Supplemental Environmental Analysis
For Purposes of
2003-2004 Dredging
(Lower Snake and Clearwater Rivers, Washington and Idaho)

ATTACHMENT F
Clean Water Act Section 404(b)(1) Evaluation
Proposed In-Water Discharges for Winter 2003-2004

U.S. Army Corps of Engineers
Walla Walla District
201 North 3rd Avenue
Walla Walla, WA 99362

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1.0 PROJECT DESCRIPTION

1.1 Location

Dredging activities for winter 2003-2004 are proposed at ten locations in the Lower Granite, Little Goose, and Ice Harbor Reservoirs on the lower Snake River. Specific locations are listed in section 1.4.1 of this attachment. One location in Lower Granite Reservoir has been identified for in-water discharge of the dredged materials. This proposed discharge site is located at Snake River Mile (RM) 116. Location of the proposed discharge site is described further in section 1.5.1 of this attachment.

1.2 General Description

This 404(b)(1) Evaluation addresses water quality impacts of the proposed in-water discharge of dredged material from routine navigation and maintenance dredging operations proposed for winter 2003-2004. The proposed dredging and disposal operations are specifically outlined in the Corps documents: Supplemental Environmental Analysis For Purposes of 2003-2004 Dredging (SEA-03/04); and the 2002 Dredged Material Management Plan/Environmental Impact Statement (2002 DMMP/EIS). The SEA-03/04 indicates the short-term actions necessary to adequately maintain the lower Snake River navigation system, while the 2002 DMMP/EIS describes the rationale and alternatives.

The following is a brief description of the 2003-2004 project details. Further information can be found in the previously mentioned U.S. Army Corps of Engineers' documents.

Continued deposition of sedimentary material in the lower Snake River project area interferes with the navigation and flood control benefits of the lower Snake River Project. In response, the Corps evaluated various alternatives for restoring these primary project functions, determining that the short-term solution was dredging of the navigation channel at various locations and disposal of the material in a beneficial manner.[1] The beneficial manner chosen for 2003-2004 was the development of endangered salmonid rearing habitat. Dredged material would be placed so that deep- to mid-water benches would be changed to sandy shallow-water benches, meant to mimic the near-shore sand conditions of the lower Snake River prior to impoundment, which have been shown to provide salmonid habitat in upper areas of the Lower Granite reservoir.

The first dredging activity following completion of the 2002 DMMP/EIS is currently proposed for winter 2003-2004. Dredging is proposed at ten sites, including approximately three miles of the main navigation channel, two port berthing areas, five recreational facilities, and downstream approaches to two navigational locks. The proposed beneficial use of the dredged material from these sites is to create a woody riparian habitat planting bench and shallow water fish habitat at RM 116.

[1] 2002 DMMP/EIS.

The Corps and the Environmental Protection agency (EPA) are concurrently developing a separate programmatic Dredged Material Management Plan/Supplemental Environmental Impact Statement (PDMMP/SEIS) and the SEA-03/04. The programmatic PDMMP/SEIS will address the long-term dredged material management issues and supplements the 2002 DMMP/EIS. The SEA-03/04 evaluation sets forth reasons why the 2003-2004 dredging activities are independent from the programmatic PDMMP/SEIS, but clearly demonstrates the concurrent development and the relationship of both documents to the 2002 DMMP/EIS. The 2003-2004 dredging activities are independent actions because they were designed primarily to deal with existing and immediate navigation and maintenance problems and, therefore, can be separated from the development of the programmatic plan.

1.3 Authority and Purpose

The portion of the Columbia-Snake Rivers navigation system addressed in the DMMP was authorized by the Rivers and Harbors Act of 1945 (Public Law 79-14, 79th Congress, 1st Session) and approved March 2, 1945, in accordance with House Document 704, 75th Congress, 3rd Session. This portion of the navigation system includes the following projects:

- McNary Lock and Dam (McNary) – Lake Wallula, Columbia and Snake Rivers, Oregon and Washington
- Ice Harbor Lock and Dam (Ice Harbor) – Lake Sacajawea, Snake River, Washington
- Lower Monumental Lock and Dam (Lower Monumental) – Lake Herbert G. West, Snake River, Washington
- Little Goose Lock and Dam (Little Goose) – Lake Bryan, Snake River, Washington
- Lower Granite Lock and Dam (Lower Granite) – Lower Granite Lake, Snake River, Washington and Idaho

Each of these projects is authorized to provide slackwater navigation, including locks and a 14-foot- (4.3 m-) deep channel. Additionally, each project is authorized to provide hydroelectric power generation, irrigation, recreation, and wildlife habitat. Historically, the Corps has dredged accumulated sediments from the navigation channel and the other facilities noted above in order to maintain their operational capacities.

The purpose of this 404(b)(1) Evaluation is to demonstrate that the in-water discharge proposed for winter 2003-2004 would not have an unacceptable adverse impact on the chemical, physical, and biological integrity of waters of the United States, either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern.

1.4 General Description of Dredged or Fill Material

1.4.1 Source of Material

During the proposed 2003-2004 dredging cycle, material would be obtained from dredging in the following areas. (Plate numbers refer to plates in the SEA-03/04.)

- Federal navigation channel at the confluence of the Snake and Clearwater Rivers, from RM 138 on the Snake River to RM 2 on the Clearwater River (Plate 3).
- Port of Clarkston berthing area at RM 139 on the Snake River (Plate 4).
- Port of Lewiston berthing area between RM 1 and RM 1.5 on the Clearwater River (Plate 5).
- Green Belt Boat Basin at RM 139.5 on the Snake River (Plate 6).
- Swallows Park swimming beach and boat launch at RM 141.7 and RM 141.9 on the Snake River (Plate 7).
- Downstream approach to Lower Granite Navigation Lock at RM 107 (Plate 8).
- Downstream approach to Lower Monumental Navigation Lock at RM 41.5 (Plate 9).
- Illia boat launch at RM 104 in Little Goose Reservoir (Plate 10).
- Willow boat launch at RM 88 in Little Goose Reservoir (Plate 11).

1.4.2 General Characteristics of Materials

In general, materials to be dredged would be composed mostly of sediments containing a mixture of silt, sand, gravel, cobbles, and/or rock. Dredged materials will vary with location. Materials to be dredged have been analyzed for grain size distribution and selected chemical parameters. Results of these analyses are described in subsequent sections of this evaluation.

1.4.3 Quantity of Material

During winter 2003-2004, a total of 315,600 cubic yards (244,046 cubic meters) of material is proposed to be dredged from ten sites. Quantities to be dredged from each site are presented in Table 1-1. The majority of the material, 250,500 cubic yards (191,521 cubic meters), is proposed to be dredged from the Federal navigation channel in the Snake and Clearwater Rivers confluence area.

Table 1-1. Sites Proposed to be Dredged in Winter 2003-2004 and the Estimated Quantity to be Dredged from Each Site.

Site to be Dredged	Quantity to b Dredged (cubic yards	Quantity to be Dredged (cubic meters)
Federal Navigation Channel at Confluence of Snake and Clearwater Rivers	250,500	191,521
Port of Clarkston	9,600	7,339.7
Port of Lewiston	5,100	3,899.2
Green Belt Boat Basin	2,800	2,140.8
Swallows Park Swim Beach/Boat Basin	11,000/5,000	8,410.1/3 822.8
Lower Granite Navigation Lock Approach	4,000	3,058.2
Lower Monumental Navigation Lock Approach	20,000	15,291.1
Illia Boat Launch	1,400	1,070.4
Willow Landing Boat Launch	6,200	4,740.2
TOTAL	**315,600**	**244,046**

1.5 Description of Proposed Discharge Sites

1.5.1 Location

The proposed in-water discharge/habitat development site for the proposed dredging activities is located in Lower Granite Reservoir at RM 116. This site is a mid- to shallow depth bench on the left bank (looking downstream) of the Snake River just upstream of Knoxway Canyon. Dredged material disposed of at this site would be used to create a planting bench for riparian vegetation and to construct shallow and mid-depth fish habitat. The location of this site is shown on Figure 7 of the SEA-03/04. The Corps selected this site because it is close to the confluence (where most of the dredging would occur), has potential to provide suitable resting/rearing habitat for juvenile salmon once the river bottom is raised, would not interfere with navigation, would not impact cultural/historic properties, and is of sufficient size to accommodate dredged material disposal for several years.

1.5.2 Size

The discharge site at RM 116 is a 44-acre underwater bench that could hold approximately 3 million cubic yards of dredged material when filled to capacity. The site would be filled to about 10 percent capacity with the material dredged during winter 2003-2004. Disposal activities in 2003-2004 would discharge dredged material over about 14.8 acres of the site (See figure 7 of the SEA-03/04). The riparian planting bench would be about 1.3 acres in size and would vary from about 75 to 150 feet wide by 600 feet long. The shallow water resting/rearing bench would be about 2.5 acres in size. The transition zone between the two benches would be about 1.6 acres. The remaining 9.4 acres would provide further shallow-water and mid-depth habitat. An additional 1.5 acres of the site along the downstream edge may be used for disposal if necessary.

1.5.3 Type of Site

The RM 116 site is an unconfined, open water site near the confluence of Knoxway Canyon and the Snake River. Based on aerial photographs (circa 1958) the proposed disposal site is on ground that, prior to the creation of Lower Granite Reservoir, was positioned on an upland section of the floodplain, above the 100-year floodplain. The disposal site was an orchard with grass and forb coverage that was also used for livestock grazing. A road was located between the site and the river. Riverward of the road lay a long, linear, sandy shoreline along the water's edge, connected to large sandbars downriver of the canyon mouth. In later aerial photographs (circa 1974) vegetation and structures had been removed in preparation for reservoir fill. Based on aerial photography and personal observations in 1992 during the experimental physical drawdown test of the Lower Granite Reservoir, the exposed underwater section of mid-depth bench was completely covered with silt and fine sand deposition due to low velocities; however, heavier sand was deposited on the larger opposing bar on the sharper inside bend of the river. Evidence of the road and orchard observed earlier was no longer visible. The site is currently a mid- to shallow depth bench with a thick silt layer, which has been accumulating at about 2 inches (5.1 cm) per year for 25 years [approximately 4 feet (1.2 m)] over a sand base (less than 20 percent composition).

1.5.4 Types of Habitat

Based on review of historic aerial photographs, the RM 116 site was likely good habitat for spawning and rearing of anadromous salmonids from the 1910s through the 1960s. While there was evidence of human disturbance in the area (e.g. the existence of an orchard with grass and forb coverage that was also used for livestock grazing), the site was near a long, linear, sandy shoreline along the water's edge connected to large sandbars downriver. By the mid 1970s, vegetation and structures had been removed in preparation for reservoir fill, and habitat quality appeared to have degraded to poor for salmonid spawning and fair for rearing. During the drawdown test in 1992 the disposal site was observed to be completely covered with silt and fine sand, and therefore, habitat quality was likely inadequate for spawning or rearing. Habitat suitability at the site is currently poor for rearing and overwintering due to the thick silt layer, and habitat suitable for spawning is nonexistent.

1.5.5 Timing and Duration of Discharge

Proposed in-water work will be conducted during the time period prescribed by applicable regulatory agencies. This time period has been selected to avoid migrations of anadromous salmonids, thus minimizing impacts to these fish. The current in-water work window is December 15 through March 1 for the lower Snake River.

1.6 Description of Disposal Method

Placement of materials may occur using one or a combination of four methods: bottom dumping from hopper barges, dozing the material from flat deck barges, hydraulic conveyance from a pump scow, and placement with a dragline.

Bottom dumping from hopper barges is the preferred placement method, because it would result in the least release of turbidity and would be the most efficient, least expensive placement method. However, this method requires a water depth of about 8 to 10 feet, so use of this type of placement method at this site could be limited. One method employed to overcome water shallowness would be to bottom dump in deeper water and use a dragline to move the material into the desired position.

Dredged material dozed from a flat deck barge would be similar to bottom dumping. Turbidity may be slightly higher than using a bottom dump barge, because material would be shoved off the barge deck in several clumps, compared to one clump from a bottom dump. While water depth would still be an issue (about a 6 foot depth is required), the flat deck barge could reach shallower depths than a bottom dump barge. Moving the material a second time with a dragline would be an option for this method also.

Hydraulic conveyance is a process of liquefying the dredged material and pumping to the desired discharge location. Depending on the material being pumped, the slurry would be about 80 percent water. This method does not have depth as a limiting factor, except that some form of underwater containment berm would need to be constructed using either bottom dumping or clamshell placement. Also, moving the floating discharge point pipeline would require a boat or crane. This method has the highest potential for turbidity, would likely require weirs between the shore and the containment berm to form cells to act as settling catchments, and would possibly require silt fence deployment.

Dragline is a method that would employ a crane and bucket for excavation of dumped material and placement in its final location in the embankment. Material would be brought to the disposal area, and likely bottom-dumped. The dragline would be positioned to reach the dumped material, scoop it up and place it in the fill.

The Corps of Engineers standard practice for contracting this type of work is to specify the environmental protection requirements and final specifications that must be met by the contractor, but let the contractor determine the exact construction methods that would be used to meet the contract requirements. Contractors are selected by lowest bid price and more restrictive placement requirements could result in higher costs. Consequently, the contract for the 2003-2004 dredging would focus on requirements (i.e., turbidity level, work window, slope of underwater fill, placement of a silt cap) rather than placement methods to allow the contractor to be as innovative as possible. Prior to any work being performed in the field, the low bid contractor would be required to submit their work execution plan, including how they intend to meet the environmental requirements. Until the contractor submits their plan, the exact placement method is uncertain.

The Corps has identified four possible placement scenarios: construction of earthen cells and hydraulic placement of material within the cell, silt curtain cells used with hydraulic placement, a combination of silt curtain and earth embankment with hydraulic placement, and placement using a bottom dump with clamshell or dragline. These are discussed below. One, or a combination of these methods may be used to construct the habitat. In addition to these scenarios, it may be advantageous to raise and/or lower the Lower Granite Pool during placement operations. For example, a deeper pool would allow barge access closer to shore. Lowering the pool may facilitate placement of the silt cap on the riparian bench.

Scenario 1 – Construction of earthen cells and hydraulic placement within the cells. This method employs all of the placement methods described above. First, an earth berm would be constructed along the outer edge of the disposal area. This would be formed by pushing dredged material off flat deck barges or bottom dump scows. A floating dragline would be set up on the inside of the earth berm. Boats would be used to position the dragline. Once the berm was constructed to a depth that precluded placement from a flat deck barge or bottom dump scows, the dumps would be made outside of the berm. The dragline would be used to scoop the dumped material and place it on top of the berm. This would be repeated until the berm was above the water surface. Cross berms would be constructed using the dragline perpendicular to shore, between the shore and the berm. This would create containment cells. Once the containment cells were complete, all remaining dredged material would be placed hydraulically. Placement would begin at the upstream cell and work downstream. It is expected that the cells would contain any turbidity that might occur during placement. Materials used for the berm construction would be mostly sand with some gravel and cobbles intermixed. The fill inside the cells would be mostly sand up to just above the water surface. The shoreline portion of each cell, which will define the riparian bench, would then be capped with hydraulically placed silt from the recreation sites and ports.

Scenario 2 - Silt curtain cells used with hydraulic placement. This would be similar to Scenario 1, except the containment cells would be formed using a geotextile fabric draped to the river bottom to act as a silt barrier. The bottom edge would be anchored if necessary. Material would be hydraulically placed within the geotextile containment cell. Placement would proceed until material within the cell was at the existing water surface. The geotextile fabric would be moved downstream and an adjacent cell would be similarly formed. This would continue for the length of the disposal area. Once the fill had been brought up to the water surface, the shoreline portion of each cell, which will define the riparian bench, would be capped with silt material from the dredging operations. A silt fence would be installed on the fill, and material would be placed hydraulically inside the silt fence.

Scenario 3 – Lower Granite pool would be raised to the maximum operating pool. Placement would be performed from flat deck barges or bottom dump scows as much as possible in the depth provided. Once the placement had reached an elevation that could not be accessed by flat deck barges or bottom dump scows, a silt curtain would be installed and a containment cell formed as discussed above. Dredged material would be placed hydraulically within the silt curtain. Once the platform within that cell reached the water surface, the silt curtain would be relocated to form the next cell. Once the fill had been brought to the water surface, the shoreline portion of each cell, which defined the riparian bench, would be capped with silt material from the dredging operations. A silt fence would be installed on the fill and silt would be placed hydraulically.

Scenario 4 - Placement using a dragline. Lower Granite pool would be raised to its maximum operating pool elevation. A dragline would dredge its way into shore, with the material side cast in the proposed disposal area. Flat deck barge or bottom dump scow placement would be performed as much as possible in the depth provided. As the bench grows higher and the water depth becomes inadequate for dumping directly from the barge, the dumping would occur in the channel dredged by the dragline. After each dump, the dragline would excavate that material and place it in the fill. This would continue until a section of the bench was complete within the reach of the dragline. Once the riparian bench had been brought to the water surface, the silt cap would be placed as in the scenarios described above. A silt containment structure such as a silt fence or other barrier may be needed to prevent effluent from re-entering the river.

For all four scenarios, some underwater grading and final shaping would be required once the bench and slope are completed. This would be performed by the dredging contractor. Shaping of the in-water slopes most likely would be by floating dragline. A boat-towed beam may also be used. Surface shaping of the capped area would be by conventional grading equipment such as a dozer, rubber tired loader, or backhoe and would be performed sometime after the placement of the dredged material was complete. Some surface undulations would be desired to provide differing root zone conditions.

Once the final shaping of the shoreline was complete, the cobbles would be placed around the perimeter of the bench. This would likely be performed using a clamshell and a flat deck barge. Cobbles would be brought by barge to the disposal site and the clamshell would lift the cobbles off the barge and place them in a band within the selected elevations along the shoreline.

2.0 FACTUAL DETERMINATIONS

2.1 Physical Substrate Determinations

2.1.1 Substrate Elevation and Slope

The existing substrate elevation at the RM 116 site is typically more than 25 feet below the minimum operating pool elevation. The substrate slope ranges from approximately 16 to 60 percent near shore and approximately 1 to 4 percent on the existing bench. The proposed in-water discharge would raise the substrate elevation to create a planting bench for riparian species and a shallow water bench for fish rearing habitat. The planting bench would be submerged when the water surface elevation exceeds 736 feet above mean sea level (MSL). (The Lower Granite Reservoir minimum and maximum operating pool elevations are 733 feet MSL and 738 feet MSL, respectively). The riparian bench would have an undulating surface to provide variable root zone conditions for planting. A shallow water habitat slope would be constructed adjacent to the bench, with a transition slope of 10 horizontal to 1 vertical extending from elevation 736 down to elevation 728. This transition slope would be covered with a layer of cobbles. Adjacent to and below the transition slope, the contractor would construct another bench with a flatter slope (between 1 and 3 percent). This bench would be below the water surface and would vary in width between 100 and 150 feet. The embankment would then again drop off at a steeper 10 horizontal to 1 vertical slope until the toe intersects the existing riverbed. All underwater surfaces created would be available for use by juvenile salmonids for resting/rearing although the optimal conditions would be over the 100-150 foot wide resting/rearing bench. Cross sections of the existing and proposed slopes and elevations are shown on Figure 7 of the SEA-03/04.

2.1.2 Sediment Type

The RM 116 site is located in a low velocity area that has been accumulating sediment since the filling of Lower Granite Reservoir at an estimated rate of 2 inches (5.1 cm) per year. The substrate at this site was visually inspected in 1992 during a reservoir drawdown test. The substrate was observed to be primarily silt. Approximately 4 feet (1.2 m) of silt are estimated to cover the bottom of the existing mid- to shallow depth bench.

Sediment samples were collected from the proposed material sources in June 2000 and April 2003. The results of grain size analyses conducted on these samples are as follows.

- Samples collected from the main navigation channel in the Snake and Clearwater Rivers confluence area contained 85-90% sand and 10-15% fines in 2000. The 2003 data encompassed larger ranges with 52-99+ percent sand and <1-48% fines in the recovered samples. The navigation channel would provide approximately 78% of the material to be discharged in winter 2003-2004.

- Samples collected in 2000 from the Lewiston and Clarkston ports were comprised of over 90% silt. The recovered 2003 samples from the same areas consisted primarily of 83-95% sand and 4-17% fines. These ports would provide approximately 5% of the material to be discharged in winter 2003-2004.

- Samples collected from the Hells Canyon Resort Marina, Swallows Park, and the Willow Boat Launch in 2000 averaged between 56 and 67% sand and 21 to 27% fines. No samples were collected from the Marina in 2003. The analytical results for the 2003 Swallows Park samples averaged 61% sand and 39% fines, while the comparable data from Willows Landing Boat Launch had a mean sand content of 22% and 78% fines. These sources would provide approximately 8% of the material to be discharged in winter 2003-2004.

- Samples collected from the Green Belt Boat Basin averaged 45% sand and 35% fines in 2000, but changed to 69% sand and 31% fines in 2003. This source would provide approximately 1% of the material to be discharged in winter 2003-2004.

- The downstream lock approach sites at Lower Granite and Lower Monumental consist of large rock substrate and 2 to 6 inch cobbles. The lock approaches would provide approximately 8% of the material to be discharged in winter 2003-2004.

- 2000 sampling data indicate that the sediments to be dredged from the Illia Boat Launch site are variable, and include areas composed of 86-95% silt and 5-14% sand, areas composed of approximately 11% gravel, 63% sand and 26 % fines, and areas composed of two and three inch cobbles. Only one sample was recovered in 2003 and yielded 83% sand and 15% fines. This source would provide less than 0.5% of the material to be discharged in winter 2003-2004.

The overall composition of the sediments to be dredged is expected to be less than 30% silt, and includes materials that will be suitable to provide improved substrate conditions for aquatic organisms.

2.1.3 Dredged/Fill Material Movement

At the RM 116 site materials used to construct the in-water embankment would consist of sand with minimal amounts of silt. Silt materials would be placed on top of the sand, above the water surface, to create a rooting zone for riparian plants. Cobbles would be used to armor the upstream end of the embankment to minimize wave erosion. The site would be monitored after construction to determine if the embankment slumps or moves. Monitoring would be accomplished by taking cross-section soundings immediately after disposal was complete and again in the summer after high flows. The Corps would use this information to make adjustments for future in-water embankment construction and to determine whether or not a berm needed to be constructed around the toe of the embankment to prevent movement.

2.1.4 Physical Effects on Benthos

Benthic organisms at the proposed in-water disposal site would be buried by discharge activities. However, the shallow water and mid-depth habitat created is expected to be conducive to recolonization by benthic organisms from adjacent areas.

2.1.5 Other Effects

Other effects on the physical substrate are not anticipated.

2.1.6 Actions Taken to Minimize Impacts

- Alterations to substrate elevation and slope are designed to provide woody riparian and/or shallow water habitat and are not considered to be adverse impacts.

- Changes in the substrate sediment type are designed to provide woody riparian and/or shallow water habitat and are not considered to be adverse impacts.

- Dredged/fill material movement would be minimized by armoring selected portions of the RM 116 site with cobbles. Dredged/fill material movement would be monitored at the RM 116 site with cross section soundings. Information gathered from this monitoring would be used, if applicable, to improve in-water placement strategies for future projects.

- Physical effects on benthos would be minimized by limiting discharges to a localized area, which is small relative to the reservoir system.

- Physical effects on benthos within the project site would be mitigated by the shallow water and mid-depth habitat created by the in-water discharge.

2.2 Water Circulation, Fluctuation, and Salinity Determinations

2.2.1 Water

2.2.1.1 Conductivity

Between October 1997 and September 1998, the average conductivity in samples collected from the lower Snake River between RM 6 and RM 129 ranged from 68 micro-mhos/cmohms (μmhos/cmohms) to 363 μmhos/cmohms. Effects of the in-water discharge of dredged material on conductivity are expected to be localized, short-term, and minimal.

2.2.1.2 Water Chemistry

The availability of site-specific background water chemistry at the in-water disposal sites is limited. A summary of available water quality data from the lower Snake River and mid-Columbia River is included in Appendix H of the 2002 DMMP/EIS.

To minimize the potential for impacts to water chemistry, materials have been screened for selected chemicals prior to dredging. Also, turbidity will be regulated and monitored during in-water discharges. Thus, the effects of in-water discharge on water chemistry are expected to be localized, short-term, and minimal.

2.2.1.3 Temperature

Water temperature in the lower Snake River varies with time of year and location. Generally, water temperature is lower in the winter months of January and February, increases slowly during spring runoff (March to May), increases more rapidly in late spring until mid-summer (June to early August), plateaus through mid-September, then decreases steadily through January. Temperature data collected from the tailrace at Lower Granite dam are presented in Appendix H of the 2002 DMMP/EIS. In 2000, the average monthly temperature measured between December and March ranged from 39.7 °F (4.3 °C) to 47.3 °F (8.5 °C). The average monthly temperature measured between April and November ranged from 51.3 (10.7 °C) to 69.4 °F (20.8 °C). Temperature data from the proposed discharge sites are not available.

In-water discharges will be conducted during the in-water work window, when water temperature is relatively low. The creation of shallow water habitat may result in a localized increase in water temperature at the disposal site. However, the area affected will be small relative to the reservoir system. The proposed in-water discharges are not expected to result in long-term impacts to the overall water temperature of the reservoir.

2.2.1.4 Light Attenuation

Between March and October 1997, clarity was measured in the lower Snake River between RM 6 and RM 140. The average Secchi disk transparency ranged from 1.1 to 2.5 meters and the photic zone ranged from 3.3 to 5.5 meters.

The in-water discharge and shaping of the dredged material at the disposal sites is expected to result in localized turbidity plumes. Operations causing a 5-nephelometric turbidity unit (NTU) increase over background (or 10 percent increase when background is over 50 NTUs) at a point 300 feet (91.4 m) downstream of the project site will not be allowed. Turbidity will be monitored during in-water discharge and construction of woody riparian and fish habitat to ensure that this restriction is not violated.

Localized, short-term effects on water clarity are expected within the in-water discharge site and mixing zone. These effects are expected to dissipate quickly after habitat construction is completed. Long-term effects on water clarity are not anticipated.

2.2.1.5 Color

Water color is defined as the true and apparent color by a chroma analysis and is measured only after all turbidity is removed. Color in water may result from the presence of natural metallic ions (iron and manganese are the most common colorants in natural water), humus, plankton, weeds, and wastes. Excessive color affects both domestic and commercial uses and may require removal.

A high resolution (upper end) scanning spectrophotometer or tintometer is required to measure true and apparent color. Actual true and apparent color is poorly understood in the Snake River basin. Currently, no credible data exists. Potential impacts to color are expected to be minimal.

2.2.1.6 Odor

The Corps has not conducted standardized odor tests on the Snake River; therefore data are not available. Changes in odor are not anticipated in association with this project. However, unusual odors detected during construction would be investigated.

2.2.1.7 Taste

Taste test data approved by the American Society for Testing and Materials (ASTM) or EPA are not available. Any potential changes in taste would likely be associated with suspension of sediments. Because turbidity increases would be localized and short-term, any change in taste would also be localized and of short duration.

2.2.1.8 Dissolved Gas Levels

Background dissolved oxygen data collected from the lower Snake River and mid-Columbia River are summarized in Appendix H of the 2002 DMMP/EIS. Resuspension of sediments during in-water discharge and habitat construction may cause a localized, short-term decrease in dissolved oxygen levels.

Dissolved gas supersaturation has been one of the major water quality concerns in the Columbia River Basin, including the Snake River, since the 1960s. Dissolved gas supersaturation is caused when water passing through a dam's spillway carries trapped air deep into the waters of the plunge pool, increasing pressure and causing the air to dissolve into the water. Most spillway discharges affecting dissolved gas levels occur during spring runoff between the months of March and June. The proposed in-water discharges will occur during the in-water work window (December 15 through March 1) and are not expected to increase dissolved gas levels.

2.2.1.9 Nutrients

Nitrogen and phosphorus data collected from the lower Snake River and mid-Columbia River between June and October 1997 is summarized in Appendix H of the 2002 DMMP/EIS. Total nitrogen concentrations ranged from 0.3 mg/L to 1.1 mg/L. Nitrate was the prevalent form of nitrogen in background water samples. Total phosphorus concentrations in the lower Snake River impoundments ranged from 0.03 mg/L to 0.07 mg/L. These concentrations indicate that the reservoirs are generally eutrophic.

The discharge of dredged material has the potential to increase nitrate and phosphorus levels. However, because the discharges will be conducted during winter months and during months of low productivity, impacts resulting from increased nutrient levels are expected to be localized and of short duration.

Ammonia is present in some of the sediments that are proposed for in-water fill. The amount of ammonia that would be released into the water is site specific, dependent upon temperature and pH of the water, and varies with the particle size of the material being dredged. Finer grained sediment (*i.e.*, silt) would be expected to have higher ammonia concentrations and would be more likely to release larger amounts of ammonia into the water.

Ammonia concentrations will be monitored during in-water disposal and habitat construction activities. If the levels reach critical concentrations, in-water disposal or construction methods will be modified to reduce the effects. Because construction will be managed to minimize increases in ammonia concentrations, effects are expected to be localized and short-term.

2.2.1.10 Eutrophication

The proposed in-water discharge and habitat construction are expected to have localized, short-term effects on nutrient concentrations. Long-term effects resulting in increased eutrophication are not anticipated.

2.2.1.11 Others

Other water quality effects are not anticipated.

2.2.2 Current Patterns and Circulation

2.2.2.1 Current Patterns and Flow

Existing data on current and flow patterns at the proposed in-water disposal site are not available.

The creation of woody riparian habitat and shallow to mid-depth fish habitat may affect current patterns and flow at the in-water disposal site. However, these changes are expected to be beneficial to salmonids and other organisms.

2.2.2.2 Velocity

Velocity within the proposed discharge site varies with depth and location.

Existing velocity data at the proposed RM 116 in-water discharge site are not available.

The creation of woody riparian habitat and shallow to mid-depth fish habitat may affect velocity at the in-water disposal site. However, these changes are expected to be beneficial to salmonids and other organisms.

2.2.2.3 Stratification

Thermal stratification has not been observed at the RM 116 in-water disposal site and is not expected to occur as a result of in-water disposal for the creation of woody riparian and/or fish habitat.

2.2.2.4 Hydrologic Regime

In-water disposal for the creation of woody riparian and/or fish habitat is not expected to affect the hydrologic regime. Changes in hydrologic regime are most likely to occur in response to changing weather patterns or changes in the overall management of flows within the lower Snake River system.

2.2.3 Normal Water Level Fluctuations

Normal water level fluctuations in the reservoirs are controlled at the dams. In-water disposal for the creation of woody riparian and/or fish habitat is not expected to have a significant effect on water level fluctuations. Proposed discharges will be designed to prevent the creation of standing water bodies in areas of normally fluctuating water levels.

2.2.4 Salinity Gradients

The proposed discharge site is located in a freshwater system. Because brackish and saline waters are not present, salinity gradients are not an issue for this evaluation.

2.2.5 Actions Taken to Minimize Impacts

- During in-water discharges for construction of woody riparian and/or fish habitat, turbidity and other selected water quality parameters will be monitored to ensure that applicable regulatory limits are not exceeded at the mixing zone boundary. Parameters to be monitored will be determined through coordination with the Washington Department of Ecology. The Corps is prepared to monitor turbidity, ammonia, and other parameters as prescribed.

- If the applicable turbidity limit is exceeded at the mixing zone boundary, the in-water work will be stopped and disposal/construction methods will be modified to reduce the impact.

- Effects on current patterns and circulation are designed to develop woody riparian and/or fish habitat and are not considered to be adverse impacts.

- Normal water level fluctuations are controlled at the existing dams and will be maintained by designing in-water discharges to prevent the creation of standing water bodies.

2.3 Suspended Particulate/Turbidity Determinations

2.3.1 Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site

Background turbidity data collected from the lower Snake River in 1999 indicated that turbidity was lowest at the confluence of the Snake and Clearwater Rivers and increased farther downstream in the Snake River. Median turbidity values ranged from 2 to 4 NTUs in the Snake River, well below Washington's 25-NTU background action limit. These measurements did not include sampling during periods of heavy runoff or heavy storm non-point source water discharge.

Washington regulations specify that turbidity shall neither exceed 5 NTUs over background levels when the background level is 50 NTUs or less nor have more than a 10 percent increase when background is more than 50 NTUs.

In-water disposal for construction of woody riparian and/or fish habitat is expected to result in a localized, short-term increase in turbidity. Turbidity will be monitored during disposal and construction activities to ensure that regulatory limits are not exceeded at the mixing zone boundary [300 feet (91.4 m) downstream].

2.3.2 Effects on Chemical and Physical Properties of the Water Column

2.3.2.1 Light Penetration

Light penetration within the project site and mixing zone boundary would be reduced during disposal and construction activities. The effects are expected to be localized and short-term.

2.3.2.2 Dissolved Oxygen

Dissolved oxygen may be reduced during disposal and construction activities. The effects are expected to be limited to the project site and mixing zone. Dissolved oxygen levels are not expected to decrease below 5 mg/L, which is generally accepted to be the minimum concentration required for higher forms of aquatic life. The effects are also expected to be short-term. The work will be conducted during the in-water work window, when water temperatures are relatively cool and the solubility of oxygen is higher.

2.3.2.3 Toxic Metals and Organics

Materials to be dredged were sampled and analyzed in 2000 and 2003 for metals and organics, including polynuclear aromatic hydrocarbons, organophosphate pesticides, chlorinated herbicides, oil and grease, glyphosate, AMPA, and dioxin. Detected concentrations of these materials were below the screening levels prescribed in the Dredged Material Evaluation Framework: Lower Columbia River Management Area.

2.3.2.4 Pathogens

Anthropogenic sources of pathogenic organisms are not known to exist at the proposed dredging sites.

2.3.2.5 Aesthetics

Turbidity plumes associated with the proposed discharge may have a localized, short-term aesthetic impact. The impact would occur during the winter, when human use of the reservoir is minimal. The creation of woody riparian and fish habitat is expected to provide long-term aesthetic benefits.

2.3.2.6 Others

Other effects are not anticipated.

2.3.3 Effects on Biota

2.3.3.1 Primary Production, Photosynthesis

Increased turbidity is expected to have a short-term negative effect on primary production within the project site and mixing zone [300 feet (91.4 m) downstream]. The effect would be localized, limited to the duration of the in-water discharge and habitat construction, and minimal during the winter when water temperatures are relatively low. The impact would not effect a significant percentage of the reservoir system's primary production.

2.3.3.2 Suspension/Filter Feeders

Increased turbidity is expected to have a short-term negative effect on suspension feeders within the project site and mixing zone [300 feet (91.4 m) downstream]. The effect would be localized and limited to the duration of the in-water discharge and habitat construction. The impact would not affect a significant percentage of the reservoir system's suspension feeders.

2.3.3.3 Sight Feeders

Increased turbidity is expected to have a short-term negative effect on resident sight feeders within the project site and mixing zone [300 feet (91.4 m) downstream]. The effect would be localized and limited to the duration of the in-water discharge and habitat construction. The impact would occur during the in-water work window, which would minimize the number of salmonids present. The impact would not affect a significant percentage of the reservoir system's sight feeders.

2.3.4 Actions Taken to Minimize Impacts

- Expected changes in suspended particulate and turbidity levels will be minimized by managing and monitoring discharges to ensure that applicable regulatory limits are not exceeded at the mixing zone boundary [300 feet (91.4 m) downstream]. If regulatory limits are exceeded, the in-water work will be stopped and discharge/construction methods will be modified to reduce the impact.

- Effects on the chemical and physical properties of the water column will be minimized by chemical and physical screening of potential discharge materials. Sediments to be dredged were evaluated for grain size distribution and selected chemical parameters. Results were evaluated to determine that the sediments are suitable for the proposed in-water discharge.

- Effects on Endangered Species Act (ESA)-listed anadromous fish will be minimized by restricting discharges to the in-water work window, which is currently December 15 through March 1 in the lower Snake River.

- Working during the in-water work window when water temperatures are lower will also decrease the risk of aquatic organisms' exposure to ammonia.

- Effects on biota will also be minimized by limiting discharges to a small area relative to the reservoir system.

- Materials discharged will be used to construct woody riparian habitat and shallow to mid-depth fish habitat. The long-term benefits of the improved habitat will mitigate for the localized, short-term impacts to biota described above.

2.4 Contaminant Determinations

The purpose of contaminant determinations is to determine the degree to which the proposed discharges will introduce, relocate, or increase contaminants. Under the general framework of Section 404 of the Clean Water Act, testing of dredged material is conducted to assist in making factual determinations regarding the effect of the discharge on the aquatic ecosystem.

The Corps had a series of analyses performed on samples collected in 2000 and 2003 to determine chemical content of sediments at potential dredging sites in the lower Snake River and at the confluence of the Snake and Clearwater Rivers. Chemical tests included polynuclear aromatic hydrocarbons, organophosphate pesticides, chlorinated herbicides, oil and grease, glyphosate, aminomethylphosphonic acid (AMPA), dioxin, and metal analysis.

Results from most of the herbicide and pesticide tests were below reportable laboratory detection testing levels. Polynuclear aromatic hydrocarbons (PAHs) and metal concentrations were below standards listed for the compounds listed in the Washington Department of Ecology Draft Sediment Standards dated June 1999. One site located in the Green Belt Boat Basin at Clarkston showed glyphosate above lab detection limits at 23 parts per billion (ppb) in 2000. Two other samples for glyphosate in the same boat basin came back below reportable lab detection limits. This compound is highly soluble and should biodegrade. Glyphosate was not included in the 2003 analyses. However, the pesticide Linuron was detected with six quantifiable detections (two from the Swallows Boat Landing area, one each below the confluence of the Snake and Clearwater Rivers and at RM 116, and two from Willow Landing Boat Launch) out of thirty-four possible site sample analyses. All detections ranged from 28-77 ppb. In-water concentrations during dredging would probably range from 3.5 ppb to about 9.6 ppb, estimated by the approximate half-life of the compound. As such, it is anticipated that Linuron would not pose a measurable risk to the aquatic environment during the winter work window.

Dioxin screens and analyses were completed in both 2000 and 2003. Twenty-four sites were sampled and screened from the confluence of the Snake and Clearwater Rivers downstream for several miles in Lower Granite Reservoir in 2000 and eighteen were processed in 2003. Chlorinated furans and dioxin congeners have been detected in the past in this area (1991, 1996, and 1998). The 2000 results showed seven sites had sediments that contained some chlorine dioxin congeners. One was at the confluence and four sites were on or near the left bank at RM 139.1 and RM 138.4. The seven sites that tested positive on the dioxin screen were tested further with high-resolution gas chromatograph-mass spectrometric methods. Results showed there were no concentrations of 2,3,7,8- tetrachlorodibenzo-*p*-dioxin (TCDD), considered a very potent carcinogen according to Universal Treatment Standards. Less toxic congeners were present in small amounts (parts per trillion). TCDD was not detected at RM 116, Port of Clarkston, or in the Snake River below the confluence in 2003 either. The two congeners that occurred in the highest concentrations were HpCDD and OCDD. However, when the toxic equivalent (TEQ) was calculated using maximum concentrations from each area, the results were less by more than an order of magnitude than the bioaccumulation screening criteria.

Oil, grease, total organic carbon (TOC), and total petroleum hydrocarbons (TPH) have also been included in past analyses. Thirty-eight locations were sampled for oil and grease in 2000. Results ranged from 41 to 770 ppm. Only three of the samples exceeded 400 parts per million (a soil criteria in Washington) and they were located downstream from boat basins. The TOC content of these samples ranged from 0 to 5.8 percent. The same sites yielded concentrations of PAHs that were below reportable lab detection limits, and the oil and grease composition was hypothesized as originating from animal matter.

Analyses for TPH-diesel and motor oil were added in 2003 to better differentiate the source of the oil and grease. The values reported for TPH diesel at the Port of Lewiston, Illia Boat Landing, and Willow Landing Boat Launch were all less than detection limits. Six of the samples from the Port of Clarkston, three from Greenbelt Boat Basin, and two from the Snake River below the confluence had concentrations that ranged from 28 to 82 mg/L. One additional sample from the Port of Clarkston had a concentration of less than 28 mg/L. The TPH motor oil results paralleled the TPH diesel data, but were four to five times higher.

Detected concentrations of contaminants were below the screening levels prescribed in the Dredged Material Evaluation Framework: Lower Columbia River Management Area.

2.5 Aquatic Ecosystem and Organism Determinations

2.5.1 Effects on Plankton

Most phytoplankton and zooplankton populations would be in the resting stage during the winter months of the in-water work window. The localized, short-term impacts of the in-water discharge and habitat construction are not expected to have a significant effect on plankton populations.

2.5.2 Effects on Benthos

Benthic organisms would be buried or displaced by the in-water discharge. However, the shallow and mid-depth habitats created are expected to provide a suitable substrate for re-colonization by organisms from adjacent benthic communities.

2.5.3 Effects on Nekton

The in-water work window is timed to avoid migrations of anadromous salmonids and minimize the number of salmonids present in the project area during in-water work. Swimming organisms that are present during the in-water discharge would likely be displaced, but may also be incidentally destroyed by construction activities. The localized, short-term impacts of the in-water discharge are not expected to have a significant effect on nekton populations. The shallow water and mid-depth habitat created is expected to provide long-term benefits for salmonids and other nekton.

2.5.4 Effects on Aquatic Food Web

Because most of the spring and summer dominant species of plankton are in the resting stage during the winter in-water work window, impacts to the spring and summer food web are not expected.

The winter months have a different food web than the spring, summer, and fall months. Because most freshwater aquatic organisms are poikilothermic, the bioenergetics of the system slow down in parallel to the decrease in temperature. Some organisms feed very little in the winter and live off stored fat reserves. Aquatic insects do feed and rely on detritus for food sources. The winter phytoplankton species are relatively unstudied. Because the impacts of the in-water discharges are limited to the project site and mixing zone, significant impacts to the winter food web outside of the project site are not expected.

2.5.5 Effects on Special Aquatic Sites

Wetlands are not present at the RM 116 site. Sanctuaries and refuges, mud flats, vegetated shallows, coral reefs, and riffle and pool complexes are also not present at the proposed discharge site.

2.5.6 Threatened and Endangered Species

The Endangered Species Act (ESA) establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the preservation of the ecosystems on which they rely. Section 7 of the ESA requires Federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS), as necessary to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy critical habitat. It also requires that Federal agencies prepare biological assessments (BAs) of the potential effects of major construction actions on listed species.

The U.S. Fish and Wildlife Service has been contacted concerning consultation, and provided the current biological assessment determinations. These determinations are as follows: bald eagle *(Haliaetus leucocephalus) – "May Affect But Is Not Likely To Adversely Affect;"* bull trout *(Salvelinus confluentus) – "May Affect But Is Not Likely To Adversely Affect;"* Ute ladies' tresses *(Spiranthes diluvialis) – "no effect;"* and Spaulding's silene *(Silene spaldingii) – "no effect."* Since the last consultation, the proposed critical habitat rule was published for bull trout populations in the Columbia River Basin. The portions of the Snake River proposed for dredging activities in 2003-2004 are included in the proposed critical habitat designation for bull trout. The proposed dredging areas, however, are *not* part of the spawning areas or resident habitat for bull trout. The large impounded Snake River does provide important habitat for migrant populations and for some sub-adults, for portions of the year, near tributaries that are also critical habitat for this species. Although the activity may cause temporary effects to resident fish and some anadromous fish populations in the vicinity of the dredge and/or fill actions, the Corps concludes there will be "no effect" to the critical habitat for bull trout in the proposed work areas, since overall food supply and water quality will be relatively unchanged after the work is completed. There will be some small-scale improvements for the food supply due to the techniques used for the bench development at Snake River Mile 116.

It is anticipated that NMFS will issue a biological opinion this summer. A letter of concurrence from USFWS is also expected.

The proposed discharge site is designed to develop habitat that will provide long-term benefits for threatened and endangered anadromous fish. The Corps conducted surveys at the RM 116 site, prior to use of the area for disposal, to determine if the area is currently being used by ESA species. The survey results indicated that few juvenile salmonids are currently using the site, but using dredged material to create shallow water habitat has the potential to reduce predator habitat and increase resting/rearing habitat for juveniles of ESA-listed salmonid species.

2.5.7 Other Wildlife

The project reservoirs provide essential habitat for numerous birds, reptiles, amphibians, small mammals, bats, and big game animals. They generally are dependent on tree-shrub riparian habitat associated with the project reservoirs. In general, riparian and wetland areas support higher population densities and species numbers than dryland shrub-steppe, talus, cliff, and/or grassland habitat, which are also prevalent along the project reservoirs. Habitats associated with the river generally support trees or dense grass-forb cover that provide more structurally complex areas and more abundant forage resources than adjacent uplands.

Inundation of the lower Snake and mid-Columbia Rivers following dam construction between the early 1950s and 1975 eliminated most of the woody riparian habitat that was in the area at that time. Since inundation, the shorelines with adequate hydrology have re-established a portion of this riparian community. Due to the lack of suitable hydrology and land management practices of the time, the riparian habitat is now highly discontinuous and dominated by exotic species of vegetation, such as Russian olive. Additional riparian habitats have been developed through the establishment of intensive HMUs. Thus, wildlife generally associated with riparian habitats tends to be concentrated in these HMUs and in the natural vegetation along major tributaries.

Adverse effects on other wildlife are not anticipated. The addition of riparian and shallow water habitat is expected to benefit other wildlife by providing cover and food.

2.5.8 Actions to Minimize Impacts

- Effects on plankton will be minimized by restricting discharges to the in-water work window, when the majority of plankton populations are in a resting stage.

- Effects on plankton will also be minimized by limiting discharges to a small area relative to the size of the reservoir system. In-water work will be conducted and monitored to ensure that direct impacts caused by an increase in turbidity are limited to the project site and mixing zone.

- Effects on benthos will be minimized by limiting discharges to a small area relative to the size of the reservoir system.

- Effects on ESA-listed salmonids will be minimized by restricting discharges to the in-water work window, which is timed to avoid migrations of anadromous salmonids and minimize the number of salmonids present is the project area during in-water work.

- Effects on nekton will be minimized by limiting discharges to a small area relative to the reservoir system. In-water work will be conducted and monitored to ensure that direct impacts caused by an increase in turbidity are limited to the project site and mixing zone.

- Impacts to the aquatic food web will be minimized by restricting discharges to the winter in-water work window, because this minimizes impacts to spring and summer plankton populations that are an important segment of the aquatic food web.

- Impacts to the aquatic food web will also be minimized by limiting discharges to a small area relative to the size of the reservoir system

- Impacts to special aquatic sites are not anticipated. Special aquatic sites are not present at the RM 116 site.

- Adverse impacts to other wildlife are not anticipated. Other wildlife species are expected to benefit from the development of woody riparian and shallow water fish habitat.

- Potential short-term, localized impacts to plankton, benthos, nekton, the aquatic food web, and threatened and endangered species will be mitigated by the long-term benefits created by development of woody riparian and shallow water habitat.

2.6 Proposed Disposal Site Determinations

2.6.1 Mixing Zone Determination

Historically, a mixing zone extending 300 feet (91.4 m) downstream from the project site has been used for in-water disposal projects in the lower Snake River. A mixing zone extending 300 feet (91.4 m) downstream of the discharge site is proposed for the purpose of turbidity regulation and monitoring at the RM 116 site.

2.6.2 Determination of Compliance with Applicable Water Quality Standards

Section 401 of the Clean Water Act requires that applicants requesting a Federal license or permit to conduct activities that may result in a discharge in waters of the United States, provide, to the licensing or remitting agency, a certification from the State that any such discharge complies with applicable provisions of the Clean Water Act and state water quality standards. This 404(b)(1) Evaluation and a request for an amendment to our current Section 401 water quality certification will be submitted to the Washington Department of Ecology.

2.6.3 Potential Effects of Human Use Characteristic

2.6.3.1 Municipal and Private Water Supply

Municipal and public water supply intakes are not located in the vicinity of the proposed discharge site at RM 116.

2.6.3.2 Recreational and Commercial Fisheries

Commercial fishing is not conducted in the vicinity of the proposed disposal site or the dredging sites. Recreational fishing for Snake River steelhead and resident fish does occur in the vicinity. In-water disposal and habitat construction activities may have a localized, short-term impact on recreational fishing in the immediate vicinity of the construction site. Short-term impacts will be minimized by restricting work to the in-water work window, which is not during a period of high recreational use. The creation of shallow water and mid-depth fish habitat is expected to have a long-term beneficial effect on recreational fisheries.

Numerous aquatic species, including salmonids, Pacific lamprey, sturgeon, whitefish, and sculpin, retain cultural significance to tribes. Federally recognized tribes have the right to set their own priorities and develop and manage tribal resources within the Federal government framework. Tribal interests and rights are viewed by tribes and traditional communities with the spatial context of tribal ceded lands, traditional native homelands, and places traditionally used by native peoples. Of particular concern to tribes are the potential impacts of water resource management on anadromous fish runs and associated aquatic habitats, and tribal rights to fish for ceremonial, subsistence, and commercial needs.

Short-term impacts to fisheries will be minimized by restricting work to the in-water work window, which is designated to reduce impacts to anadromous salmonids. The creation of shallow water rearing habitat is expected to have a long-term beneficial effect on fisheries.

2.6.3.3 Water-Related Recreation

The lower Snake River provides an important recreational resource for the region. There are numerous recreational facilities lining the shores of Lower Granite Reservoir. Recreational activities take place throughout the year, with the highest activity levels during late spring, summer, and early autumn. Boating, swimming, fishing, camping, picnicking, hiking, and wildlife observation are common recreational activities on or adjacent to the reservoir.

Recreational facilities such as boat ramps or developed swimming beaches are not present at the proposed discharge site at RM 116. Recreational activities may occur in the vicinity of the RM 116 throughout the year, however, recreational use is lower during the in-water work window than the rest of the year. In-water disposal and habitat construction is expected to have a minor, localized, short-term effect on recreational activities. The creation of woody riparian and/or fish habitat is expected to have indirect, long-term, beneficial effects on recreation by providing enhanced hunting, fishing, and/or wildlife viewing opportunities.

2.6.3.4 Aesthetics

The lower Snake River system is located in an arid region with surrounding open and agricultural landscapes interspersed with urban, suburban, and industrial land uses. The river provides a visual break in an otherwise arid landscape with often dramatic, steep surrounding hillsides and canyons, making it an important aesthetic feature. Many of the recreational facilities that have been developed along the lower Snake River take advantage of the scenic qualities of this landscape.

People viewing the aesthetic resources of the project area include highway/roadway travelers, recreational users of the river and surrounding lands, and local residents. The aesthetic values of the river and surrounding landscapes vary based on the viewers' perspectives and values. Highway travelers tend to view the resources as they are traveling on roadways through the area. These travelers tend to view the resources at a distance, generally from an automobile and generally at high rates of speed. Recreational users, such as boaters, campers, swimmers, and fishermen, tend to view the resources for longer periods of time due to the fact that they are involved in recreational activities that are dependent on the river setting.

The disposal site at RM 116 is somewhat remote and therefore the number of people viewing the site would be limited. During in-water disposal and habitat construction, barges placing material at the site would be visible to recreational users on the river and roadway travelers using an existing county road on the opposite side of the canyon from the disposal site. The disposal and construction activities proposed at the RM 116 site would have localized, short-term, adverse impacts on aesthetics. However, the creation of woody riparian and or shallow-water habitat is expected to provide long-term aesthetic benefits. After construction, there may be some limited short-term impacts to aesthetics while the vegetation is established. Over the long-term (after the riparian vegetation has become firmly established) it is unlikely that anyone would be able to identify any significant adverse aesthetic impacts.

2.6.3.5 Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves

The RM 116 site is not located in or adjacent to any parks, National Seashores, Wilderness Areas, or Wild and Scenic Rivers.

2.7 Determination of Cumulative Effects on the Aquatic Ecosystem

Cumulative effects of the proposed in-water disposal activities would most likely be associated with aquatic resources. Benthic communities would continue to be displaced by future dredging activities and buried by future in-water disposal activities. However, these communities would be expected to re-establish within six months to a year. Any future dredging and in-water disposal would have the potential to negatively impact ESA-listed fish species, but these impacts would be minimized by performing the work during a period when few individuals of the listed species would be present. In-water disposals of the dredged material would be designed to create woody riparian habitat and/or shallow water fish habitat. The additional habitat would be expected to provide long-term cumulative benefits for the aquatic ecosystem.

2.8 Determination of Secondary Effects on the Aquatic Ecosystem

Secondary effects, such as water level fluctuations, septic tank leaching, and surface runoff from residential or commercial development on fill, are not expected to be associated with the proposed in-water disposal and habitat construction activities.

3.0 FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

3.1 Adaptation of the Section 404(b)(1) Guidelines to this Evaluation

No significant adaptations of the Guidelines were made relative to this evaluation.

3.2 Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site which Would Have Less Adverse Impact on the Aquatic Ecosystem

The habitat value at the proposed disposal site would be improved, not adversely affected, by the proposed actions. Other practicable alternatives that incorporate beneficial uses were not available. Upland beneficial uses are dependent on identifying an entity that has use for the material. No such entity has been identified for the proposed winter 2003-2004 project.

3.3 Compliance with Applicable State Water Quality Standards

In-water disposal and habitat construction activities will be conducted and monitored for impacts to water quality. Actions will be taken to reduce resulting impacts to a level within the criteria set forth in applicable state standards.

3.4 Compliance with Applicable Toxic Effluent Standard or Prohibition Under Section 307 of the Clean Water Act

Materials to be dredged have been sampled and analyzed for selected metals and organic compounds. Contaminant concentrations measured were below the screening levels prescribed in the Dredged Material Evaluation Framework: Lower Columbia River Management Area.

3.5 Compliance with Endangered Species Act of 1973

The Corps has initiated ESA consultations with the USFWS and NMFS regarding listed species at sites included in the proposed winter 2003-2004 work.

3.6 Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972

Designated marine sanctuaries are not located within the proposed work area.

3.7 Evaluation of Extent of Degradation of the Waters of the United States

3.7.1 Significant Adverse Effects on Human Health and Welfare

3.7.1.1 Municipal and Private Water Supplies

Municipal and private water supply intakes are not located in the vicinity of the proposed discharge sites. Such water supplies are not expected to be adversely affected by the proposed in-water disposal activities.

3.7.1.2 Recreational and Commercial Fisheries

Commercial fisheries are not present within the lower Snake or Clearwater rivers. Localized, short-term adverse impacts to recreational fisheries are expected to be mitigated by the long-term benefits provided by additional woody riparian and shallow water habitat.

3.7.1.3 Plankton

Localized, short-term adverse impacts to plankton are expected to be mitigated by the long-term benefits provided by additional shallow water and mid-depth habitat.

3.7.1.4 Fish

Localized, short-term adverse impacts to ESA-listed salmonids are expected to be mitigated by the long-term benefits provided by additional woody riparian and shallow water habitat. Significant adverse impacts to other fish populations are not anticipated.

3.7.1.5 Shellfish

Localized, short-term adverse impacts to shellfish are expected to be mitigated by the long-term benefits provided by additional shallow water habitat.

3.7.1.6 Wildlife

Impacts to other wildlife are not anticipated. Other wildlife are expected to receive long-term benefits from development additional woody riparian and shallow water habitat.

3.7.1.7 Special Aquatic Sites

Wetlands are not present at the RM 116 disposal site. Sanctuaries and refuges, mud flats, vegetated shallows, coral reefs, and riffle and pool complexes are also not present at the proposed discharge site.

3.7.2 Significant Adverse Effects on Life Stages of Aquatic Life and Other Wildlife Dependent on Aquatic Ecosystems

The in-water work window had been scheduled to avoid migrations of anadromous fish. Localized, short-term adverse effects on resident aquatic life and other wildlife are expected to be mitigated by the long-term benefits provided by additional woody riparian and shallow water habitat.

3.7.3 Significant Adverse Effects on Aquatic Ecosystem Diversity, Productivity and Stability

Localized, short-term adverse effects on the productivity of plankton and benthic communities within proposed disposal site are expected to be mitigated by the creation of woody riparian and/or shallow water habitat. The additional habitat is expected to be conducive to recolonization by more diverse, productive, and stable populations.

3.7.4 Significant Adverse Effects on Recreational, Aesthetic, and Economic Values

Adverse effects on economic values are not expected. Adverse effects on recreational and aesthetic values are expected to be localized and short-term. The long-term effects of creating additional woody riparian and shallow water fish habitat are expected to be beneficial to recreational, aesthetic, and economic values

3.8 Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem

- In-water discharges will be used to develop woody riparian and/or shallow water habitat.
- In-water discharge and habitat construction activities will be restricted to December 15 through March 1.
- Materials to be dredged have been sampled and analyzed for grain size distribution and selected chemical concentrations.
- The composite of dredged materials to be discharged in-water has less than 30% silt.
- Dredged material to be discharged does not have significant contaminant concentrations.
- Water quality and sediment contaminant monitoring will be performed prior to, during, and after in-water disposal activities as described in the monitoring plan (Attachment C of the SEA-03/04).
- Data collected from the discharge project will be used to improve management of future dredged material discharges.

3.9 Finding of Compliance or Non-Compliance

The discharge complies with the Section 404(b)(1) Guidelines, with the inclusion of the appropriate and practicable steps taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem. A request for Section 401 water quality certification for the proposed winter 2003-2004 work is being submitted to the Washington Department of Ecology.