore facilities where all washing and other processing will take place. All barge drainage water, wash water, and wash water return flows from upland processing facilities will be pumped to an appropriate settling facility before allowing to return to the river. All processing of sand and gravel products, including washing, will be limited to onshore facilities.

4. Volume. Sand and gravel removed from the channel will be restricted to 18,000 CY per year, equivalent to 25% of the estimated average annual volume of bedload transported through the study area each year. Because of uncertainties regarding the actual volume of bedload transport, river channel morphology, and the restriction imposed by setbacks in each specific area proposed for mining, this volume must be viewed as the maximum allowable volume and may not be interpreted as an amount guaranteed to be available for mining each year. Further, any deficiency in this volume that is not removed in a given year may not be 'carried over' and added to the volume authorized for a subsequent year.

5. Compensatory Mitigation. Prepare and carry out a compensatory mitigation plan, pursuant to the Corps' Regulatory Guidance Letter No. 02-2 (December 24, 2002), to replace riparian and aquatic resource functions unavoidably lost or adversely affected by authorized activities. For this proposed action, acceptable mitigation must include replacement of lost functions by reestablishment or rehabilitation of natural riparian vegetation and shallow-water habitats in areas of the Lower Umpqua River watershed (1710030308) occupied by OC coho salmon. Priority will be given to the reestablishment of intertidal marsh and shallow-water habitat within this watershed.

6. Monitoring. Provide pre- and post-mining surveys of channel morphology throughout the mining area.. Also, provide a copy of the written plans for pollution and erosion control, estimated depths of mining activities, sand and gravel volumes, sediment size

distribution, turbidity monitoring reports and a summary of pollution and erosion control inspections, including any erosion control failure, contaminant release, and correction effort.

RPA #3

This RPA allows a larger volume of sand and gravel to be mined for 5 years in exchange for a phase-out and end of mining and completion of compensatory mitigation plan. Under this RPA the subject permit, if issued, shall be conditioned as follows:

1. Duration. The permit will be restricted to 5 years without option for renewal.

2. Time. All in-water work involving sand and gravel excavation will take place from July 1 through September 30 and November 1 through February 28.

3. Place. The Corps will identify areas that are excluded from gravel mining. These areas are described as follows:
    (a) Horizontal set back of 150 feet or more from the nearest shoreline, using NGVD;
    (b) 1500 feet downstream and 500 feet upstream from the mouths of fish-bearing tributaries, which includes excluding from mining the area from bank to bank of the Umpqua River; and
    (c) Pits will be restricted to beds of sand and gravel whose surface before mining is more than 10 feet using NGVD. The maximum depth of any pit may not exceed the depth of the thalweg in that cross section.

4. Mining methods. The clamshell will be equipped with an enclosed bucket to reduce re-suspension of sediment throughout the water column. Sand and gravel may be washed and sorted on board the barge, provided that turbidity is not increased at any point in the water column by more than 10% over background conditions 150 feet from the barge during two consecutive monitoring periods. Turbidity will be monitored at least every four hours. If this level of turbidity cannot be met before February 28, 2005, the applicant must implement additional turbidity limiting practices to meet the following incremental targets:

    August 1- September 30 2004- 5 NTU's over background
    November 1- December 31, 2004- 4 NTU's over background
    January 1- February 28, 2005- 3 NTU's over background

    If these targets are exceeded at two consecutive monitoring intervals, the Corps' permit must require turbidity producing operations to stop for the day. After February 28, 2005, the Corps permit must ensure the permitted action may not increase turbidity by more than 10% over background conditions 150 feet from the barge.

    The Corps has indicated that applicant has also expressed consideration for an adaptive management turbidity plan. If 10% turbidity over background at 150 feet cannot be met

by February 28, 2005, the Corps may develop and submit a turbidity plan for future operation that includes the following information:

(a) Proposed turbidity levels;
(b) Proposed turbidity compliance intervals and/or locations;
(c) Justification for proposed turbidity levels, compliance intervals and/or locations that consists of: scientifically valid turbidity monitoring information that includes location of data points, tidal stages at each point taken, turbidity readings, background turbidity levels, and size of turbidity plumes created at all times of the year;
(d) Compiled aquatic life/habitat monitoring information related to OC coho salmon habitat with supported information regarding the appropriateness of the relationship between the proposed turbidity levels, compliance intervals and/or locations and the essential features of OC coho salmon habitat; and,
(e) Any proposed additional BMPs, and associated timelines to be implemented over the course of the following years.

Provided this information is submitted to NOAA Fisheries for review at the same time a reinitiated BA is submitted, NOAA Fisheries will assess the turbidity plan's effects on OC coho salmon. NOAA Fisheries cannot guarantee that this plan will avoid the section 7(a)(2) prohibitions, but will review the information provided to assess whether survival and recovery of proposed threatened OC coho salmon would be appreciably reduced by the proposed action, as well as determine if the new proposed effects are within the analysis of effects described in this conference opinion.

5. Volume. The volume of sand and gravel mined during the first permit year will be limited to 180,000 CY. Each subsequent year, this amount will be reduced in accordance with the following schedule:

Year 1 (two dredging windows): 180,000 CY
Year 2: 150,000 CY
Year 3: 120,000 CY
Year 4: 90,000 CY
Year 5: 90,000 CY

Although setbacks used to constrain mining under this RPA are smaller than those described in RPA #2, the volume offered during the first half of the phase out is far larger than was mined by the operation during most years from 1981 until the present (see Figure 2). Therefore, it is uncertain whether the approved volumes will be available during each year of the phase out consistent with other place and timing restrictions. Like the volume described in RPA #2, these annual phase out volumes must be viewed as the maximum allowable and may not be interpreted as an amount guaranteed to be available for each year of mining. Any deficiency in this volume resulting from inability to mine due to mechanical considerations (*i.e.*, machinery breakdown) or inclement weather that is not removed in a given year may be 'carried over' and added to the

subsequent year's allowable dredging volume, so long as the annual volume removed does not exceed 180,000 CY in any given year and mining is consistent with other place and timing restrictions. Mining shall not extend beyond the fifth year, nor shall the total authorized volume for the 5-year phase-out period exceed 630,000 CY.

6. Compensatory Mitigation. Prepare and carry out a compensatory mitigation plan, pursuant to the Corps' Regulatory Guidance Letter No. 02-2 (December 24, 2002), to replace riparian and aquatic resource functions unavoidably lost or adversely affected by authorized activities. For this proposed action, acceptable mitigation may include reestablishment or rehabilitation of natural riparian vegetation and shallow-water habitats in areas of the Lower Umpqua River watershed (1710030308) occupied by OC coho salmon. Priority will be given to the reestablishment of intertidal marsh and shallow-water habitat within this watershed.

7. Monitoring. Provide pre- and post-mining surveys of channel morphology throughout the mining area. Also, provide a copy of the written plans for pollution and erosion control, estimated depths of mining activities, sand and gravel volumes, sediment size distribution, turbidity monitoring reports and a summary of pollution and erosion control inspections, including any erosion control failure, contaminant release, and correction effort.

Effects of Reasonable and Prudent Alternatives

RPA #1
Compliance with RPA #1 will avoid jeopardy by dispelling uncertainty regarding the sediment budget, thus allowing mining volumes and methods to be more precisely and appropriately tailored as necessary to avoid endangering OC coho salmon. RPA #1 does not authorize any gravel mining, or any other action that may affect coho salmon. It calls for collection and analysis of new data, reinitiation of consultation will have to occur before any mining may begin.

RPA #2
Compliance with RPA #2 will avoid jeopardy of OC coho by ensuring that the most vulnerable life stages of OC coho will be isolated from the direct effects of mining by scheduling in-water work to occur when the fewest numbers of vulnerable individuals will be present in the action area.

Compliance with the place element of this RPA will ensure that the loss and degradation of riparian and aquatic resource functions caused by the physical removal of substrate will be avoided or limited by excluding mining operations from aquatic habitats that are the most valuable for salmon and the most sensitive to disturbance, including shallow water areas less than 20 feet deep and areas around the mouths of tributary streams that provide the most productive conditions for OC coho and the organisms they require as food.

The methods element of this RPA will further limit the loss and degradation of riparian and aquatic resource functions by preventing the depth of mined pits from exceeding the thalweg, thus reducing the potential for further channel incision that would threaten the most productive habitat areas in the action area and disrupt the ecological interactions between the stream and adjacent riparian and floodplain areas.

Restricting the volume of mined material as described here will ensure that it does not exceed natural recruitment, given the lack of certainty regarding the sediment budget, and with an adequate margin of safety to compensate for differences between annual variation in recruitment and the uniform disturbance caused by mining. The effects of this condition will be to ensure the restoration of a positive sediment transport budget and the related processes necessary to produce and sustain channel features and other habitat elements required by OC coho salmon.

Compliance with the compensatory mitigation element of this RPA will offset long term adverse effects in the extraction area by replacing riparian and aquatic resource functions lost within the extraction area.

Compliance with the monitoring element of this RPA will ensure that the proposed action is not causing unanticipated effects or an unacceptable level of take. It will also ensure that the operation is complying with the conservation measures of this RPA.

NOAA Fisheries believes the limitations in this RPA will reduce the intensity and severity of harm caused by instream mining enough to avoid jeopardizing the long-term survival and recovery of OC coho salmon.

RPA #3

Compliance with RPA #3 will avoid jeopardy of OC coho by ensuring that mining in the action area will cease after 5 years and the natural recovery of riparian and aquatic resource functions within the action area will not be prevented or delayed by additional mining in the future.

Compliance with the timing element of this RPA will ensure that the most vulnerable life stages of OC coho salmon will be isolated from the direct effects of mining by scheduling in-water work to occur when the fewest numbers of vulnerable individuals will be present in the action area.

Compliance with the place element of this RPA will ensure that the loss and degradation of riparian and aquatic resource functions caused by the physical removal of substrate will be appropriately limited by excluding mining operations from those aquatic habitats that are currently both the most valuable and the most sensitive, including shallow water areas near banks and areas around the mouths of tributary streams that provide the most productive conditions for OC coho salmon, including the organisms they require as food. The depth condition will further limit the loss and degradation of riparian and aquatic resource functions by preventing the depth of mined pits from exceeding the thalweg, thus reducing the potential for further channel incision that would threaten the most productive habitat areas in the action area

and disrupt the ecological interactions between the stream and adjacent riparian and floodplain areas.

Compliance with the turbidity element of this RPA will ensure that the effects to OC coho salmon will be localized within the vicinity of the dredging barge. The timing element works with the turbidity element by scheduling in-water work to occur when the fewest number of OC coho salmon, vulnerable to turbidity, will be present in the action area.

Compliance with the volume component of this RPA will ensure that adverse effects to the riparian and aquatic resource functions decrease each year. As the volume of sand and gravel taken each year decreases, the adverse effects of mining will abate proportionately until the volume of aggregate is completely phased out after 5 years. Carry over of volume from one year to the next due to inability to mine may result in larger impacts in a given year. But the limit of 180,000 CY in any year and the 630,000 CY cap over 5 years maintains the predicted amount of impacts over the duration of the project.

Compliance with the compensatory mitigation element of this RPA will offset long term adverse effects in the extraction area by replacing riparian and aquatic resource functions lost within the extraction area. Active restoration of these riparian and aquatic resource function will increase the quantity and quality of habitat for OC coho salmon quicker than passively allowing recovery within the extraction area.

Compliance with the monitoring element of this RPA will ensure that the proposed action is not causing unanticipated adverse effects or exceeding the expected level of take. It will also ensure that the operation is complying with the conservation measures of this RPA.

NOAA Fisheries believes the measures in this RPA will reduce the intensity and severity of harm caused by instream mining enough to avoid jeopardizing the long-term survival and recovery of OC coho salmon. Improvements, such as limiting the time, place and mining depth, over the proposed action and past mining methods have been proposed which are expected to reduce adverse effects to OC coho salmon and protect core riparian and aquatic resource functions. Greater short-term effects are exchanged for the certainty of long-term recovery.

Taken together, NOAA Fisheries believes the measures in these RPAs will reduce the intensity and severity of harm caused by instream mining enough to avoid jeopardizing the long-term survival and recovery of OC coho salmon.

2.1.9 Conservation Recommendations

Section 7(a)(1) of the ESA requires Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of threatened and endangered species. Conservation recommendations are discretionary measures suggested to avoid or minimize adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitats, or to develop additional information. NOAA Fisheries

believes the following recommendation is consistent with these obligations, and therefore should be carried out by the Corps.

1. To the extent possible, the Corps should develop a database of all existing permits that have resulted in sand and gravel mining in Oregon. For consistency, this database should be applied in all basins and contain, where possible, the following information: (1) Location by county, nearest town or city, waterway, and stream mile; (2) the type of mining authorized (*e.g.*, floodplain, bar scalping, in-water); (3) indicate whether the permit includes conditions calling for compensatory mitigation and a reclamation plan; and (4) the volume of sand and gravel mining authorized.

2. The Corps should complete all necessary work to decide whether those permits are candidates for consultation as ongoing actions before December 31, 2004. To speed up consultation and improve salmon survival, the Corps should accelerate a feasibility study of alternatives to rank permits for reevaluation based on relative effects to salmon. Using this information, NOAA Fisheries will decide in coordination with the Corps which existing permits warrant consultation. This measure is not intended to be included as a permit condition for the proposed action. It is an evaluation NOAA Fisheries believes in necessary to make progress toward salmon recovery in Oregon.

Please notify NOAA Fisheries if the Corps carries out these recommendations so that we will be kept informed of actions that minimize or avoid adverse effects, and those that benefit species or their habitats.

2.1.10 Reinitiation of Consultation

As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) The amount or extent of taking specified in the incidental take statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; (3) the action is modified in a way that causes an effect on listed species that was not previously considered; (4) a new species is listed or critical habitat is designated that may be affected by the action; or (5) the turbidity limiting practices are not sufficient to achieve required target levels. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending conclusion of the reinitiated consultation.

The Corps indicates the applicant has also expressed interest in mining within areas that would be excluded under RPA #3. On an annual basis, the Corps and the applicant may develop and submit a BA evaluating the effects of the proposed mining plan. This annual mining plan will describe specific locations to be mined in the subsequent year. This request would require reinitiation of consultation, since the action would be modified in a way that causes an effect on listed species that was not previously considered.

Reinitiation of consultation requires submittal of a new BA and would include detailed bathymetric map(s) of the proposed area(s) to be mined, maps identifying shallow water and tributary habitats within or beside the proposed mining area, information on the sediment particle sizes to be mined, information on the natural angles of repose for side slopes in the area, and the previous year's monitoring information. Provided this information is submitted to NOAA Fisheries for review at least six months in advance of the proposed dredging period, NOAA Fisheries will consider whether site-specific exceptions to the "Place" restrictions described in #3 above, *i.e.*, exceptions to the tributary mouth setbacks, shallow water restrictions, and thalweg deepening constraint, would result in jeopardizing OC coho salmon, adversely modifying any critical habitat that might be proposed, or violating section 7(a)(2). NOAA Fisheries cannot guarantee that annual exceptions to these rules will be consistent with Section 7(a)(2) prohibitions, but will review the information provided to assess whether the survival and recovery of proposed threatened OC coho salmon would be affected by gravel mining, within the analysis of effects described in this conference opinion.

2.2 Incidental Take Statement

The ESA at section 9 [16 USC 1538] prohibits take of endangered species. The prohibition of take is extended to threatened anadromous salmonids by section 4(d) rule [50 CFR 223.203]. Take is defined by the statute as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." [16 USC 1532(19)] Harm is defined by regulation as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering." [50 CFR 222.102] Harass is defined as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering." [50 CFR 17.3] Incidental take is defined as "takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant." [50 CFR 402.02] The ESA at section 7(o)(2) removes the prohibition from any incidental taking that is in compliance with the terms and conditions specified in a section 7(b)(4) incidental take statement [16 USC 1536].

An incidental take statement specifies the amount or extent of incidental take for the project. It also provides reasonable and prudent measures to minimizes the incidental take of the species. However, the incidental take statement included in this conference opinion does not become effective until NOAA Fisheries adopts the conference opinion as a biological opinion, after the listing is final. Until the time that the species is listed, the prohibitions of the ESA do not apply.

2.2.1 Amount or Extent of Take for RPA #1

NOAA Fisheries concludes that the proposed action would jeopardize the long-term survival and recovery of OC coho salmon. The proposed action, as modified by the RPA #1, is not expected to result incidental take of OC coho because it does not authorize any gravel mining, or any other

action that may affect coho salmon. It calls only for collection and analysis of new data. Reinitiation of consultation will have to occur before any mining may begin, at which time an incidental take statement can be issued.

2.2.2 Amount or Extent of Take for RPA #2

NOAA Fisheries concludes that the proposed action would jeopardize the long-term survival and recovery of OC coho salmon. The proposed action, as modified by the RPA #2, is expected to result in minimal incidental take (harm) of OC coho because of the following: (1) Degradation of the Umpqua River sediment transport processes and channel conditions; (2) increased turbidity and settling of fine sediment; (3) increased water contamination; and (4) reduction in the distribution and productivity of macroinvertebrate populations used as food by OC coho salmon. The effects of these activities on population levels are not expected to be measurable in the long term, and despite the use of best scientific and commercial data available, NOAA Fisheries cannot quantify a specific amount of incidental take for this action. In instances such as this, NOAA Fisheries designates the expected level of take in terms of the extent of take allowed.

The best scientific and commercial data available can not quantify the number of OC coho salmon that will utilize the permitted dredge area, therefore, in cases such as this, NOAA Fisheries identifies the extent of take. For this project, NOAA Fisheries limits the exemption of take to areas within the Umpqua River between RM 19 and RM 27. Allowable take is also limited to that which occurs by extracting 18,000 CY of aggregate from sediments more than 20 feet below NGVD but less the thalweg depth. Areas identified for excluding gravel extraction within this section of river are not included in this exemption. Because the action is prohibited from the areas most likely to be utilized by OC coho salmon, that is, less than 150 feet from streambanks, and one-half mile upstream and downstream from coho-bearing tributaries, NOAA Fisheries expects a small proportion of the migrating OC coho salmon (adults and juveniles) to utilize the permitted dredging area.

2.2.2.1 Reasonable and Prudent Measures for RPA #2

The measures described below are non-discretionary. They must be carried out so that they become binding conditions for the incidental take exemption in section 7(a)(2) to apply. The Corps has the continuing duty to regulate the activities covered in this incidental take statement. If the Corps fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms added to the document authorizing this action, or fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to minimize the likelihood of take of listed fish resulting from implementation of this Opinion.

1. Minimize incidental take due to alteration of channel and substrate transport processes by restricting the volume of sand and gravel removed each year.

2. Minimize incidental take due to dredge and barge operations by completing in-water work when the fewest number of juvenile salmon are likely to be present.

3. Minimize an incidental take due to damage and conversion of shallow water habitats by excluding mining operations from the most valuable and sensitive areas, including shallow water areas that produce most of the organisms juvenile OC coho require as food.

4. Minimize incidental take due to turbidity, sedimentation, exposure to hazardous materials, and degradation of riparian and floodplain conditions by ensuring that operation of the clamshell dredge, transportation barges, and product processing plants all include appropriate conservation measures.

5. Ensure completion of a comprehensive compensatory mitigation plan to offset the long-term adverse effects of mining and related onshore operations.

6. Ensure completion of a comprehensive monitoring and reporting program to confirm this Opinion is meeting its objective of minimizing take from permitted activities.

2.2.2.2 Terms and Conditions for RPA #2

To be exempt from the prohibitions of section 9 of the ESA, the Corps must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. To implement reasonable and prudent measure #1 (alteration of channel and transport processes), the Corps shall limit the sand and gravel removed from the channel to18,000 CY per year. Because of uncertainties regarding the actual volume of bedload transport, river channel morphology, and the restriction imposed by setbacks in each specific area proposed for mining, this volume must be viewed as the maximum allowable volume and may not be interpreted as an amount guaranteed to be available for mining each year. Further, any deficiency in this volume that is not removed in a given year may not be 'carried over' and added to the volume authorized for a subsequent year.

2. To implement reasonable and prudent measure #2 (in-water work period), the Corps shall limit in-water work to the period between July 1 and August 31, when migrating adult salmon and juvenile salmon acclimating to salt water conditions are least likely to be present.

3. To implement reasonable and prudent measure #3 (protection of shallow-water habitats), the Corps shall limit mining places as follows:

    a. All clamshell dredge operations will observe the following minimum setbacks.
        i. 150 feet from the shoreline.

ii. One-half mile from Harvey Creek, Indian Charlie Creek, Franklin Creek, Mill Creek, Charlotte Creek, and Luder Creek.

b. Specific sediments to be mined will have a surface before mining that is 20 feet or more below NGVD, and the maximum depth of any pit at the conclusion of mining may not exceed the depth of the pre-mining thalweg in that reach.

c. Post-mining side slopes will not exceed 4 feet horizontal to 1-foot vertical.

4. To implement reasonable and prudent measure #4 (operation of dredge, barge, and product processing facilities), the Corps shall ensure that the clamshell dredge, rock product barges, and onshore processing facilities will be operated as follows:

a. Pollution and erosion control plan. Prepare and carry out a pollution and erosion control plan to prevent pollution caused by all operations. The plan must contain the elements listed below, and meet requirements of all applicable laws and regulations.

i. The name and address of the party(s) responsible for accomplishment of the pollution and erosion control plan.

ii. Practices to prevent erosion and sedimentation associated with barge and related shoreline operations, including access roads, stream crossings (if any), sand and gravel stockpile operations, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations, staging areas, and roads being decommissioned.

iii. Practices to confine, remove and dispose of sediments from any washout facilities.

iv. A description of any regulated or hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring.

v. A spill containment and control plan with notification procedures, specific cleanup and disposal instructions for different products, quick response containment and cleanup measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.

vi. Practices to prevent materials or debris from dropping from the barge into any stream or waterbody.

b. The clamshell will be equipped with an enclosed bucket that closes tightly to reduce resuspension of sediment throughout the water column.

c. The clamshell dredge barge and all rock product barges will be maintained in a water tight condition to prevent any material from returning to the waterway.

d. Barge drainage and barge wash water will be pumped to an appropriate settling facility to ensure that return flows do not increases ambient stream turbidity by more than 10% above background 100 feet below the discharge, when measured relative to a control point immediately upstream from the discharge.

e. All processing of sand and gravel products, including washing, will be limited to onshore facilities.

f. Wash water return flows from onshore processing facilities may not exceed 4 feet per second at either the outfall or diffuser port, and the maximum size of any aperture may not exceed one inch.

g. All related onshore operations, such as vehicle parking, administrative functions, fuel storage, settling facilities, and product stockpiles, and will be conducted 150 feet or more from ordinary high water, whenever feasible, to minimize degradation and destruction of riparian habitats.

5. To implement reasonable and prudent measure #5 (compensatory mitigation plan), the Corps shall ensure the following:

a. Base the level of mitigation on a functional assessment of adverse effects of the project, and functional replacement (*i.e.*, 'no net loss of function'), whenever feasible, or a minimum one-to-one linear foot or acreage replacement.

b. Acceptable mitigation includes reestablishment or rehabilitation of natural riparian vegetation or shallow-water habitats.

c. Include the following information:

i. The name and address of the party(s) responsible for meeting each component of the mitigation plan.

ii. Performance standards for determining compliance.

iii. Any other pertinent requirements such as financial assurances, real estate assurances, monitoring programs, and the provisions for short and long-term maintenance of the restoration or mitigation site.

iv. A provision for Corps certification that all action necessary to carry out each component of the restoration or mitigation plan is completed, and that the performance standards are achieved.

6. To implement reasonable and prudent measure #6 (monitoring), the Corps shall ensure that the applicant will complete the following monitoring activities to ensure that the proposed action is not causing an unacceptable level of take, and to provide information necessary to analyze alternatives to instream mining:

a. Written planning requirements. Before beginning any work below bankfull elevation,[10] the permittee will provide a copy of the written plans for Pollution and Erosion Control, and Compensatory Mitigation, to the Corps and the Oregon State Habitat Office of NOAA Fisheries at the following address:

[10] 'Bankfull elevation' means the bank height inundated by a 1.5 to 2-year average recurrence interval and may be estimated by morphological features such average bank height, scour lines and vegetation limits.

Director, Oregon State Habitat Office
Habitat Conservation Division
National Marine Fisheries Service
Attn: 2003/01665
525 NE Oregon Street
Portland, OR 97232

b. Implementation report. The permittee submits an implementation monitoring report to the Corps and to NOAA Fisheries, at the address above, by December 31 of each year of operations. The monitoring report will describe the permittee's success meeting his or her permit conditions and include the following information.

i. Project identification
   (1) Permittee name, permit number, and project name.
   (2) Project location, including any compensatory mitigation site(s), by 5th field HUC and by latitude and longitude as determined from the appropriate USGS 7-minute quadrangle map.
   (3) Corps contact person.
   (4) Starting and ending dates for work completed.

ii. Project data.
   (1) Dates of any dredging activity.
   (2) Daily GPS barge locations.
   (3) Pre- and post mining surveys of channel morphology in the mined area and surrounding setback displayed in a 3-D digital elevation model (DEM) format.[11]
   (4) Estimated depths of mining activities, sand and gravel volumes, and sediment size distribution.
   (5) A summary of turbidity monitoring reports, including ay data or analyses that show an exceedence of turbidity criteria.
   (6) A summary of pollution and erosion control inspections, including any erosion control failure, contaminant release, and correction effort.
   (7) Photographs of habitat conditions at any mitigation site, before, during, and after project completion.[12] Label each photo with date,

[11] For an example of an inexpensive, commercially available system based on high-resolution multibeam sonar, see, Terri Prickett, *Underwater inspection of coastal structures*, REMR Bulletin, 14(2), U.S. Army Corps of Engineers, available online at http://www.wes.army.mil/REMR/bulls/vol14/no2/text/coastal.html.

[12] Relevant habitat conditions may include characteristics of clamshell, barge or onshore operations, channel conditions, eroding and stable streambanks in the project area, riparian vegetation, water quality, flows at base, bankfull and over-bankfull stages, and other visually discernable environmental conditions at the project area, and upstream and downstream from the project.

time, project name, photographer's name, and a comment about the subject.

(8) Any other data or analyses the Corps or applicant believes is necessary or helpful to assess habitat trends in the action area.

c. Failure to provide timely monitoring causes incidental take statement to expire. If the applicant fails to provide specified monitoring information by December 31, NOAA Fisheries will consider that a modification of the action that causes an effect on listed species not previously considered and causes the incidental take statement of the Opinion to expire.

d. Reinitiation contact. To reinitiate consultation, contact the Oregon State Habitat Office of NOAA Fisheries, at the address above.

e. Salvage notice. The following notice is included as a permit condition.

> If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify the Roseburg Field Office of NOAA Fisheries Law Enforcement at 541.957.3388. The finder must take care in handling of sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

2.2.3 Amount or Extent of Take for RPA #3

NOAA Fisheries concludes that the proposed action would jeopardize the long-term survival and recovery of OC coho salmon. The proposed action, as modified by the RPA #3, is expected to result in minimal incidental take (harm) of OC coho because of the following: (1) Degradation of the Umpqua River sediment transport processes and channel conditions; (2) increased turbidity and settling of fine sediment; (3) increased water contamination; and (4) reduction in the distribution and productivity of macroinvertebrate populations used as food by OC coho salmon. The effects of these activities on population levels are not expected to be measurable in the long term, and despite the use of best scientific and commercial data available, NOAA Fisheries cannot quantify a specific amount of incidental take for this action. In instances such as this, NOAA Fisheries designates the expected level of take in terms of the extent of take allowed.

The best scientific and commercial data available can not quantify the number of OC coho salmon that will utilize the permitted dredge area, therefore, in cases such as this, NOAA Fisheries identifies the extent of take. For this project, NOAA Fisheries limits the exemption of take to areas identified for dredging within the Umpqua River between RM 19 and RM 27.

Allowable take is also limited to that which occurs by extracting the allowed volume of aggregate from sediments deeper than 10 feet but less than the thalweg depth. Areas identified for excluding gravel extraction within this section of river are not included in this exemption. Because the action is prohibited from the areas most likely to be utilized by OC coho salmon, that is, less than 150 feet from streambanks, and the entire river (bank to bank) 1500 feet downstream and 500 feet upstream from coho-bearing tributaries, NOAA Fisheries expects a small proportion of the migrating OC coho salmon (adults and juveniles) to utilize the permitted dredging area.

2.2.3.1 Reasonable and Prudent Measures for RPA #3

The measures described below are non-discretionary. They must be carried out so that they become binding conditions for the incidental take exemption in section 7(a)(2) to apply. The Corps has the continuing duty to regulate the activities covered in this incidental take statement. If the Corps fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms added to the document authorizing this action, or fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to minimize the likelihood of take of listed fish resulting from implementation of this Opinion.

1. Minimize incidental take due to long term alteration of the Umpqua River channel and substrate by restricting permit renewal in the future.

2. Minimize incidental take due to dredge and barge operations by completing in-water work when the fewest number of juvenile salmon are likely to be present.

3. Minimize incidental take due to damage and conversion of shallow water habitats by excluding mining operations from the most valuable and sensitive areas, including shallow water areas that produce most of the organisms juvenile OC coho require as food.

4. Minimize incidental take due to turbidity, sedimentation, exposure to hazardous materials, and degradation of riparian and floodplain conditions by ensuring that operation of the clamshell dredge, transportation barges, and product processing plants all include appropriate conservation measures.

5. Minimize incidental take due to alteration of channel and substrate transport processes by restricting the volume of sand and gravel removed each year.

6. Ensure completion of a comprehensive compensatory mitigation plan to offset the long-term adverse effects of related shoreline operations.

7. Ensure completion of a comprehensive monitoring and reporting program to confirm this Opinion is meeting its objective of minimizing take from permitted activities.

2.2.3.2 Terms and Conditions for RPA #3

To be exempt from the prohibitions of section 9 of the ESA, the Corps must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. To implement reasonable and prudent measure #1 (permit renewal), the Corps shall not issue another permit to extract sand and gravel from the extraction area after the 5-year phase-out period.

2. To implement reasonable and prudent measure #2 (in-water work period), the Corps shall limit in-water work to the period between July 1 and September 30 and November 1 through February 28, when migrating adult salmon and juvenile salmon are least likely to be present.

3. To implement reasonable and prudent measure #3 (protection of shallow-water habitats), the Corps shall limit mining places as follows:

    a. All clamshell dredge operations will observe the following minimum setbacks.
        i. 150 feet from the shoreline using NGVD in approved mining areas.
        ii. The entire river 1500 feet downstream and 500 feet upstream from the edges of the mouths of Harvey Creek, Indian Charlie Creek, Franklin Creek, Mill Creek, Charlotte Creek, and Luder Creek.
    b. Specific sediments to be mined will have a surface before mining that is 10 feet or deeper, and the maximum depth of any pit at the conclusion of mining may not exceed the depth of the pre-mining thalweg in that reach.
    c. Post-mining side slopes will not exceed 4 feet horizontal to 1-foot vertical.

4. To implement reasonable and prudent measure #4 (operation of dredge, barge, and product processing facilities), the Corps shall ensure that the clamshell dredge, rock product barges, and onshore processing facilities will be operated as follows:

    a. Pollution and erosion control plan. Prepare and carry out a pollution and erosion control plan to prevent pollution caused by all operations. The plan must contain the elements listed below, and meet requirements of all applicable laws and regulations.
        i. The name and address of the party(s) responsible for accomplishment of the pollution and erosion control plan.
        ii. Practices to prevent erosion and sedimentation associated with barge and related shoreline operations, including access roads, stream crossings (if any), sand and gravel stockpile operations, construction sites, borrow pit

operations, haul roads, equipment and material storage sites, fueling operations, staging areas, and roads being decommissioned.

iii. Practices to confine, remove and dispose of sediments from any washout facilities.

iv. A description of any regulated or hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring.

v. A spill containment and control plan with notification procedures, specific cleanup and disposal instructions for different products, quick response containment and cleanup measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.

vi. Practices to prevent materials or debris from dropping from the barge into any stream or waterbody.

b. The clamshell will be equipped with an enclosed bucket that closes tightly to reduce resuspension of sediment throughout the water column.

c. Do not increases ambient stream turbidity by more than 10% above background 100 feet below the discharge, when measured relative to a control point immediately upstream from the discharge.

d. All related onshore operations, such as vehicle parking, administrative functions, fuel storage, settling facilities, and product stockpiles, and will be conducted 150 feet or more from ordinary high water, whenever feasible, to minimize degradation and destruction of riparian habitats.

5. To implement reasonable and prudent measure #5 (alteration of channel and transport processes), the Corps shall limit the sand and gravel removed from the channel to the following:

a. 180,000 CY in the first calendar year
b. 150,000 CY in the second calendar year
c. 120,000 CY in the third calendar year
d. 90,000 CY in the fourth calendar year
e. 90,000 CY in the fifth calendar year

Because of uncertainties regarding the actual volume of bedload transport, river channel morphology, and the restriction imposed by setbacks in each specific area proposed for mining, this volume must be viewed as the maximum allowable volume and may not be interpreted as an amount guaranteed to be available for mining each year. Any deficiency resulting from inability to mine due to mechanical considerations (*i.e.*, machinery breakdown) or inclement weather in this volume that is not removed in a given year may be 'carried over' and added to the subsequent year's allowable dredging volume, so long as the annual volume removed does not exceed 180,000 CY in any given year. Mining shall not extend beyond the fifth year, nor shall the total authorized volume for the 5-year phase-out period exceed 630,000 CY.

6. To implement reasonable and prudent measure #6 (compensatory mitigation plan), the Corps shall ensure the following:

   a. Base the level of mitigation on a functional assessment of adverse effects of the project, and functional replacement (*i.e.*, 'no net loss of function'), whenever feasible, or a minimum one-to-one linear foot or acreage replacement.
   b. Acceptable mitigation includes reestablishment or rehabilitation of natural riparian vegetation or shallow-water habitats.
   c. Include the following information:
      i. The name and address of the party(s) responsible for meeting each component of the mitigation plan.
      ii. Performance standards for determining compliance.
      iii. Any other pertinent requirements such as financial assurances, real estate assurances, monitoring programs, and the provisions for short and long-term maintenance of the restoration or mitigation site.
      iv. A provision for Corps certification that all action necessary to carry out each component of the restoration or mitigation plan is completed, and that the performance standards are achieved.

7. To implement reasonable and prudent measure #7 (monitoring), the Corps shall ensure that the applicant will complete the following monitoring activities to ensure that the proposed action is not causing an unacceptable level of take, and to provide information necessary to analyze alternatives to instream mining:

   a. Written planning requirements. Before beginning any work below bankfull elevation,[13] the permittee will provide a copy of the written plans for Pollution and Erosion Control, and Compensatory Mitigation, to the Corps and the Oregon State Habitat Office of NOAA Fisheries at the following address:

      Director, Oregon State Habitat Office
      Habitat Conservation Division
      National Marine Fisheries Service
      Attn: 2003/01665
      525 NE Oregon Street
      Portland, OR 97232

   b. Implementation report. The permittee submits an implementation monitoring report for the previous 12 months to the Corps and NOAA Fisheries, at the address above, by April 30 of each year. The monitoring report will describe the permittee's success meeting his or her permit conditions and include the following information.

[13] 'Bankfull elevation' means the bank height inundated by a 1.5 to 2-year average recurrence interval and may be estimated by morphological features such average bank height, scour lines and vegetation limits.

i. Project identification
   (1) Permittee name, permit number, and project name.
   (2) Project location, including any compensatory mitigation site(s), by 5th field HUC and by latitude and longitude as determined from the appropriate USGS 7-minute quadrangle map.
   (3) Corps contact person.
   (4) Starting and ending dates for work completed.

ii. Project data.
   (1) Dates of any dredging activity.
   (2) Daily GPS barge locations.
   (3) Pre- and post mining surveys of channel morphology in the mined area and surrounding setback displayed in a 3-D digital elevation model (DEM) format.[14]
   (4) Estimated depths of mining activities, sand and gravel volumes, and sediment size distribution.
   (5) A summary of turbidity monitoring reports, including any data or analyses that show an exceedence of turbidity criteria.
   (6) A summary of pollution and erosion control inspections, including any erosion control failure, contaminant release, and correction effort.
   (7) Photographs of habitat conditions at any mitigation site, before, during, and after project completion.[15] Label each photo with date, time, project name, photographer's name, and a comment about the subject.
   (8) Any other data or analyses the Corps or applicant believes is necessary or helpful to assess habitat trends in the action area.

c. Failure to provide timely monitoring causes incidental take statement to expire. If the applicant fails to provide specified monitoring information by December 31, NOAA Fisheries will consider that a modification of the action that causes an effect on listed species not previously considered and causes the incidental take statement of the Opinion to expire.

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e. Salvage notice. The following notice is included as a permit condition.

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[14] For an example of an inexpensive, commercially available system based on high-resolution multibeam sonar, see, Terri Prickett, *Underwater inspection of coastal structures*, REMR Bulletin, 14(2), U.S. Army Corps of Engineers, available online at http://www.wes.army.mil/REMR/bulls/vol14/no2/text/coastal.html.

[15] Relevant habitat conditions may include characteristics of clamshell, barge or onshore operations, channel conditions, eroding and stable streambanks in the project area, riparian vegetation, water quality, flows at base, bankfull and over-bankfull stages, and other visually discernable environmental conditions at the project area, and upstream and downstream from the project.

If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify the Roseburg Field Office of NOAA Fisheries Law Enforcement at 541.957.3388. The finder must take care in handling of sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

3. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The Data Quality Act (DQA) requires Federal agencies to document that disseminated information is based on adequate science, has been appropriately reviewed, and meets certain quality criteria. The DQA specifies three components contributing to the quality of a document, and they should each be addressed in DQA documentation. They are utility, integrity, and objectivity. Each biological opinion/EFH consultation issued in the NOAA Fisheries Northwest Region must meet these criteria, and include a section documenting compliance with the DQA.

Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users.

This ESA section 7 consultation on the LTM, Inc. Instream Sand and Gravel Mining Project is likely to jeopardize the continued existence of OC coho salmon. This conference opinion presents the Corps with three RPAs, any of which may be accomplished to prevent the proposed action from jeopardizing the continued existence of the proposed species. Individual copies of this consultation were provided to the Corps, the USFWS, and appropriate state agencies. This consultation was posted on the NOAA Fisheries Northwest Region web site (http://www.nwr.noaa.gov). The format and naming adheres to conventional standards for style.

Integrity

Integrity refers to security - the protection of information from unauthorized access or revision, to ensure that the information is not compromised through corruption or falsification.

This consultation was completed on a computer system managed by NOAA Fisheries in accordance with relevant IT security policies and standards set out in Appendix III “Security of

Automated Information Resources", OMB Circular A-130, the Computer Security Act, and the Government Information Security Reform Act.

Objectivity

Objectivity refers to how the consultation presents information in an accurate, clear, complete, and unbiased manner, and in the proper context.

Information Product Category
This consultation falls under the product category of natural resource plans.

Standards
This consultation and supporting documents are clear, concise, complete, and unbiased, and were developed using commonly accepted scientific research methods. They adhere to published standards including the NOAA Fisheries ESA Consultation Handbook, ESA Regulations, 50 CFR 402.01 *et seq*.

Best Available Information
This consultation and supporting documents use the best available information, as referenced in the document's 'Literature Cited' section. This conference opinion contains more background on information sources and quality.

Referencing
All supporting materials, information, data, and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process
This consultation was drafted by NOAA Fisheries staff with training in ESA implementation, and reviewed in accordance with Northwest Region ESA quality control and assurance processes.

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