US Army Corps
of Engineers®
Walla Walla District

United States
Environmental Protection Agency
Region 10

DREDGED MATERIAL MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT

McNary Reservoir and Lower Snake River Reservoirs

APPENDIX G
Endangered Species Act Consultation for Non-Anadromous Fish and Terrestrial Species

FINAL
July 2002

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
P. O. Box 848
Ephrata, Washington 98823
Phone: 509-754-8580 Fax: 509-754-8575

June 27, 2002

Peter F. Poolman
Walla Walla District, Corps of Engineers
201 North Third Avenue
Walla Walla, Washington 99362-1876

RE: Dredged Material Management Plan and Environmental Impact Statement for the McNary Reservoir and Lower Snake River Reservoirs
FWS Reference: 02-I-E0252, 01-I-E0423

Dear Mr. Poolman:

Thank you for your letter of June 4, 2002, requesting reinitiation of consultation pursuant to Section 7(c) of the Endangered Species Act. The request to reinitiate consultation is based upon the addition of a new listed plant species (water howellia) and on modification of the originally proposed Federal action. The letter included an addendum to the Biological Assessment (BA) for the Dredged Material Management Plan and Environmental Impact Statement for the McNary Reservoir and Lower Snake River Reservoirs. The addendum to the BA addressed changes proposed to the 2002-2003 dredging and disposal activities including the deletion of one dredging site and the addition of a new preferred dredged material disposal site. The addendum also addressed changes in the dredging and disposal methods for the 20-year plan as well as the addition of water howellia as a listed plant species.

The Corps of Engineers (COE) has determined that the proposed actions may affect, but are not likely to adversely affect bull trout (*Salvelinus confluentis*), bald eagle (*Haliaeetus leucocephalus*), Ute ladies' tresses (*Spiranthes diluvialis*), and water howellia (*Howellia aquatillus*) and will have no effect on Spalding's silene (*Silene spaldingii*). The U. S. Fish and Wildlife Service (Service) concurs with the COE determination that the proposed project may affect, but is not likely to adversely affect bull trout, bald eagle, Ute ladies' tresses, and water howellia and will have no effect on Spalding's silene. This concurrence is dependent upon the implementation of the conservation measures and proposed dredging and disposal activities as described in the BA and the associated addendums, as well as the assumptions described in our letter to your office dated August 22, 2001.

This concludes informal consultation for species under the purview of the Service pursuant to

Section 7 of the Endangered Species Act of 1973, as amended (Act). This project should be re-analyzed if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this consultation; if the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this consultation; and/or, if a new species is listed or critical habitat is designated that may be affected by this project.

Your efforts to protect endangered species are appreciated. If you have further questions about this letter or your responsibilities under the Act, please contact Gregg Kurz at (509) 754-8580.

Sincerely,

Mark G. Miller

Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Eastern Washington Ecological Services Field Office
P.O. Box 848
Ephrata, WA 98823
(509) 754-8580 FAX: (509) 754-8575

August 22, 2001

Peter F. Poolman
Chief, Environmental Compliance Branch
Walla Walla District, Corps of Engineers
201 N. Third Ave.
Walla Walla, WA 99362-1876

RE: Dredged Material Management Plan and Environmental Impact Statement for the McNary Reservoir and Lower Snake River Reservoirs
FWS Reference: 01-I-E0423

Dear Mr. Poolman:

This is in regards to your letter of June 27, 2001, which we received in our office on July 3, 2001, regarding the Biological Assessment (BA) for the Dredged Material Management Plan and Environmental Impact Statement for the McNary Reservoir and Lower Snake River Reservoirs. This letter supplements our concurrence letter on the proposed dredging activities dated July 27, 2001. The proposed project includes a 20-year dredging concept plan along with specific dredging activities proposed for 2002-2003. The Corps of Engineers (Corps) plans to consult on future proposed activities that would take place over five-year time periods, with the next consultation covering the time period 2004-2009.

In our July 27, 2001, letter, the U. S. Fish and Wildlife Service (Service) concurred with your determinations that the Corps' proposed activities for 2002-2003 "may affect, but are not likely to adversely affect" bald eagles, Ute ladies'-tresses, and bull trout and would have "no effect" on Spalding's silene. This concurrence is contingent upon implementation of the proposed dredging and disposal activities as described in the biological assessment, in addition to the conservation measures described therein. However, as was pointed out by Scott Ackerman, of your staff, in an electronic letter to me on August 21, 2001, we neglected to concur with your findings on the 20-year dredging concept plan. The Service now concurs with the Corps' determinations that the 20-year dredging plan "may affect, but is not likely to adversely affect" bald eagles, Ute ladies'-tresses, and bull trout and would have "no effect" on Spalding's silene. Our concurrence is based on the following assumptions:

- Consultation for specific dredging and associated actions will occur over 5-year or shorter time periods, as discussed in the BA

- As discussed in the BA, the Corps will comply with the terms of the Service's Biological Opinion (BO) on the Federal Columbia River Power System (FCRPS) to monitor bull trout in the lower Snake River system

- The Corps will comply with the term of the Service's BO on the FCRPS to investigate the presence in, and use of, the main stem Lower Snake River by bull trout migrating from the Tucannon River

- The Corps will comply with the term of the Service's BO on the FCRPS to initiate studies to determine bull trout timing and usage of the Lower Snake River dam facilities

- The Corps will comply with the term of the Service's BO on the FCRPS to estimate annual population size of bull trout migrating to and from the Lower Snake River reservoirs, and develop abundance trends over time

Based on the findings from the above bull trout studies, other investigations on bull trout, other investigations on dredging effects on aquatic resources, or based on recommendations contained in the Bull Trout Recovery Plan, we may request reinitiation of section 7 consultation for the proposed project activities in the future. We would appreciate being made aware of findings from the above mentioned studies and investigations, as they relate to bull trout or other listed species.

This concludes informal consultation for species under the purview of the Service pursuant to Section 7 of the Endangered Species Act of 1973, as amended (Act). This project should be re-analyzed if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this consultation; if the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this consultation; and/or, if a new species is listed or critical habitat is designated that may be affected by this project.

Should you have any additional questions regarding endangered species or your responsibilities under the Act, please contact me at (509) 754-8580.

Sincerely,

Mark G. Miller

Supervisor

CC: NMFS, Lacey, (Joe Miller)
USFWS, Spokane, (Susan Martin)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Eastern Washington Ecological Services Field Office
P.O. Box 848
Ephrata, WA 98823
(509) 754-8580 FAX: (509) 754-8575

July 27, 2001

Peter F. Poolman
Chief, Environmental Compliance Branch
Walla Walla District, Corps of Engineers
201 N. Third Ave.
Walla Walla, WA 99362-1876

RE: Dredged Material Management Plan and Environmental Impact Statement for the McNary Reservoir and Lower Snake River Reservoirs
FWS Reference: 01-I-E0423

Dear Mr. Poolman:

This is in regards to your letter of June 27, 2001, which we received in our office on July 3, 2001, regarding the Dredged Material Management Plan and Environmental Impact Statement for the McNary Reservoir and Lower Snake River Reservoirs. The proposed project includes a 20-year dredging concept plan along with specific dredging activities proposed for 2002-2003. The Corps of Engineers (Corps) plans to consult on future proposed activities that would take place over five-year time period, with the next consultation covering the time period 2004-2009.

The proposed activities for the 2002-2003 time period would include dredging in certain locations from the McNary Pool up to Lower Granite Pool, in-water and upland disposal of dredged material, and raising of levees in Lewiston, Idaho. You requested U. S. Fish and Wildlife Service (Service) concurrence with your determinations that the Corps' proposed activities for 2002-2003 "may affect, but are not likely to adversely affect" bald eagles, Ute ladies'-tresses, and bull trout and would have "no effect" to Spalding's silene. The Service does concur with your determinations of affect for the bald eagle, Ute ladies'-tresses, bull trout, and Spalding's silene. This concurrence is contingent upon implementation of the proposed dredging and disposal activities as described in the biological assessment, in addition to the conservation measures described.

This concludes informal consultation for species under the purview of the Service pursuant to Section 7 of the Endangered Species Act of 1973, as amended (Act). This project should be re-analyzed if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this consultation; if the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this consultation; and/or, if a new species is listed or critical habitat is designated that may be affected by this project.

Should you have any additional questions regarding endangered species or your responsibilities under the Act, please contact me at (509) 754-8580.

Sincerely,

Mark G. Miller

Supervisor

CC: NMFS, Lacey, (Joe Miller)

DREDGED MATERIAL MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT

MCNARY RESERVOIR AND LOWER SNAKE RIVER RESERVOIRS

APPENDIX G

ENDANGERED SPECIES ACT CONSULTATION FOR NON-ANADROMOUS FISH AND TERRESTRIAL SPECIES

prepared by:

U.S. Army Corps of Engineers
Walla Walla District
Walla Walla, WA 99362

July 2002

1.0 GENERAL

This appendix presents the Endangered Species Act consultation documents for non-anadromous fish and terrestrial species that might be affected by implementation of the Dredged Material Management Plan. These documents include the Biological Assessment (BA) and addendums prepared by the Walla Walla District Corps of Engineers (Corps) and the concurrence letters from U.S. Fish and Wildlife Service (USFWS).

The Corps prepared a BA that addressed the impacts on listed species of both the 20-year plan and the proposed winter 2002-2003 dredging and dredged material disposal activity. The Corps also prepared two addendums to the original BA. These addendums addressed changes to the proposed dredging and disposal sites for the 2002-2003 dredging activity, modifications to the description of impacts on several species, and the addition of new plant species. The Corps determined that the proposed 20-year plan and 2002-2003 dredging activity "*may affect, but are not likely to adversely affect*" bald eagles, Ute ladies'-tresses, bull trout, and water howellia and would have "*no effect*" on Spalding's silene.

The USFWS prepared three letters concurring with the Corps' determination of effect on listed species. The first letter, dated July 27, 2001, concurred with the effect of the 2002-2003 dredging and disposal activity. The second letter, dated August 22, 2001, concurred with the effects of the 20-year dredging concept plan. The third letter, dated June 27, 2002, concurred with the effects of the changes described in the Corps' Addendum B.

2.0 ORGANIZATION OF DOCUMENTS

The documents in this appendix are organized with the concurrence letters from USFWS presented first, followed by the addendums and the BA. The letters are arranged in reverse chronological order with the most recent letter presented first. The BA and addendums are arranged with Addendum B presented first, followed by Addendum A and the BA.

3.0 ERRATA

Figure G-1 of the BA - Disposal Site Selection Decision Tree
Insert the following note on the figure:
For an emergency dredging situation, the Corps would perform environmental coordination on an expedited basis. The Corps would perform as much coordination as possible before initiating the emergency dredging, but some coordination may be performed during the dredging or after the dredging is completed. The Corps would use this decision tree to the extent possible to determine where to dispose of the dredged material in an emergency dredging situation.

Plate G-1 of the BA – Lower Granite Reservoir In-Water Disposal Areas
Insert the following note in the legend:
The dark blue fan-shaped lines on the disposal sites depict the slope of the fill material.

DREDGED MATERIAL MANAGEMENT PLAN
AND ENVIRONMENTAL IMPACT STATEMENT

McNARY RESERVOIR AND LOWER SNAKE RIVER RESERVOIRS

ADDENDUM B TO THE BIOLOGICAL ASSESSMENT FOR NON-ANADROMOUS FISH AND TERRESTRIAL SPECIES PROVIDED TO THE U.S. FISH AND WILDLIFE SERVICE

prepared by:

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

June 2002

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1.0 INTRODUCTION

The Walla Walla District Corps of Engineers previously submitted a Biological Assessment (BA) for the Dredged Material Management Plan and Environmental Impact Statement of McNary and the Lower Snake River Reservoirs (DMMP/EIS) to the U.S. Fish and Wildlife Service (USFWS). The document was assigned USFWS Reference Number 01-I-E0423 and was received by the USFWS Ephrata, Washington office on July 3, 2001. The Corps also previously submitted an addendum to the BA in October 2001 that provided information on changes being made to the description of dredging areas for the proposed winter 2002-2003 dredging. This second addendum provides information on additional changes proposed for the 2002-2003 dredging and disposal activities including the deletion of one dredging site and the addition of a new preferred dredged material disposal site. This addendum also addresses some changes in the dredging and disposal methods for the 20-year plan. It also addresses an additional listed plant species (water howellia) that was not included in the original BA as well as providing additional information on several other species of concern.

2.0 REVISIONS TO SECTION 1.0 - INTRODUCTION

In the last paragraph, add water howellia (*Howellia aquatillus*) as a listed plant species addressed in the BA.

3.0 REVISIONS TO SECTION 2.4 - DREDGING METHODS AND TIMING

Replace Table G-1 with the following:

Table G-1. Dredging Options by Area.

Area to be Dredged	Dredging Option*		
	Time of Year to Dredge	Method of Dredging	Disposal Location
Navigation Channel	Winter	Mechanical	In water or upland
Ports	Winter	Mechanical	In water or upland
Boat Basins	Winter	Mechanical	In water or upland
	Summer	Mechanical or hydraulic	Upland
Swim Beach	Summer	Mechanical or hydraulic	Upland
	Winter	Mechanical or hydraulic	In water or upland
Irrigation Intakes	Summer	Mechanical or hydraulic	Upland
	Winter	Mechanical or hydraulic	In water or upland

* Options listed in order of preference

Replace the next to the last paragraph of this section with the following paragraph:

Maintenance of off-channel areas such as boat basins, swim beaches, or irrigation intakes has often required small quantity dredging, usually less than 5,000 cubic yards (3,822.8 m^3). Off-channel dredging activities may involve either mechanical or hydraulic dredging methods. While hydraulic dredging is generally not preferred, it may be used in limited situations such as when mechanical equipment could cause damage to intake structures. Hydraulic dredging would require the use of exclusion devices such as bubble curtains to keep fish from entering the hydraulic pump. Most dredging of off-channel areas would be performed within the established winter in-water work window although some dredging may occur during the summer when water temperatures exceed 73 °F (the National Marine Fisheries Service has indicated that listed anadromous fish are less likely to be in backwater areas when the water temperature exceeds 73 °F) or in locations that do not have listed anadromous fish species.

In the last paragraph, change the last sentence to read "All summer dredging activities would require upland disposal of material."

4.0 REVISIONS TO SECTION 2.9.1 - DESCRIPTION OF DREDGING AREA

The Corps is no longer proposing to dredge the Hollebeke HMU irrigation intake in 2002-2003. This site should be deleted from Table G-3 and from the text of section 2.9.1.

5.0 REVISIONS TO SECTION 2.9.2 – DREDGING METHODS (FOR THE 2002-2003 DREDGING)

Replace this section with the following:

All dredging would be done using mechanical dredging methods. These methods would include clamshell, dragline, backhoe, or shovel/scoop. Based on previous dredging activities, the method used most frequently would probably be clamshell dredging. For the boat basins, the method would most likely be backhoe. Dredging would take place during the established in-water work windows of December 15 to March 1 for the Snake and Clearwater Rivers.

In general, material would be scooped from the river bottom and loaded onto a barge for in-water disposal. The contractor would be allowed to overspill excess water from the barge while the barge is being loaded. The water would be discharged a minimum of 2 feet (0.6 m) below the river surface. The Corps estimates it could take about 6 to 8 hours to fill a barge. The barge would then be pushed by a tug to the disposal site. Once unloaded, the barge would be returned to the dredging site for additional loads. The contractor could be expected to work between 10 and 24 hours per day, 6 to 7 days per week.

6.0 REVISIONS TO SECTION 2.9.4 – DISPOSAL METHODS AND LOCATION

The Corps has revised its disposal plans for the material to be dredged in winter 2002-2003. The Corps now proposes to dispose of the dredged material in shallow water adjacent to the Chief Timothy Habitat Management Unit (HMU) to create a planting bench for woody riparian habitat. A description of the rationale for this disposal method, the location, and possible disposal scenarios are described below. This site is of sufficient size to contain all of the material that would be dredged in 2002-2003. However, because the site is shallow water, there is a concern that juvenile fall chinook, a species listed under the Endangered Species Act, may be using the location for resting and rearing. The Corps started conducting surveys of the site in May 2002 to determine if fall chinook are using the site. If no fall chinook are found, the Corps plans to use the site for dredged material disposal. If fall chinook are present, the Corps may need to dispose of the dredged material at River Mile 116 as originally planned and as described in the BA.

Description of the Chief Timothy HMU Disposal Plan

The Corps plans to use the dredged material in 2002-2003 for beneficial use. At this time, the Corps proposes to use in-water disposal to build up shoreline for woody riparian habitat development. Inundation of the lower Snake River canyon by the Corps' reservoirs destroyed many acres of riparian habitat. The Corps is required to replace riparian habitat as part of the Lower Snake River Fish and Wildlife Compensation Plan. The Corps has developed riparian habitat along the lower Snake River over the last 25 years, but still has not met mitigation goals for this habitat. The Corps proposes to use the material from this dredging activity to construct a planting bench and establish riparian vegetation on the bench to continue to mitigate for the loss of the original habitat.

For the 2002-2003 dredging, the Corps proposes to construct a riparian planting bench in Lower Granite reservoir on the left bank near river mile (RM) 132 (Plates G–3 and G-4). This site is located adjacent to the Chief Timothy HMU. The portion of the site that would be used for the 2002-2003 disposal consists of a shallow sloping bench (about 10 feet deep at maximum operating pool) extending along about 4,000 feet of shoreline. The Corps selected this site because it has high potential for woody riparian habitat development, is close to the confluence of the Snake and Clearwater Rivers (where most of the dredging would occur), would not interfere with navigation, and would not impact cultural/historic properties. This site has a capacity of approximately 550,000 cubic yards. It is anticipated that this site would be filled to about 60 percent capacity with the material dredged during the 2002 –2003 dredging activity. Dredged material disposal at RM 132 is designed to accomplish three goals: (1) create planting zones for woody riparian habitat, (2) increase suitability and acreage of shallow water rearing habitat for Snake River fall Chinook juveniles, and (3) dispose of dredged material in a beneficial manner.

The Corps has collected sediment samples from the areas to be dredged and identified which sites or portions of sites contain mostly silt and which ones contain mostly sand or coarser material. Dredged material from the navigation channel is expected to be predominately sand (>80%). Some cobbles and gravels would be removed from the navigation lock channels. Silt would be dredged from the recreation sites and port areas. The silt has the highest potential for increasing turbidity.

Proposed Development

Dredged material placement in 2002-2003 would occur in a manner that extends the shore riverward along the proposed reach in an effort to create an approximately 18 lineal acre planting bench for riparian species that would submerge within the water surface elevation range between

736 and 738 feet m.s.l. The Lower Granite reservoir maximum operating pool is elevation 738 feet m.s.l. and minimum operating pool is elevation 733 feet m.s.l. The overall plan is to place the sands in the below-water portion extending riverward of the riparian embankment. Riverward to the approx 18 lineal acre riparian bench sand would be placed to enhance the rearing suitability of the mid-depth habitat bench by decreasing the depth at a 1 vertical to 10 horizontal slope across approx 16 acres of shallow water rearing habitat. Most of the riparian bench would be capped with silt. The outer slope would be at the angle of repose for the material placed (about 1 vertical to 10 horizontal), and shaped to form a relatively smooth surface. Cobbles from the dredging of the navigation lock approaches would be placed around the perimeter of the bench in a one-foot thick band to cover the maximum fluctuation in pool elevation (between elevation 732 and 736). The cobbles would provide armoring to protect the bench from waves action from the wind or passing barges/boats. Cobble placement would start at the upstream end of the bench and be tied into the existing shoreline. The band of cobbles would extend downstream until the entire bench was armored or until all of the cobbles had been used. The riparian bench surface area would vary from about 150 feet to about 400 feet wide by 4,000 feet long. The final riparian bench surface would be left in an undulating condition to provide variable root zone conditions for final planting. Final shaping of the above-water surface and planting would occur by separate contract.

Placement Methods

Placement may occur using four methods or a combination of these: 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. It would result in the least release of turbidity, and would be the most efficient placement method (and least expensive). However, this method requires a water depth of about 8 to 10 feet, so use of this type placement method at this site could be limited. One method employed to overcome water depth 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 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 may still be an issue (about 6 foot depth required), the flat deck barge could reach somewhat shallower depths than a bottom dump barge. Moving the material a second time with a dragline would again be an option.

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 and would likely require weirs between the shore and the containment berm to form cells to act as settling catchments and possibly 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.

Placement Plan

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 2002-2003 dredging will 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 will 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. 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 accomplished using dredged material placed by pushing 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 is constructed to a depth that precludes 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 is 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 gravels 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 defines 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 is 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 has been brought up to the water surface, the shoreline portion of each cell, which defines 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 during the in-water work window. Placement would be performed from flat deck barges or bottom dump scows as much as possible in the depth provided. Once the placement has reached an elevation that flat deck barges or bottom dump scows can no longer place their load, 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 reaches the water surface, the silt curtain would be relocated to form the next cell. Once the fill has been brought to the water surface, the shoreline portion of each cell, which defines 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 the maximum operating pool during the in-water work window. A dragline would be used to 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 is brought to the water surface, and depths are 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. The silt cap would be similarly placed, once the riparian bench has been brought to the water surface. A silt containment structure such as a silt fence or other barrier may be needed to prevent effluent from re-entering the river.

Final Shaping

Some underwater grading and final shaping would be required once the bench and slope is 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.

7.0 REVISIONS TO SECTION 3.13 - EFFECTS OF THE ACTION [ON BALD EAGLE (*Haliaetus leucocephalus*)]

Add the following paragraph:

The dredged material disposal activities at Chief Timothy HMU for the 2002-2003 dredging would have no or minimal impact on bald eagles. The proposed activities do not include removal of any shoreline vegetation; all potential bald eagle habitats would remain intact. Prey species such as fish and waterfowl may be displaced by disposal activities, but the impacts would be localized. Disposal activities would take place at Chief Timothy HMU during the entire length of the in-water work window, currently December 15 – March 1. Any bald eagles in the work area may become habituated to the activities, or may use vegetation adjacent to the work area. Once the riparian planting bench is completed and the vegetation becomes established, the site would provide perch trees (cottonwoods) for bald eagles and improved habitat for fall chinook.

8.0 REVISION TO SECTION 3.1.5 - DETERMINATION OF EFFECT (ON BALD EAGLE)

Add the following paragraph:

Impacts to bald eagles for the 2002-2003 disposal at Chief Timothy HMU would be minimal. Habitat would remain intact. Fish, waterfowl, and other prey species may be displaced but would be available in areas adjacent to the project activities. Thus, the dredging and disposal, activities "*may affect, but are not likely to adversely affect*" bald eagles.

9.0 REVISION TO SECTION 3.2.3 - EFFECTS OF THE ACTION [ON BULL TROUT (*Salvelinus confluentus)*]

Replace the third paragraph with:

Some of the dredging in off-channel backwater areas may be performed using hydraulic equipment. Hydraulic equipment has potential to cause direct mortality to fish through use of a cutterhead and suction pump, which can pull fish into the equipment and damage or kill them in the process. Several measures would be used to avoid such impacts. First, the amount of sediment to be dredged would be minimal (usually less than 5,000 CY per site). Second, if hydraulic dredging is proposed during summer in areas that may have salmonids, the water temperature must exceed 73°F to exclude likely presence of salmonids and bull trout. Third, exclusion devices such as bubble curtains would be used where salmonids may be present. The details of these mitigation measures will be established prior to individual project activities.

Replace the fifth paragraph with the following:

Disposing of dredged material for beneficial use would have minimal impacts on bull trout. In-water disposal would occur only during the winter in-water work window. At that time of year, only adult bull trout might be present. If there were bull trout present, aside from turbidity, the action of disposal would allow time for fish to escape the area of disposal. Injury to fish from direct impact of dumping of dredged material is unlikely. Disposal at in-water sites to create fall chinook resting and rearing habitat may have minimal positive indirect impacts on bull trout. If the additional rearing habitat results in better survival of juvenile fall chinook, there may be more juvenile fall chinook available as prey for bull trout. Other beneficial uses involving in-water disposal of dredged material, such as riparian habitat restoration or shoreline stabilization, may also have similar effects on bull trout.

Add the following paragraph at the end of the section:

Disposing of dredged material at either the Chief Timothy HMU or RM 116 (Knoxway Canyon) disposal sites in winter 2002-2003 would have minimal impacts on bull trout. The Chief Timothy HMU site is 69 miles (111 km) upstream of the Tucannon River and 8 miles (12.8 km) downstream of the Clearwater River while the RM 116 site is about 60 miles (96.6 km) upstream of the Tucannon River and about 25 miles (40.2 km) downstream from the Clearwater River. Only one bull trout has been reported at Lower Granite Dam since monitoring began. It is unlikely any bull trout would be at the Chief Timothy HMU or RM 116 disposal sites during disposal. If there were fish present, aside from turbidity, the action of disposal would allow time for fish to escape the area of disposal. Injury to fish from direct impact of dumping of dredged material is unlikely.

10.0 REVISION TO SECTION 3.2.5 - DETERMINATION OF EFFECT (ON BULL TROUT)

Add the following statement at the end of the paragraph:

The 2002-2003 disposal activities at either Chief Timothy HMU or RM 116 "*may affect, but are not likely to adversely affect*" bull trout.

11.0 REVISION TO SECTION 3.3.3 - EFFECTS OF THE ACTION [ON UTE LADIES' TRESSES (*Spiranthes diluvialis*)]

Add the following paragraph:

Currently the shoreline along Chief Timothy HMU does not have native habitat conducive to the development of Ute ladies' tresses populations. The area proposed for woody riparian habitat creation is composed largely of cut bank shoreline, and as such, is unlikely to provide Ute ladies' tresses habitat. The area is also dominated by exotic plant species such as reed canary grass and giant reed, which would make it extremely difficult for Ute ladies' tresses to become established. There is a small pond/wetland which would be impacted by the development. Although the corps has determined that this species would not be affected by the proposed disposal action, a site survey is planned for August of 2002 to ensure the area is free of this plant prior to construction activities. The new development has the potential to provide better habitat and hydrology for the Ute ladies' tresses.

12.0 REVISION TO SECTION 3.4.5 – DETERMINATION OF EFFECT [ON SPALDING'S SILENE *(Silene spaldingii)*]

Disposal of dredged material at Chief Timothy HMU would have "*no effect*" on Spalding's silene as none of the activities would take place within suitable habitat for the plant species.

13.0 ADDITION OF A NEW SECTION 3.4a

After Section 3.4.5, insert the following:

3.4a Water howellia (*Howellia aquatillus*)

3.4a.1 Habitat Requirements/Population Status

Howellia grows in firm consolidated clay and organic sediments that occur in wetlands associated with ephemeral glacial pothole ponds and former river oxbows (Shelly and Moseley 1988; Lesica 1992). These wetland habitats are filled by spring rains and snowmelt run-off; and depending on temperature and precipitation, exhibit some drying during the growing season. This plant's microhabitats include shallow water, and the edges of deep ponds that are partially surrounded by deciduous trees (Shelly and Moseley 1988; Gamon 1992).

Only seventy-nine small populations of this aquatic plant were known to exist when the proposed rule to list the species was published (58 FR 19795). Subsequent inventories conducted for howellia in the State of Washington located 28 new sites in Spokane County alone, thus expanding the number of known populations to 107 (Roe and Shelly 1992; N. Curry, in litt., 1993; J. Gamon, Washington Natural Heritage Program in litt., 1993; R. Moseley, Idaho Conservation Data Center, in litt. 1993). Howellia appears to be extirpated from California and Oregon and from Mason, and Thurston Counties in Washington, and Kootenai County in Idaho (Jokerst 1980; Shelly and Moseley 1988; Oregon Natural Heritage Program 1991; Gamon 1992).

3.4a.2 Known Occurrences in Project Vicinity

Nearly all of the remaining populations of howellia are clustered in two main population centers or metapopulations. Within these areas, individual populations occur primarily in clusters of closely adjacent ponds, although some ponds within the range of these metapopulations are unoccupied. One metapopulation near Spokane, Washington, consists of 46 individual populations in Spokane County, Washington, and one in Latah County, Idaho. A second metapopulation is found in the drainage of the Swan River in northwestern Montana (Lake and Missoula Counties), where 59 individual populations are found. In addition to metapopulations, a third site near Vancouver in southwestern Washington (Clark County) contains two small populations that are in close proximity of each other (Gamon 1992). Water howellia is not documented in Idaho near the five-reservoir study area (Idaho Conservation Data Center, 2000).

3.4a.3 Effects of the Action

Dredging activities for both the 20-year plan and the 2002-2003 dredging are not likely to affect water howellia as no dredging would occur in wetlands. All dredging would be in open water sites.

Some disposal activities may affect potential habitat for this species as some of the disposal areas would be near wetlands. However, many of the wetlands are dominated by exotic plant species, thereby reducing the likelihood that this plant would be present. Any shoreline or wetland habitat that would be disturbed through these activities would be surveyed prior to project implementation to determine if the habitat is suitable for water howellia and to determine if the plant is present. Populations of water howellia would be protected from disturbance.

Disposal of dredged material in 2002-2003 would not affect habitat for water howellia. The Chief Timothy HMU site is adjacent to a wetland that does experience drying during part of the year. However, the disposal plan is designed to maintain and improve flow of water through the wetland. The RM 116 is in deeper water and has no wetlands.

3.4a.4 Conservation Measures

Primary project activities (dredging and in-water disposal of dredged material to create juvenile fall chinook rearing habitat) would not impact this species. Protocol surveys would be conducted prior to any activity at Joso, the west Lewiston levee, or wetland/shoreline areas that may impact suitable habitat. Any population of water howellia that is discovered would be protected with recommended buffers.

3.4a.5 Determination of Effect

This project "*may affect, but is not likely to adversely affect*" water howellia.

14.0 REVISION TO SECTION 3.5.1.2 – CALIFORNIA FLOATER (*Anodonta californiensis*)

Add the following:

The California floater has been located upstream of Hells Canyon Dam (Idaho Department of Fish and Game, Conservation Database Center GIS Database). Dorband, 1980 indicated that this genus was not found in Lower Granite Reservoir in 1977. It is unlikely this species would occur in the study area.

Disposal of dredged material at Chief Timothy HMU would fill some shallow water area that meets the habitat requirements of the California floater. A maximum of 18 acres would be filled to create dry land. About 16 acres of shallow water habitat with a sand substrate would be created. The sand substrate may provide habitat for both juvenile and adult California floaters.

15. REVISION TO SECTION 3.5.1.3 - COLUMBIA PEBBLESNAIL (*Flumincola columbiana*)

Add the following:

The Columbia pebblesnail has been located upstream of the study area in the Lower Salmon River by Idaho Conservation Database Personnel. Dorband, 1980 did not list the genus of this species as present in the Lower Granite reservoir in 1977. Since this species has been found in a direct tributary of the Snake River above Lower Granite Reservoir, it is possible a few individuals could migrate downstream of that point. Water quality would still be a limiting factor, so it would be unlikely to find this species in the impounded areas of the lower Snake River.

16.0 REVISION TO SECTION 3.5.1.8 - LITTLE WILLOW FLYCATCHER (*Empidonax trailii brewsteri*)

Add the following:

Willow flycatchers are seen along riparian drainages in or near the study area during spring and early summer.

17.0 REVISION TO SECTION 3.5.1.9 - LOGGERHEAD SHRIKE (*Lanius ludovicianus*)

Add the following:

Loggerhead shrikes are currently seen on the Hanford Reservation and adjacent areas during the summer. Most of the DMMP study area is outside of this native shrub-steppe habitat.

18.0 REVISION TO SECTION 3.5.1.11 - MOUNTAIN QUAIL (*Oreortyx pictus*)

Add the following:

Mountain Quail have been recorded in the mountainous areas of northwestern Idaho by the Idaho Conservation Database personnel. The DMMP study area is primarily degraded shrub-steppe which starts at the foothills of the Idaho mountains and goes into the heart of the Pasco Basin. There is no suitable habitat for this species within the study area.

19.0 REVISION TO SECTION 3.5.1.12 - NORTHERN GOSHAWK (*Accipiter gentilis*)

Add the following:

The northern goshawk is primarily a migrant in the area which has been seen regularly in and around the DMMP study area by local chapters of the Audubon Society.

20.0 REVISION TO SECTION 3.5.1.13 - NORTHERN SAGEBRUSH LIZARD (*Sceloporus graciosus graciosus*)

Add the following:

Northern sagebrush lizards are currently seen on the Hanford Reservation and adjacent areas during the summer. Most of the DMMP study area is outside of this native shrub-steppe habitat.

21.0 REVISION TO SECTION 3.5.1.14 - OLIVE-SIDED FLYCATCHER (*Contopus borealis*)

Add the following:

Olive-sided flycatchers are seen along riparian drainages in or near the DMMP study area during spring and early summer.

22.0 REVISION TO SECTION 3.5.1.16 - WASHINGTON GROUND SQUIRREL (*Spermophilus washingtoni*)

Add the following:

Suitable habitat for Washington ground squirrels does not exist at the Chief Timothy HMU disposal site.

23.0 REVISION TO SECTION 3.5.1.17 - WESTERN BURROWING OWL (*Athene cunicularia hypugea*)

Add the following:

Suitable habitat for western burrowing owls does not exist at the Chief Timothy HMU.

24.0 REVISION TO SECTION 3.5.2.1 - NORTHWEST RASPBERRY (*Rubus nigerrimus*)

Add the following:

Protocol surveys conducted along the Chief Timothy HMU shoreline for Ute ladies' tresses during the active growing season prior to disposal activities should include searching for this species.

25.0 REVISION TO SECTION 3.5.2.2 - JESSICA'S ASTER (*Aster jessicae*)

Add the following:

None of these populations are found within the study area.

26.0 REVISIONS TO SECTION 2.5.2.5 - WASHINGTON POLEMONIUM (*Polemonium pectinatum*)

Add the following:

This species has not been documented in the DMMP study area. The species is associated with wet meadow conditions which could be found in the area, therefore the species may be found in the area if habitat conditions are suitable.

27.0 ADDITIONS TO LIST OF PLATES

28.0 ADDITIONS TO SECTION 4.0 - REFERENCES CITED

Dorband, W.R. 1980. Benthic Macroinvertabrate Communities in the Lower Snake River Reservoir System. PhD Dissertation, University of Idaho, Moscow Idaho, 150 pgs.

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Jokerst, J.D. 1980. Status report Howellia aquatilis Gray for the Mendocino National Forest. Unpublished report, California State University, Chico. 18 pp.

Lesica, P. 1992. Autecology of the endangered plant Howellia aquatilis; implications for management and reserve design. Ecological Applications 2:411-421.

Shelly, J.S., and R. Moseley. 1988. Report on the conservation status of Howellia aquatilis, a candidate threatened species. Unpublished Report, Montana Natural Heritage Program, Helena, Montana. 166 pp.

DREDGED MATERIAL MANAGEMENT PLAN
AND ENVIRONMENTAL IMPACT STATEMENT

McNARY RESERVOIR AND LOWER SNAKE RIVER RESERVOIRS

ADDENDUM A TO THE BIOLOGICAL ASSESSMENT
PROVIDED TO THE U.S. FISH AND WILDLIFE SERVICE

prepared by:

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

October 2001

1.0 INTRODUCTION

The Walla Walla District Corps of Engineers previously submitted a Biological Assessment (BA) for the Dredged Material Management Plan and Environmental Impact Statement for McNary and the Lower Snake River Reservoirs (DMMP/EIS) to the U.S. Fish and Wildlife Service (USFWS). The document was assigned USFWS Reference Number 01-I-E0423. This addendum is meant to provide revisions to information in the BA that was received by the Ephrata, Washington, USFWS office on July 3, 2001.

2.0 REVISIONS TO SECTION 2.9.1 – DESCRIPTION OF DREDGING AREAS

As of September 1, 2001, the following dredging operations are not expected to occur during the Fiscal Year 2003 (FY03) dredging activity: Port of Walla Walla at Boise Cascade, Schultz Bar, and Joso Habitat Management Unit Barge Slip. Joso is not being considered for the first year of dredging under the DMMP because of funding and timing constraints. Consequently, any material unsuitable for in-water disposal would have to be taken to an alternate upland disposal area or an existing permitted upland disposal facility. Should the decision be made to use an alternate upland site, the Corps would re-consult with the USFWS. As reported in the BA on page G-13, table G-3 presents quantities and locations of dredging proposed for the winter of 2002-2003 in FY03. The following table updates table G-3. Please note the removal of the three locations specified above. Also, note that the quantities have been revised to reflect the most recent available sounding data.

Table G-3 (revised). Sites Proposed for Dredging in FY03 and the Estimated Quantities for Each.

Site to be Dredged	Quantity to be Dredged (CY)
Federal Navigation Channel at Confluence of Snake and Clearwater Rivers	250,500
Port of Clarkston	9,600
Port of Lewiston	5,100
Hells Canyon Resort Marina	3,600
Greenbelt Boat Basin	2,800
Swallows Swim Beach/Boat Basin	16,000
Lower Granite Dam Navigation Lock Approach	4,000
Lower Monumental Dam Navigation Lock Approach	20,000
Illia Boat Launch	1,400
Willow Landing Boat Launch	6,200
Hollebeke HMU Irrigation Intake	3,300
TOTAL	**322,500**

DREDGED MATERIAL MANAGEMENT PLAN
AND ENVIRONMENTAL IMPACT STATEMENT

McNARY RESERVOIR AND LOWER SNAKE RIVER RESERVOIRS

APPENDIX G

BIOLOGICAL ASSESSMENT
FOR NON-ANADROMOUS FISH AND TERRESTRIAL SPECIES

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

In Compliance with the Requirements of
the Endangered Species Act

August 2001

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1.0 INTRODUCTION

The Walla Walla District Corps of Engineers is proposing to conduct navigation and maintenance dredging on the lower Snake River and mid-Columbia River in Washington and Oregon and at the mouth of the Clearwater River in Idaho and Washington. Proposed activities are detailed in the Walla Walla District Dredged Material Management Plan and Environmental Impact Statement (DMMP/EIS) (USACE and EPA, 2001). These activities include: dredging, disposing of dredged material, and raising of levees. These activities would occur over a 20-year period from the date the Record of Decision is signed, at sites associated with four dams operated by the Corps on the lower Snake River and McNary Lock and Dam (McNary) on the mid-Columbia River. The purpose of the dredging is to restore the authorized depth of the navigation channel, remove sediment from port areas, provide for recreational use, and provide for irrigation of wildlife habitat and recreation sites.

As part of the environmental review process, the Corps is conducting assessments of the potential impacts of project actions to species listed under the Endangered Species Act (ESA). For the purposes of this Biological Assessment (BA), only non-anadromous fish species and terrestrial flora and fauna are evaluated. Correspondence with the U. S. Fish and Wildlife Service (USFWS) in July 2000 identified federally listed species that occur or may occur in the project vicinity. These included: bald eagle (*Haliaeetus leucocephalus*), bull trout (*Salvelinus confluentus),* and Ute ladies' tresses (*Spiranthes diluvialis*). In addition, Spalding's silene (*Silene spaldingii*) is proposed for listing and may occur in the project area.

2.0 PROJECT DESCRIPTION

2.1 Background and Purpose

The Corps is authorized by the River and Harbor Act of 1945 (Public Law 79-14) to maintain a navigation system on the lower Snake and Columbia Rivers. The portion of the navigation system within the Walla Walla District includes five reservoirs: Ice Harbor, Lower Monumental, Little Goose and Lower Granite reservoirs on the lower Snake River, spanning the region from Tri-Cities, Washington, east to Lewiston, Idaho; and McNary reservoir on the Columbia River between Umatilla, Oregon, and Tri-Cities, Washington [plate 1 (NOTE: Plates without a "G-" designation are from the main DMMP report.)]. These reservoirs are part of the Columbia/Snake River inland navigation waterway, which provides slack-water navigation from the mouth of the Columbia River near Astoria, Oregon, to port facilities on the Snake and Clearwater Rivers at Lewiston, Idaho, and Clarkston, Washington. Each of these reservoirs requires some level of dredging on a periodic basis to maintain the navigation channel at the minimum authorized depth of 14 feet (4.3 m).

The Corps also maintains recreation facilities and irrigated wildlife habitat management units (HMU's) as part of the lock and dam projects. The HMU's are designated areas where the Corps has made vegetative improvements to provide habitat for various birds, mammals, reptiles, amphibians, and native plants. Often, these areas require irrigation to maintain the improved vegetation. The irrigation intakes at the wildlife HMU's and some recreation sites require periodic dredging to remove sediment that clogs the pumps. The boat launch facilities and swimming beaches at the recreation sites also periodically require dredging to remove accumulated sediment that reduces water depth and interferes with recreational use.

There are five locks and dams on the portion of the Columbia and Snake River navigation project in the study area: McNary, Ice Harbor Lock and Dam (Ice Harbor), Lower Monumental Lock and Dam (Lower Monumental), Little Goose Lock and Dam (Little Goose), and Lower Granite Lock and Dam (Lower Granite) (plate 1). Each of these projects is authorized to provide navigation facilities including locks with dimensions of 86 feet [26.2 meters (m)] wide and over 665 feet (202.7 m) long to allow passage of a tug and four-barge tow commonly used in river navigation. Construction of these dams has created a series of slackwater reservoirs on the Snake and Columbia Rivers adding an additional 179 miles [288.1 kilometers (km)] to the Columbia/Snake River shallow-draft inland navigation system. This navigation system has resulted in a significant shift in the economy of eastern Washington as new inland ports have become established to handle the needs of barge shippers. Wheat, barley, wood chips, and other wood products are the primary commerce downbound from this region, with petroleum and fertilizer the principal commerce upbound. These shipments depend on the availability of a navigation system that provides a 14-foot (4.3-m) draft channel for barge tows.

Lower Granite, the most upstream of the four lower Snake River dams, receives a large sediment load from a drainage area that includes the Salmon, Grande Ronde, and Imnaha Rivers and the main stem of the Clearwater River. The upper reach of the Lower Granite pool serves as a sediment trap for most of the material carried in suspension in the free-flowing reaches of the contributing rivers. The quantity of sediment that collects in the Lower Granite reservoir exceeds the quantities observed in each of the other lower Snake River reservoirs and in the McNary reservoir.

The Lower Granite project includes levees as appurtenant facilities of the authorized project to allow normal operating water surfaces of 733 to 738 feet above mean sea level (msl) in the Lewiston and Clarkston areas. The backwater levees constructed around Lewiston were designed to protect the city from inundation during the occurrence of the Standard Project Flood (SPF) of 420,000 cubic feet per second (cfs) (11,893.1 cubic meters per second).

In anticipation of future sediment problems and projected volumes of dredged material, the Walla Walla District has prepared a DMMP to provide long-range planning for the management of dredged material.

The purpose of the DMMP is threefold:

a) To evaluate alternative programs to maintain the authorized navigation channel and certain publicly owned facilities in the lower Snake River and McNary Reservoirs for the next 20 years.

b) To evaluate alternative measures to maintain flow conveyance of the Lower Granite Reservoir for the remaining economic life of the project (through 2074).

c) To evaluate alternative programs of managing dredged material in a cost effective, environmentally acceptable, and, wherever possible, beneficial manner.

2.2 The BA and Section 7 Consultation

This BA is programmatic in nature, addressing the preferred conceptual plan for dredging and disposal actions that would take place over the next 20 years. It also contains detailed information on dredging and disposal activities planned to take place during the first year only (2002-2003). Consultation with USFWS in 2001 will be for the 20-year conceptual plan and for the 2002-2003 activities. Subsequent consultations will be aimed at covering 5-year increments. For example, consultation in 2003 could cover dredging activities for 2004-2009.

2.3 Preferred Alternative

Following a screening process that evaluated dredging from minimal amounts up to 2 million cubic yards (CY) [1,529,110 cubic meters (m^3)] per year, levee raises from 0 to 12 feet (0 to 3.7 m), and in-water or upland disposal, the Corps selected a preferred alternative from four that were screened as best addressing the purpose and need of the DMMP.

The main components of the preferred alternative are:

- Conduct maintenance dredging of navigation-related facilities on an as-needed basis (2- to 5-year average) in each of five reservoirs on the lower Snake and Columbia Rivers.
- Conduct maintenance dredging on an as-needed basis around public recreation areas and wildlife HMU's on the lower Snake and Columbia Rivers.
- Dispose of dredged material primarily through beneficial activities coordinated with the Local Sediment Management Group (LSMG).
- Dispose of any dredged material unsuitable for beneficial uses at an upland site.
- Maintain flow conveyance capacity of the Lower Granite reservoir by raising the west Lewiston Levee by as much as 3 feet (0.9 m) where needed.

2.4 Dredging Methods and Timing

The dredging procedure to be used varies depending on the location of the dredging (see table G-1). For the dredging proposed for the navigation channels, slips, and berths of the Columbia/Snake/ Clearwater Rivers navigation system, mechanical dredging would be used. Mechanical dredging methods would include clamshell, dragline, backhoe, or shovel/scoop. Based on previous dredging activities, the clamshell method would probably be used for the larger quantities. Material would be scooped from the river bottom and loaded onto a bottom-dump barge for in-water disposal or a bin-type barge for upland disposal. The contractor would be allowed to overspill excess water from the barge while the barge is being loaded. The water would be discharged a minimum of 2 feet (0.6 m) below the river surface. Clamshell dredges of approximately 15-CY (11.5-m^3) capacity and barges with a capacity of up to 3,000 CY (2,293.7 m^3) with maximum drafts of 14 feet (4.3 m) would be used. The Corps estimates it could take about 6 to 8 hours to fill a barge. The expected rate of dredging is 3,000 to 5,000 CY (2,293.7 to 3,822.8 m^3) per 8-hour shift. The barge would then be pushed by a tug to the disposal site. No material or water would be discharged from the barge while it is in transit.

Table G-1. Dredging Options by Area.

Area to be Dredged	Dredging Option*		
	Time of Year to Dredge	Method of Dredging	Disposal Location
Navigation Channel	Winter	Mechanical	In water or upland
Ports	Winter	Mechanical	In water or upland
Boat Basins	Winter or summer	Mechanical	In water or upland
Swim Beach	Summer or winter	Mechanical	Upland or in water
Irrigation Intakes	Summer or winter	Mechanical or hydraulic	Upland for hydraulic, either for mechanical

* Options listed in order of preference

The contractor could be expected to work between 10 and 24 hours per day, 6 to 7 days per week. Dredging would be performed within the established in-water work window, which currently is December 15 through March 1 in the Snake and Clearwater Rivers and December 1 to March 31 in the Columbia River. Multiple-shift dredging workdays would be used when necessary to ensure that dredging was completed within these windows.

Maintenance of irrigation intakes and beaches has often required small quantity dredging [less than 5,000 CY (3,822.8 m^3)]. Small quantity dredging projects may involve either mechanical or hydraulic dredging methods. While hydraulic dredging is generally not preferred, it may be necessary where mechanical equipment could cause damage to intake structures. In such cases, mitigation measures would be required to minimize impacts to fish. These may include operating only during allowable temperature windows (i.e., when water temperature is above 70 °F (21.1 °C), the maximum to support salmonids) or use of exclusion devices such as bubble curtains to keep fish from entering the hydraulic pump.

Small project dredging would include discharging to a barge or truck for transport. If a truck were used, disposal of the material would be made on an appropriate upland site. Appropriate upland disposal sites include, but are not limited to, Corps land, beneficial-use upland applications, and local landfills. This small-quantity dredging activity would use the in-water work window or possibly an alternate work window at another time during the year if one were approved for the specific project. All warm water and hydraulic dredging activities would require upland disposal of material.

2.5 Dredging Locations and Quantities

Following are descriptions of dredging activities anticipated in each of the five reservoirs in this system. The dredging areas described and depicted on plates 1 through 17 are the locations that the Corps anticipates may be dredged in the 20-year period of the DMMP/EIS. Many of the areas shown on the plates are not considered to need maintenance dredging in the near future; however, additional sites may be identified as needs arise.

2.5.1 Lower Granite Reservoir

Maintenance dredging in the Lower Granite reservoir may be done at several sites (plates 15 through 17). The largest concentration of dredging would be at the confluence of the Snake and Clearwater Rivers in the Clarkston/Lewiston area (plate 17). The area that requires frequent dredging extends from the vicinity of Silcott Island near Snake River Mile (RM) 131 upstream to the U.S. 12 bridge located near Snake RM 139.5 and from the confluence at RM 139 up the Clearwater River to just downstream of Memorial Bridge at RM 2, as shown on plate 17. Other than port areas, boat basins, and HMU irrigation intakes, dredging in the confluence area will be confined to the Federal navigation channel to minimize impacts to existing salmonid habitat. The federal navigation channel extends to within 50 feet of existing port structures and the Corps is responsible for maintaining this channel. The port areas parallel the federal channel and the ports are responsible for maintaining the port areas and the access from the federal channel. Ports have expressed interest in entering into an agreement for the Corps to dredge these areas.

Other areas in the Lower Granite reservoir that may require dredging at some time over the next 20-year period include: Port of Wilma slip; Port of Clarkston on the Snake River; Port of Lewiston on the Clearwater River; Green Belt Boat Basin; Potlatch Corporation dock; Hells Gate State Park moorage; Swallows Park boat basin and swimming beach; Chief Looking Glass moorage; Hells Canyon Resort marina; and the irrigation intake for Chief Timothy HMU (plate 17).

2.5.2 Little Goose Reservoir

Maintenance dredging in the Little Goose reservoir would include the federal channel downstream of the Lower Granite navigation lock guide wall and the federal channel opposite Schultz Bar, RM 101.5 (plates 12 through 15). Dredging may also be required to maintain navigation facility clearances at the Port of Garfield, Port of Central Ferry, Port of Almota, and Boyer Park Marina. In addition, small dredging projects of 5,000 CY (3,822.8 m^3) or less may be required at the irrigation intakes of the Ridpath, New York Bar, Willow Bar, and Swift Bar HMU's over the 20-year period.

2.5.3 Lower Monumental Reservoir

Periodic dredging may be required to maintain adequate navigation clearances into Little Goose navigation lock and at Lyons Ferry State Park (plates 10 through 12). Small dredging projects may also be required to maintain the irrigation intakes for Skookum and 55 Mile HMU's.

2.5.4 Ice Harbor Reservoir

Maintenance dredging is required periodically for the Lower Monumental navigation lock approach channel and may be required to provide navigation clearances at Walla Walla Grain

Growers at Sheffler, Louis Dreyfus Windust Station, and Charbonneau Park boat moorage (plates 8 through 10). Small amounts of dredging may be required periodically to maintain the irrigation intake for the Big Flat, Lost Island, and Hollebeke HMU's.

2.5.5 McNary Reservoir

Navigation maintenance dredging is required in the downstream approach channel to Ice Harbor navigation lock for a length of approximately 7 miles (11.3 km) (plates 2 through 8). Periodic dredging may also be required at: Port of Umatilla; Port of Benton barge slip; Port of Pasco marine terminal, barge slip, and container terminal; Port of Walla Walla facilities; and Pasco Boat Basin.

2.5.6 Dredging Quantities

Most sites will require dredging on an average 2-year cycle; however, dredging frequencies are dependent on variable sedimentation rates and actual dredging cycles may vary from 2 to 10 years. Estimated dredging cycles and dredged material volumes for the lower Snake River and McNary reservoirs are presented in table G-2.

Table G-2. Estimated Dredging Cycles and Dredged Material Volumes Per Cycle.

Reservoir	Estimated Dredging Cycle (years)	Estimated Maximum Volume of Dredged Material (CY)
Lower Granite	2	300,000
Little Goose	2	4,000
Lower Monumental	2	2,000
Ice Harbor	2	2,000
McNary	2	32,000

For the Federal navigation channel, dredging quantities are based on maintaining the dredging template. The dredging template is based on the authorized navigation channel configuration, which is 250 feet (76.2 m) wide and 14 feet (4.3 m) deep as measured at minimum pool level. To maintain the authorized depth, the Corps typically allows a contractor to overdredge by up to 2 feet (0.6 m), resulting in a channel up to 16 feet (4.9 m) deep. This additional depth reduces the frequency at which the Corps needs to dredge to maintain the channel. There is no need to maintain a channel deeper than 16 feet (4.9 m) since the depth at the sills of the navigation locks is 15 feet (4.6 m).

There are no dredging templates for the recreation sites and wildlife HMU’s. Dredging in the boat basins would restore the original design contours and depths of the boat basins. Dredging around the irrigation intakes would re-establish the zone of open water around the intakes necessary for efficient operation of the intakes.

2.6 Dredged Material Disposal

Dredged material will be disposed of primarily through beneficial uses. The dredged material can be used beneficially as fill in many different circumstances. When no beneficial uses are available or when sediments are found to contain unacceptable levels of contaminants, upland disposal will be used. Refer to the decision tree presented in Figure G-1 for determination of the method and location for dredged material disposal.

2.6.1 Beneficial Uses

Dredged material can be used to benefit and restore the environment. This use is consistent with Corps policy to secure the maximum practicable benefits through the use of material dredged from navigation channels. Opportunities to use dredged material beneficially often become available over time and cannot be anticipated in a programmatic document such as this. In order to be able to take advantage of such beneficial uses, this document sets forth a process to identify and evaluate the opportunities as each major dredging activity is being planned. Part of this process is the formation of an LSMG. An LSMG has been formed, consisting of federal and state agencies including the U.S. Army Corps of Engineers (USACE), Environmental Protection Agency (EPA), USFWS, National Marine Fisheries Service (NMFS), and several others, as well as tribes, local ports, counties, and municipalities.

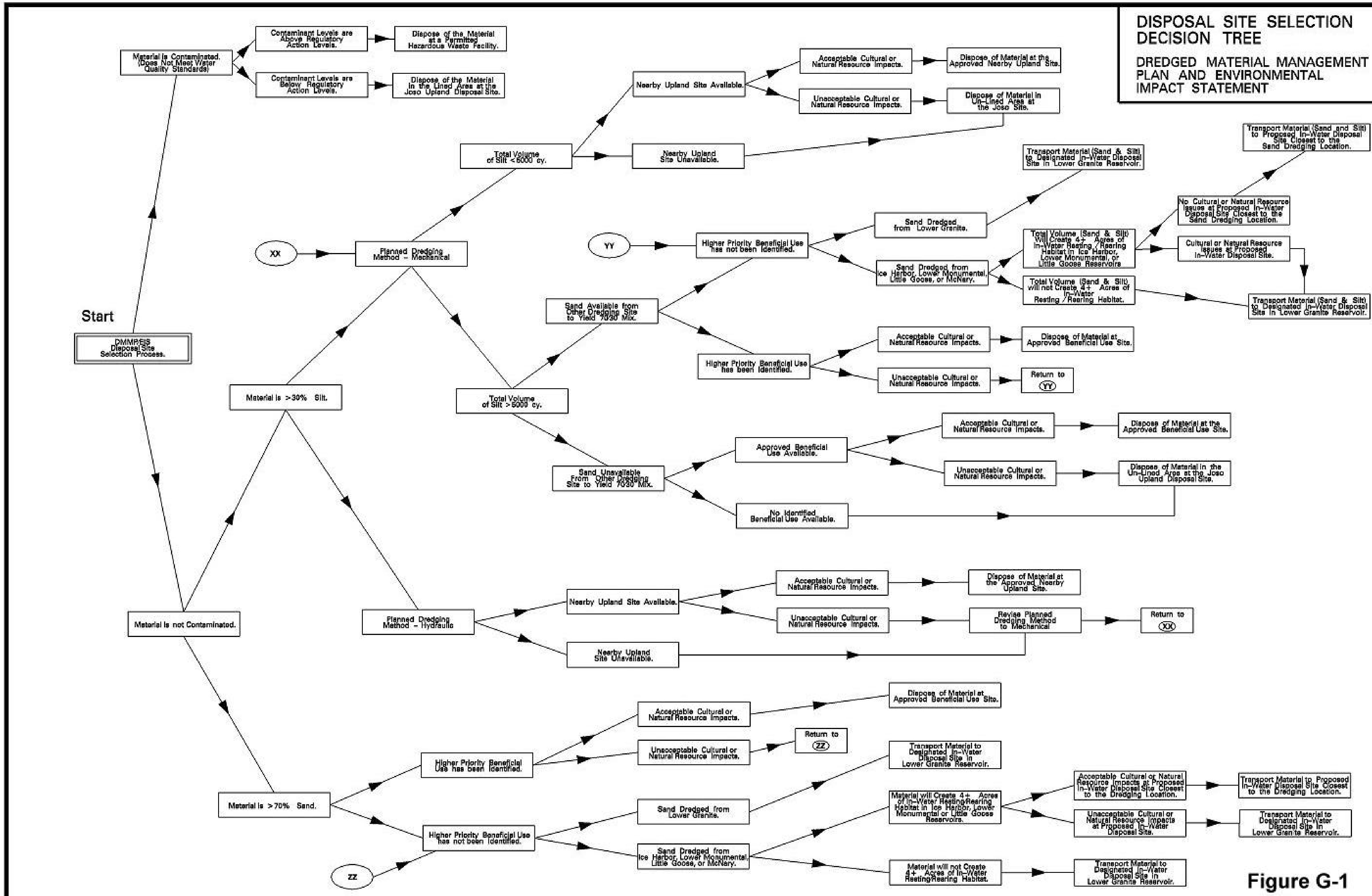
The LSMG would provide an interagency approach to management of dredged material including definition of disposal plans coordinated with and amenable to the public stakeholders and resource agencies. In accomplishing this function, the LSMG would facilitate a process involving participation of affected agencies, organizations, and groups to identify the most environmentally sound and practical beneficial use of dredged material for each major dredge activity. This group would help identify beneficial uses such as creation of aquatic and wildlife habitat, replenishment of beaches, or filling of upland commercial sites.

Each time a dredging activity is planned, the following steps would occur:

- A notice would be sent to parties such as the Ports, municipalities, environmental groups, agencies, and others known to have an interest in the beneficial use of dredged material. The notice would provide the location, estimated quantity, dredging method, expected characteristics of dredged material, and estimated time of the dredging activity. The notice would precede the proposed dredging activity by several months to allow time to negotiate an agreement with a local sponsor for the beneficial use of the dredged material.

- A public notice would be published prior to the dredging activity.

- A cultural resources report would be prepared for each dredging activity.



DISPOSAL SITE SELECTION DECISION TREE
DREDGED MATERIAL MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT
Start
DMMP/EIS Disposal Site Selection Process.
Material is Contaminated. (Does Not Meet Water Quality Standards)
Contaminant Levels are Above Regulatory Action Levels.
Dispose of the Material at a Permitted Hazardous Waste Facility.
Contaminant Levels are Below Regulatory Action Levels.
Dispose of the Material in the Lined Area at the Joso Upland Disposal Site.
Material is not Contaminated.
Material is >30% Silt.
XX
Planned Dredging Method – Mechanical
Total Volume of Silt <5000 cy.
Nearby Upland Site Available.
Acceptable Cultural or Natural Resource Impacts.
Dispose of Material at the Approved Nearby Upland Site.
Unacceptable Cultural or Natural Resource Impacts.
Dispose of Material in Un-Lined Area at the Joso Site.
Nearby Upland Site Unavailable.
Total Volume of Silt >5000 cy.
Sand Available from Other Dredging Site to Yield 70/30 Mix.
YY
Higher Priority Beneficial Use has not been Identified.
Sand Dredged from Lower Granite.
Transport Material (Sand & Silt) to Designated In-Water Disposal Site in Lower Granite Reservoir.
Sand Dredged from Ice Harbor, Lower Monumental, Little Goose, or McNary.
Total Volume (Sand & Silt) Will Create 4+ Acres of In-Water Resting /Rearing Habitat in Ice Harbor, Lower Monumental, or Little Goose Reservoirs
No Cultural or Natural Resource Issues at Proposed In-Water Disposal Site Closest to the Sand Dredging Location.
Transport Material (Sand and Silt) to Proposed In-Water Disposal Site Closest to the Sand Dredging Location.
Cultural or Natural Resource Issues at Proposed In-Water Disposal Site.
Total Volume (Sand & Silt) will not Create 4+ Acres of In-Water Resting /Rearing Habitat.
Transport Material (Sand & Silt) to Designated In-Water Disposal Site in Lower Granite Reservoir.
Higher Priority Beneficial Use has been Identified.
Acceptable Cultural or Natural Resource Impacts.
Dispose of Material at Approved Beneficial Use Site.
Unacceptable Cultural or Natural Resource Impacts.
Return to YY
Sand Unavailable From Other Dredging Site to Yield 70/30 Mix.
Approved Beneficial Use Available.
Acceptable Cultural or Natural Resource Impacts.
Dispose of Material at the Approved Beneficial Use Site.
Unacceptable Cultural or Natural Resource Impacts.
Dispose of Material in the Un-Lined Area at the Joso Upland Disposal Site.
No Identified Beneficial Use Available.
Planned Dredging Method – Hydraulic
Nearby Upland Site Available.
Acceptable Cultural or Natural Resource Impacts.
Dispose of Material at the Approved Nearby Upland Site.
Unacceptable Cultural or Natural Resource Impacts.
Revise Planned Dredging Method to Mechanical
Return to XX
Nearby Upland Site Unavailable.
Material is >70% Sand.
Higher Priority Beneficial Use has been Identified.
Acceptable Cultural or Natural Resource Impacts.
Dispose of Material at Approved Beneficial Use Site.
Unacceptable Cultural or Natural Resource Impacts.
Return to ZZ
ZZ
Higher Priority Beneficial Use has not been Identified.
Sand Dredged from Lower Granite.
Transport Material to Designated In-Water Disposal Site in Lower Granite Reservoir.
Sand Dredged from Ice Harbor, Lower Monumental, Little Goose, or McNary.
Material will Create 4+ Acres of In-Water Resting/Rearing Habitat in Ice Harbor, Lower Monumental or Little Goose Reservoirs.
Acceptable Cultural or Natural Resource Impacts at Proposed In-Water Disposal Site Closest to the Dredging Location.
Transport Material to Proposed In-Water Disposal Site Closest to the Dredging Location.
Unacceptable Cultural or Natural Resource Impacts at Proposed In-Water Disposal Site.
Transport Material to Designated In-Water Disposal Site in Lower Granite Reservoir.
Material will not Create 4+ Acres of In-Water Resting/Rearing Habitat.
Transport Material to Designated In-Water Disposal Site in Lower Granite Reservoir.

Figure G-1

Potential beneficial uses that have been identified to date include:

- Fish Habitat Creation.
- Hanford Site Capping (federal).
- Potting Soil (business).
- Riparian Habitat Restoration.
- Port of Wilma Fill.
- Fill of Non-Federal Public Land.
- Highway or Road Construction.

These opportunities are described in detail in section 2.5.4 of the DMMP/EIS.

See plate G-1 for the location of the in-water disposal sites in Lower Granite reservoir that have been proposed for fish habitat creation. In 2002-2003, the Corps proposes to use dredged material for the creation of shallow-water and mid-depth fish habitat. This is described in detail in section 2.9.4 of this appendix.

2.6.2 Upland Disposal

A contingency upland disposal site has been identified at the Joso HMU (plates 11 and G-2). This site will serve for disposal of the small portion of dredged material that may contain low levels of contaminants and is, therefore, unsuitable for in-water disposal. It would be isolated at the Joso upland disposal site (RM 56.5) where appropriate confinement measures would be taken (e.g., an impervious liner to prevent leaching of unsuitable or contaminated materials). Uncontaminated material may be unsuitable for in-water disposal as well (e.g., too much silt for use in creating shallow-water fish habitat). This material would be disposed of in a separate portion of the Joso site. All material would be disposed of within the confines of the existing gravel pit and no material would be disposed of on the surrounding shrub-steppe vegetation.

Use of the Joso site would require reconstruction of some facilities and construction of others (plate G-2). Construction activities are anticipated to take place in the fall of 2002. The existing barge slip would likely need to be dredged to restore access. Up to 79,000 CY (60,399.8 m^3) of cobbles and silt may need to be dredged to re-establish a channel 14 feet (4.3 m) deep and up to 212 feet (64.6 m) wide. The barge slip would also be reconstructed using sheet pile to provide vertical walls and tie-off facilities. This reconstruction would require removal of a 15-foot-wide by 150-foot-long (4.6-meter-wide by 45.7-meter-long) riparian vegetation strip composed of primarily false indigo and water hemlock at the east end of the slip (figure G-2) Temporary dredged material dewatering and storage areas with containment berms and detention ponds would be constructed adjacent to the slip. This is because the material would be off-loaded from

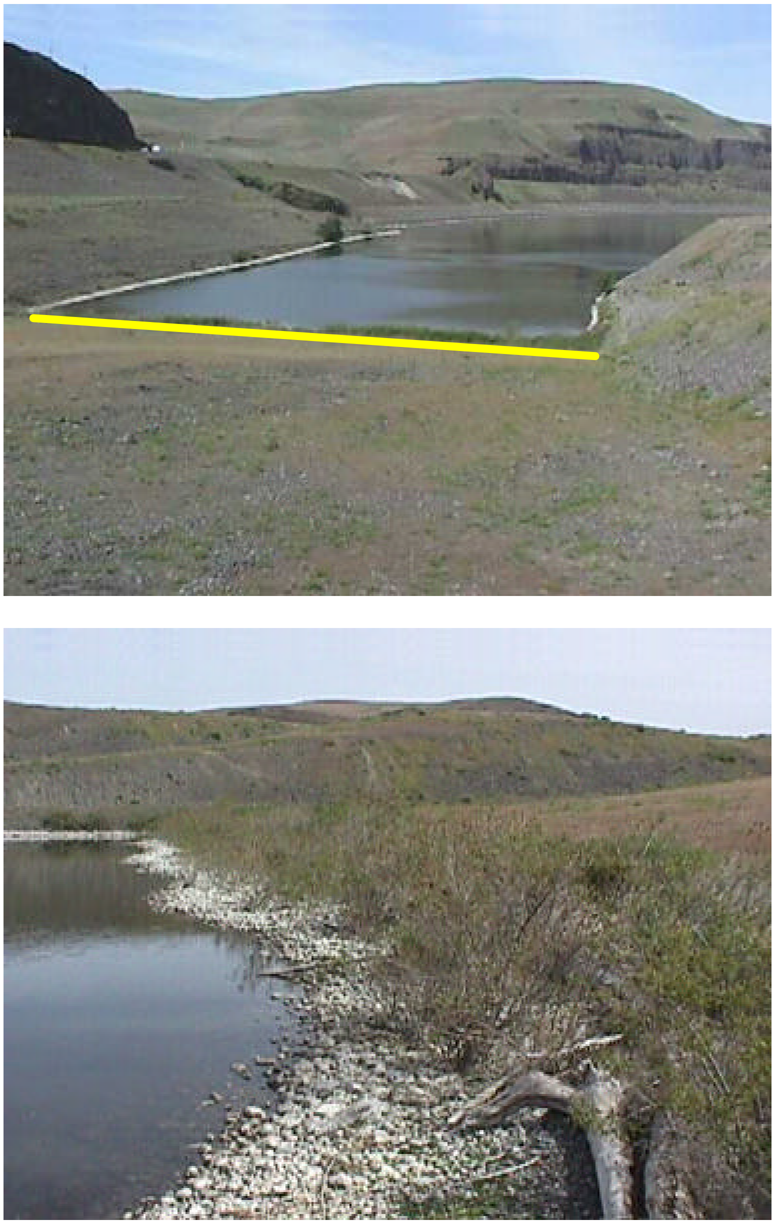


Figure G-2. Expected Riparian Vegetation to be Removed (Top, Looking West) at the Joso Barge Slip Area With a Close-Up of the Vegetation (Bottom, Looking North).

the barges and placed in the temporary storage for dewatering, then would be loaded onto trucks for transport to the disposal area. The material would then be placed in lifts using track-type tractors and compacted, resulting in a large structural fill conforming to the established final topography for the disposal area. Areas that reach final grades would be restored on a periodic basis by placing 6 inches [15.2 centimeters (cm)] of topsoil and re-seeding with native grasses to achieve a vegetative cover similar to undisturbed native sites. Filling the gravel pit with sediment and seeding it to grass would improve the site's value as wildlife habitat.

2.7 Levee Raise

The cities of Lewiston and Clarkston are adjacent to the Lower Granite reservoir. Lewiston is protected by a backwater levee system installed in lieu of relocating its business district. The levee system is an upstream extension of the dam and is designed to allow the Lower Granite reservoir to be operated to protect the Lewiston/Clarkston area from inundation during the SPF.

The upper reach of the Lower Granite reservoir collects much of the sediment carried in suspension in the free-flowing reaches of the upstream rivers. Sediment accumulation in the reservoir over time has reduced the flow conveyance capacity in this upper reach and has compromised the level of protection provided by the levees. This project would raise the west Lewiston levee (plate 17) by as much as 3 feet (0.9 m) in order to maintain flow conveyance and provide flood protection.

The 3-foot (0.9 m) levee raise involves adding an earth embankment raise to the existing levees. The plan would include:

- Raising a portion of the west Lewiston levee.
- Modifying Highway 129 and the Snake River Road upstream of Asotin.
- Increasing the risk of flooding of the convenience store at Hellsgate State Park, the U.S. Forest Service building, and the Corps' buildings.

In order to raise the levee, recreation paths would be removed and height would be added using embankment of impervious gravel. The top of the existing levee would first be excavated to the impervious core and filter to allow the new impervious gravel backfill to tie to the existing core and filter. A 12-foot (3.7-m) top width would be provided for access and maintenance and recreational paths would be reestablished.

2.8 Emergency Dredging

The Corps may need to perform dredging on an emergency basis. An emergency, as defined in 33 CFR 335.7, is a situation that would result in an unacceptable hazard to life or navigation, a significant loss of property, or an immediate and unforeseen significant economic hardship if corrective action is not taken within a time period less than the normal time needed under standard procedures.

There are several potential situations that could occur in the Snake and Columbia Rivers that may require emergency dredging. High flows could deposit enough sediment at a point or points in the Federal navigation channel to block navigation. Rock could be swept into the navigation lock approach and form a shoal or sediment could build up on the inside bend of the navigation channel, posing an unacceptable navigation hazard.

For an emergency dredging situation, the Corps would perform environmental coordination on an expedited basis. The Corps would perform as much coordination as possible before initiating the emergency dredging, but some coordination may be performed during the dredging or after the dredging is completed.

Under an emergency dredging situation, only the immediate area would be dredged; therefore, the quantities of material to be removed would likely be small. If the emergency dredging occurs in the summer, the material would be disposed of upland, either at a site where it provides beneficial use or at the Joso site. If the emergency dredging occurs in winter, the material could be disposed of either in-water or upland. Should the material be sand, it may be disposed of in-water at an existing in-water disposal site to aid in creation of shallow water habitat. If the material is silt, it would be used for beneficial purposes upland or disposed of upland at the Joso site.

2.9 Dredging and Dredged Material Management: 2002-2003

This section describes the specific proposal for maintenance dredging and dredged material disposal to be performed in the winter of 2002-2003 (the first dredging opportunity following completion of the DMMP/EIS).

2.9.1 Description of Dredging Areas

Most of the 2002-2003 dredging will take place at the confluence of the Snake and Clearwater Rivers in the Clarkston, Washington/Lewiston, Idaho area. The Corps plans to remove approximately 183,000 CY (139,913.5 m^3) of sediment from the federal navigation channel on the Snake and Clearwater Rivers surrounding the confluence and another 7,300 CY (5,581.3 m^3) from the port berthing areas (Port of Clarkston and Port of Lewiston). Other sites to be dredged in the confluence area include Hells Canyon Resort Marina entrance, the Greenbelt Boat Basin, and the Swallows Park swimming beach and boat launch (see table G-3 and plate 17).

Table G-3. Sites Proposed for Dredging in 2002-2003 and the Estimated Quantities for Each.

Site to be Dredged	Quantity to be Dredged (in CY)
Federal Navigation Channel at Confluence of Snake and Clearwater Rivers	183,120
Port of Clarkston	5,559
Port of Lewiston	1,700
Hells Canyon Resort Marina Entrance	3,532
Greenbelt Boat Basin	2,747
Swallows Swim Beach/Boat Basin	24,852
Lower Granite Dam Navigation Lock Approach	3,139
Lower Monumental Dam Navigation Lock Approach	19,987
Illia Boat Launch	1,439
Willow Landing Boat Launch	3,924
Hollebeke HMU Irrigation Intake	3,270
Port of Walla Walla at Boise Cascade	121,000
Schultz Bar	75,000
Joso HMU Barge Slip	79,000
TOTAL	**528,269**

The Corps plans to dredge up to eight sites outside of the confluence area in 2002-2003. These include the downstream approaches to both Lower Granite and Lower Monumental navigation locks (plates 15 and 10). Two boat launches, Illia at RM 104 (plate 15) and Willow at RM 88 (plate 14), on the Snake would be dredged. Up to 79,000 CY (60,399.8 m^3) of material would be dredged from the barge slip at the Joso contingency upland disposal site at Snake RM 56 (plate 11). There is also one irrigation intake at Hollebeke HMU (RM 25) that requires sediment removal (plate 9). Two areas tentatively identified for dredging in 2002-2003 are the Port of Walla Walla barge slip access channel at the Boise Cascade Plant and the federal navigation channel in the Schultz Bar area (plates 4 and 15). Each would require a fairly significant amount of dredged material removal [121,000 CY and 75,000 CY (92,511.1 m^3 and 57,341.6 m^3), respectively].

2.9.2 Dredging Methods

Most dredging would be done using mechanical dredging methods. These methods would include clamshell, dragline, backhoe, or shovel/scoop. Based on previous dredging activities, the method used most frequently would probably be clamshell dredging. For the boat basins, the method would most likely be backhoe. For the irrigation intake dredging, hydraulic dredging would be considered. Most dredging would take place during the established in-water work windows of December 15 to March 1 for the Snake and Clearwater Rivers and December 1 to March 31 for the Columbia River. The irrigation intake dredging may take place in the summer when water temperatures exceed 70 °F (21.1 °C), creating a temperature block that would discourage use of the area by juvenile salmonids. Dredging at the Joso contingency upland disposal site would take place in November 2002 to ensure the site is available for use during the established in-water work window in 2002-2003.

In general, material would be scooped from the river bottom and loaded onto a bottom-dump barge for in-water disposal or a bin-type barge for upland disposal. The contractor would be allowed to overspill excess water from the barge while the barge is being loaded. The water would be discharged a minimum of 2 feet (0.6 m) below the river surface. The Corps estimates it could take about 6 to 8 hours to fill a barge. The barge would then be pushed by a tug to the disposal site. No material or water would be discharged from the barge while it is in transit. If the disposal location were an in-water site, once the barge arrived, the bottom would be opened to dump the material all at once. If the disposal location were an upland site, the barge would be unloaded using mechanical equipment. Once unloaded, the barge would be returned to the dredging site for additional loads. The contractor could be expected to work between 10 and 24 hours per day, 6 to 7 days per week. For small, off-channel sites such as boat basins, swim beaches, or irrigation intakes, the material would either be loaded onto barges for transport to the in-water disposal site, or loaded into dump trucks for upland disposal.

2.9.3 Description of Material to be Dredged

The type of material to be dredged depends on the location of the dredging. In the Snake/Clearwater Rivers confluence area, the Corps expects to find a mix of coarse sand, fine sand, silt, fine silt, and organic material (wood particles). This determination is based on samples taken during previous dredging operations and in June 2000. The Corps expects to find sand in the main navigation channel and silt/fines near the shore, in the port areas, and in the Greenbelt Boat Basin. The Corps also expects to find silt in the other boat basins, the irrigation intakes, and the Port of Walla Walla channel at Boise Cascade.

In the area below the Lower Granite and the Lower Monumental navigation locks, the Corps expects to find river cobbles 2 to 6 inches (5.1 to 15.2 cm) in diameter with little fines and possibly some large rock up to 18 inches (45.7 cm) in diameter. Based on previous surveys, it is anticipated that redds could possibly be found in the dredging areas immediately downstream of the dams. Prior to dredging, the Corps would conduct salmon redd surveys in these areas to ensure no redds would be disturbed by dredging or disposal.

2.9.4 Disposal Methods and Locations

The Corps plans to use the dredged material for beneficial use. At this time, the Corps proposes to use in-water disposal for the majority of the dredged material to create shallow-water and mid-depth fish habitat. The Corps has identified potential in-water disposal locations for the dredging to be performed in 2002-2003. However, the Corps is requesting input from the LSMG for additional proposals for beneficial use of the dredged material. The selected beneficial use of the material to be dredged in 2002-2003 will be determined prior to the signing of the Record of Decision for the DMMP/EIS.

For the 2002-2003 dredging, the Corps would dispose of dredged material in a way similar to that described in the DMMP/EIS as Alternative 2 Maintenance Dredging with Beneficial

In-Water Disposal. The Corps has collected sediment samples from most of the areas to be dredged and has identified which sites or portions of sites contain mostly silt and which ones contain mostly sand or coarser material. For all of the dredging except the for Lower Monumental navigation lock approach, the disposal location would be at RM 116 in the Lower Granite reservoir (plates 15 and 16). This site is a shallow bench on the left bank of the Snake River just upstream of Knoxway Canyon. The Corps selected this site because it is close to the confluence (where most of the dredging would occur), could provide suitable resting/rearing habitat for juvenile salmon once the river bottom is raised, would not interfere with navigation, would not impact cultural resources, and is of sufficient size to accommodate dredged material disposal for several years.

The dredged material disposal at RM 116 is designed to accomplish two goals: (a) create shallow water habitat for juvenile salmon and (b) dispose of silt in a beneficial manner. Studies conducted on the Lower Snake River from 1988 to 1993 indicated that substrate of sand, gravel, and/or cobble provided suitable habitat for juvenile salmon while silt substrate provided no benefit (Bennett et al., 1998).

To meet its goals, the Corps proposes to place the dredged material in steps. The first step would be to use the silt [less than 0.008 inch (0.2 millimeters (mm)) in diameter] in a mixture with sand and gravel/cobble to fill the mid-depth portion of the site and form a base embankment. The dredged material would be placed aboard bottom dump barges and analyzed to determine the percentage of sand or silt. The barges would then proceed to the disposal area and would dump the material within the designated footprint close to the shoreline to raise the river bottom to a depth of 20 feet (6.1 m).

The second step would be to place sand on top of the sand/silt embankment. The contractor would be directed to reserve an area of sand as the final dredging site. The contractor would use barges to dump the sand on top of the base embankment so a layer of sand at least 10 feet (3.0 m) thick covers the embankment and the water depth is about 10 feet (3.0 m) deep as measured at minimum operating pool. The footprint of the disposal area would be sized so that the maximum amount of shallow-water, sandy substrate habitat is created with the estimated quantities of material to be dredged. The third step would be to use a beam drag to flatten and level the tops of the mounds to form a flat, gently sloping (3 to 5 percent) shallow area between 10 and 12 feet (3.0 and 3.7 m) in depth.

There are two possible disposal options identified for the Lower Monumental navigation lock material. One is to barge the material to RM 116 and add it to the embankment material. The other is to stockpile the cobble in an upland location. The stockpile could then be used for other projects such as creation of riparian planting areas or shoreline stabilization combined with riparian plantings.

2.9.5 Sediment Contaminant Analysis

In June 2000, the Corps sampled most of the proposed 2002-2003 dredge sites for sediment-type and contaminant level. Chemical sampling was conducted on sediments for polynuclear aromatic hydrocarbons (PAH's), organophosphates, chlorinated herbicides, oil, grease, glyphosate, ampa, dioxin, and heavy metals. None of the contaminants were found in concentrations exceeding regulatory thresholds.

Results from herbicide and pesticide tests were below reportable laboratory detection testing levels. Metal and PAH concentrations were below standards listed for the compounds in the Washington Department of Ecology Draft Sediment Standards, June 1999. For the glyphosphate tests, only one site, located in the Green Belt Boat Basin at Clarkston, showed glyphosate above lab detection limits at 23 parts per billion. 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.

Twenty-four sites were sampled and tested for dioxin using method EPA 4425 in the Lower Granite reservoir at and below the confluence of the Snake and Clearwater Rivers. Chlorinated furans and dioxin congeners have been detected in the past in this area (1991, 1996, and 1998). The June 2000 results showed seven sites containing some chlorine dioxin congeners. One is at the confluence and four sites are on or near the left bank traveling downstream (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. Two additional duplicate samples were included. Results showed that there were no concentrations of 2,3,7,8 TCDD, considered a very potent carcinogen according to Universal Treatment Standards. Less toxic congeners were present in small amounts (parts per trillion)

These congeners were found at all seven sites: Octachlorodibenzodioxin (OCDD) ranging from 8.81 to 166.94 parts per trillion; 1,2,3,4,6,7, 8-Heptachlorodibenzodioxin (HpCDD) from 1.05 to 22.15 parts per trillion; 1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF) at 0.29-2.99 parts per trillion; and octachlorodibenzofuran (OCDF) at 0.57 to 19.61 parts per trillion. Four sites had 1,2,3,4,7,8-haxachlorodibenzofuran (HxCDF) ranging from 0.12 to 1.15 parts per trillion and 1,2,3,6,7,8-Hexachlorodibenzodioxin (HxCDD) was found at two sites ranging from 0.42 to 1.21 parts per trillion.

Ammonia is quickly becoming a primary contaminant of concern because of its relatively high concentrations recently found in most of the lower Snake River fine sediments (silt). Over the last 5 years, most of the potential dredging sites in the lower Snake River have been tested for the concentration of ammonia in sediment. Ammonium (NH_4+) itself is generally only toxic in large concentrations. It is the un-ionized portion of ammonia (NH_3) that is toxic to aquatic organisms. Un-ionized ammonia is more toxic because it is a neutral molecule and, thus, has the ability to diffuse across the epithelial membranes of aquatic organisms far more readily than a charged ion. High external un-ionized ammonia concentrations reduce or reverse diffusive gradient and cause the buildup of ammonia in gill tissue. Assuming that ammonia and un-ionized ammonia have different partial toxicity, the un-ionized ammonia is 100 times more toxic than ionized ammonia. Studies show that un-ionized ammonia toxicity has a measurable correlation to pH.

Ammonia is present in sediments in each of the four reservoirs of the lower Snake River. The concentration of ammonia in the sediments, when compared to the potential amount of dissolved ammonia, makes unconfined excavation of sediments in the summer undesirable because the amount of un-ionized ammonia increases as water temperature increases. Un-ionized ammonia also increases dramatically when levels exceed 7.5 pH.

Waters of the Snake River have a high alkalinity with a pH typically between 7.8 and 8.5. Elutriation tests were conducted in 1997 to obtain estimates of ammonia dissolved in the water after in-water suspension of dredged material. Table G-4 compares elutriation data to average concentrations of sediment ammonia for each reservoir, to average reservoir pH, and to the National Criterion for Ammonia in Fresh Water (EPA, 1999). This risk assessment, based on chronic and acute criterion for fish (EPA, 1999), was then conducted.

Potential impacts varied for each reservoir. Potential impacts from ammonia in the Lower Granite reservoir were judged to be extremely high because the elutriate ammonia average (3.6 mg/L at 8.5 pH) could exceed the early life stage criterion three-fold and could exceed both acute criterions (2.14 mg/L and 3.20 mg/L). Potential impacts from ammonia in the Little Goose, Lower Monumental, and Ice Harbor reservoirs were judged to be moderate because the elutriate ammonia average could exceed the chronic early life stage criterion.

Table G-4. Risk Assessment of Potential Impacts of Increased Ammonia Levels Upon Fish.

	Lower Granite	Little Goose	Lower Monumental	Ice Harbor
Elutriate Ammonia Average in mg/L	3.6 mg/L	2.6 mg/L	2.5 mg/L	3.6 mg/L
Dissolved Elutriate Percentage	4.7%	4.0%	4.2%	4.4%
Average Forebay Concentration of Ammonia in mg/kg	75.7 mg/kg	64.3 mg/kg	59.6 mg/kg	81.3 mg/kg
Average pH in Winter (data source)	8.5 pH (1)	8.3 pH (2)	8.1 pH (3)	8.0 pH (2)
Early Life Stage Chronic Criterion	1.09 mg/L	1.52 mg/L	2.10 mg/L	2.43 mg/L
Acute Criterion with Salmon Present	2.14 mg/L	3.15 mg/L	4.64 mg/L	5.62 mg/L
Acute Criterion with Salmon Absent	3.20 mg/L	4.71 mg/L	6.95 mg/L	8.40 mg/L
Predicted Risk of Impact	Extremely High	Moderate	Moderate	Moderate

(1) Prototype BGS Installation at Lower Granite.
(2) Estimated pH from previous unpublished data.
(3) 1998 LSRF Data.

The potential impacts from ammonia in the McNary reservoir are unknown. The Corps has no data for the sites that might be dredged. However, the Corps would expect elevated concentrations of ammonia in the sediments in McNary reservoir. This is based on the deposition pattern of sediment from the Snake, Yakima, and Walla Walla Rivers entering the Columbia River and the knowledge that much of the sediment from these rivers is silt.

Thirty-eight locations were sampled for oil and grease. Results varied from 41 to770 parts per million (ppm). Only three of the samples exceeded 400 ppm, and they were downstream from boat basins. Total organic carbon (TOC) testing was run on the oil and grease samples and the glyphosate sample that was above detection limits. The TOC's for oil and grease averaged

1.2 percent and ranged from 0 to 5.8 percent. The TOC for the glyphosate sample was 1.6 percent. These sites all yielded concentrations of PAH chemicals below reportable lab detection limits; oil and grease composition was probably from animal matter.

The Corps will sample the remaining dredging sites for sediment type and contaminant levels prior to the 2002-2003 dredging. Based on previous dredging activities, the Schultz Bar area is expected to be predominantly sand with low potential for contamination. The Joso barge slip material is expected to be cobbles with some fines. The possibility of contaminants in the cobble material is low. Based on previous dredging activities, the Port of Walla Walla site at Boise Cascade is expected to be silt with a potential for contamination. However, the levels of contaminants in the silt are not expected to exceed regulatory thresholds.

3.0 PROJECT IMPACTS ON ESA-LISTED SPECIES

3.1. Bald Eagle (*Haliaetus leucocephalus*)

3.1.1 Habitat Requirements/Population Status

During the nesting season (February 1 through August 15), bald eagles use breeding habitat close to rivers, lakes, marshes, or other food sources. Important habitat components include nest trees, perch trees, and available prey. Live, mature trees with deformed tops are often selected for nesting, and nests are often reused year after year. Snags, trees with exposed lateral branches, or trees with dead tops are important for perch-sites while hunting or defending territories. Perches used for foraging are normally close to water where fish, waterfowl, seabirds, and other prey can be captured.

Wintering bald eagles (November 1 through March 15) congregate along rivers, lakes, and streams, where winter runs of salmon provide an abundant prey base. Waterfowl concentrations may also be important winter food sources. In eastern Washington, mixed stands of black locust and black cottonwood provide important roosting and perching habitat.

3.1.2 Known Occurrences in Project Vicinity

There are no documented successful bald eagle nests in or around the project area. An unsuccessful nesting attempt occurred on Strawberry Island near the mouth of the Snake River during the 2000 nesting season. This site is adjacent to proposed dredging activity for the approach to Ice Harbor Dam. Bald eagles have also attempted nesting in the Clearwater and Grande Ronde drainages and at the Hanford Reservation north of Richland, Washington. These sites are well over a mile from the project area. The limited amount of suitable habitat makes additional nesting in the project area unlikely.

Based on data from Corps mid-winter surveys, bald eagles may be present in the project area during the winter, roosting in black locust or black cottonwood trees where available. Mid-winter censuses have been conducted on the lower Snake and Columbia Rivers from McNary (on the Columbia below the confluence with the Snake) to Asotin, Washington, [2 miles (3.2 km) upriver from Clarkston, Washington] annually since 1989. These surveys generally take place in

January and are divided into two survey areas. The Western Project survey area extends from McNary to Lower Monumental. The Eastern Project area extends from Lower Monumental to the upper influence of the Lower Granite reservoir, near Asotin, Washington. Surveys were typically conducted in January and were confined to Corps-managed lands along the rivers.

The last 5 years of survey results were examined to determine average annual bald eagle occurrence. In the Western Project area, bald eagle counts ranged from 11 to 19 individual birds annually. Many of the locations are less than 1 mile (1.6 km) from proposed dredging and dredge disposal activities. These include Strawberry Island below Ice Harbor, Sacajawea Park at the Snake and Columbia Rivers confluence, and Big Flat HMU above Ice Harbor Dam. In the Eastern Project area, between three and five individual bald eagles per year have been counted. One or two of these are usually found in the Snake/Clearwater Rivers confluence area, near the proposed Lower Granite dredging and levee raising activities.

3.1.3 Effects of the Action

The dredging disposal activities for the both the 20-year plan and the 2002-2003 dredging would have a minimal impact on bald eagles. The proposed activities do not include removal of any shoreline vegetation; all potential bald eagle habitat will remain intact. Prey species such as fish and waterfowl may be temporarily displaced by dredging and disposal activities, but impacts would be short term (1 or 2 days in most cases) and localized.

There is some potential for project activities to cause disturbance to roosting or foraging eagles through increased noise and human activity levels. The majority of the dredging as well as the levee raising will take place at the Snake/Clearwater Rivers confluence area. Fishing boats and barge traffic generate noise and human activity in the Ports of Clarkston and Lewiston on a daily basis. Project activities will take place in these already impacted areas. Dredging and levee raising activities will add to the existing amount of human-generated noise and activity both in the river channel and on the shoreline. On the lower Snake River an average of two barges pass the Lower Monumental and Lower Granite locks daily. The proposed action would add to this existing level of barge activity. In addition, barges and equipment would remain in one place longer (several hours to 1 or 2 days) as opposed to the transitory behavior of existing barge traffic.

Eagles become habituated to routine or repetitive human activities such as automobile traffic or logging operations (Stalmaster, 1976). Other activities, such as driftboating, fishing, and hunting, may cause eagles to flush from perches or feeding areas (Stalmaster, 1976). Humans approaching eagles from the river channel caused the greatest amount of disturbance to wintering bald eagles on the Nooksack River. These birds avoided areas of high human activity and selected perches in areas of low to moderate activity. When human activities were restricted to a minimum of 984 feet (300 m) from eagles, these activities were not disturbing to 98 percent of the bald eagle population (Stalmaster, 1976).

With careful attention to the timing, location, and distance of project activities from perched or foraging bald eagles, disturbance impacts can be minimized or, in many cases, avoided altogether.

3.1.4 Conservation Measures

Dredging will overlap with wintering bald eagles during the 3 1/2-month period of December 1 to March 31. This period also overlaps with the nesting period, and nesting bald eagles may be present at the Strawberry Island site any time after early January. A wildlife biologist will conduct surveys at each project site immediately prior to the commencement of activities at that site. Activities will not commence while bald eagles are using the project area. This applies to eagles that are within 0.25 mile (0.4 km) when out of line-of-site of the activity and within 0.5 mile (0.8 km) when in line-of-site of the activity. If nesting activity is taking place at Strawberry Island, further timing restrictions (such as operating prior to the beginning of the nesting season) may be required.

3.1.5 Determination of Effect

Impacts to bald eagles of both the 20-year plan and the 2002-2003 dredging and disposal will be minimal. Habitat will remain intact. Fish, waterfowl, and other prey species may be temporarily displaced but will be available in areas adjacent to the project activities. Individual eagles occupying a project area prior to commencement of work will not be disturbed. Thus, the dredging, disposal, and levee raising activities "*may affect, but are not likely to adversely affect*" bald eagles.

3.2 Bull Trout (*Salvelinus confluentus)*

3.2.1 Habitat Requirements/Population Status

Bull trout are native inhabitants of most major river drainages in the Pacific Northwest. They are widespread throughout the Columbia River Basin, including occupation of many tributaries to the Snake River. Populations have declined throughout the area due to human impacts. Habitat components that appear to influence bull trout distribution and abundance include water temperature, cover, channel form and stability, valley form, spawning and rearing substrates, and migratory corridors (Oliver, 1979; Pratt, 1984, 1992; Fraley and Shepard, 1989; Goetz, 1989).

Watson and Hillman (1997) concluded that watersheds must have specific physical characteristics to provide habitat requirements for bull trout to successfully spawn and rear. Bull trout are found primarily in colder streams, although individual fish are found in larger river systems throughout the Columbia River Basin (Fraley and Shepard, 1989; Rieman and McIntyre, 1993; Buchanan and Gregory, 1997). Water temperature above 59 °F (15 °C) is believed to limit bull trout distribution. However, the USFWS reported 37 records of bull trout in the lower Snake River since 1991. Most were noted at adult fish counting stations and passed in April, May, or June (Hayley, 1999).

Bull trout typically spawn from August to September during periods of decreasing water temperatures. Migratory bull trout frequently begin spawning migrations as early as April and have been known to move upstream as far as 155 miles (250 km) to spawning grounds. Temperature during spawning generally ranges from 39 to 51 °F (4 to 10 °C) with redds often constructed in stream reaches fed by springs or near other sources of cold groundwater (Goetz, 1989). Bull trout require spawning substrate consisting of loose, clean gravel relatively free of fine sediments.

The primary bull trout population associated with the main stem lower Snake River spawns in the Tucannon River, a tributary to the Snake. This population was rated as "healthy" by the Washington Department of Fish and Wildlife (WDFW) (WDFW,1997) although some habitat degradation has occurred due to timber harvest and recreational use. It is not currently at risk of extinction and is not likely to become so in the foreseeable future because of sufficient habitat protection (wilderness designation) in the upper watershed and the lack of brook trout encroachment from Pataha Creek. The Pataha Creek subpopulation is at risk of extinction as a result of habitat degradation and competition and hybridization from brook trout.

3.2.2 Known Occurrences in Project Vicinity

Bull trout occur in widespread, but fragmented habitats. Bull trout occupy portions of 14 major tributaries in the Snake River basin of Idaho, Oregon, and Washington. Downstream of Hells Canyon Dam, major tributaries that support bull trout include: Tucannon River, Clearwater River, Asotin Creek, Grande Ronde River, Imnaha River, and Salmon River. Although some strongholds still exist, bull trout generally occur as isolated subpopulations in headwater lakes or tributaries where migratory fish have been lost (Bowerman et al., 1998).

The only subpopulations of bull trout associated with the four lower Snake River and McNary reservoirs spawn and rear in the Tucannon River Basin. Both resident and migratory forms occur here. Only resident fish are present in the headwaters of Pataha Creek, but both forms exist in the main stem Tucannon River and its tributaries (WDFW, 1997). Evidence suggests that migratory (adfluvial) bull trout from the Tucannon River also utilize the main stem Snake River on a seasonal basis (Buchanan et al., 1997). Adult bull trout that are adfluvial generally spend about half of every year associated with a reservoir (November to May). These fish most likely forage in shallow areas where the majority of prey exists. Depending on water conditions, bull trout will occupy deeper areas of the reservoir where water temperatures are cooler [45 to 54 °F (7.2 to 12.2 °C)] and move to the surface when water temperatures drop to or below 54 °F (12.2 °C).

There have been several observations of adult bull trout passing Lower Monumental and Little Goose. From 1994 to 1996, there were 27 bull trout passing the adult fish counting station (mainly in April and May) at Little Goose. At least six bull trout passed counters at Lower Monumental and Little Goose in 1990 and 1992 (Kleist 1993). Kleist also observed one bull trout in 1993 just downstream of the count window at Lower Monumental. Furthermore, one bull trout was captured in the Palouse River below Palouse Falls in 1998. These were likely migratory fish from the Tucannon River. However, one bull trout was observed at Lower Granite in 1998 that may indicate fluvial fish are migrating to other upstream populations.

3.2.3 Effects of the Action

Migratory bull trout from the Tucannon River may be present in the main stem Snake River below Lower Granite during the proposed window of operation. A few bull trout from the

Clearwater River or other tributaries could potentially be present in the vicinity of the Snake/Clearwater Rivers confluence. The potential for small numbers of bull trout to be present at either location necessitates the discussion of possible impacts.

The majority of the dredging will be completed using mechanical means, primarily by means of a clamshell. Due to the characteristics of this equipment, it is unlikely that the dredging would cause direct mortality to fish. Specifically, the clamshell bucket descends to the substrate in an open position. The force generated by the descent drives the jaws of the bucket into the substrate, which "bite" the sediment upon retrieval. During the descent, the bucket remains in an open position and, thus, would be unlikely to trap or contain fish.

A small amount of dredging may require the use of hydraulic equipment. Hydraulic equipment has potential to cause direct mortality to fish through use of a cutterhead and suction pump, which can pull fish into the equipment and damage or kill them in the process. Several measures will be used to avoid such impacts. First, hydraulic (suction) dredges will only be used locally around irrigation intake pipes in order to avoid damage to pipes by mechanical dredges. The amount of sediment to be dredged will be minimal (less than 5,000 CY per site). Second, timing will be based on water temperature and will be selected to exclude likely presence of salmonids and bull trout. Third, exclusion devices such as bubble curtains will be used where fish may be present. The details of these mitigations will be established prior to individual project activities.

There is potential for the dredging operation to displace fish from the immediate dredging area. Fish are known to respond evasively to a variety of stimuli (Popper and Carlson 1998). The noise of the tugboat engine pulling the transport barge may cause any bull trout present to leave the dredging area. The disturbance caused by the mechanical dredge as it enters the water and removes material will also tend to cause any bull trout present to leave the dredging area. Except in the very shallow disposal sites, the sudden stimulus of the nose or shock wave associated with the release of the dredged material, or the sudden decrease in light, would be expected to startle fish and induce them to dart away from the source (Anderson, 1990). The ability of fish to move away from the disturbance prevents them from being harmed directly by the dredging, but has potential to cause excess energy expenditure and loss of habitat use.

Disposing of dredged material at the in-water sites identified in the Lower Granite reservoir would have minimal impacts on bull trout. The disposal sites are 40 to 60 miles (64.4 to 96.6 km) upstream of the Tucannon River and 25 to 45 miles (40.2 to 72.4 km) downstream of the Clearwater River. The location of the proposed in-water disposal area for the 2002-2003 dredging is at Knoxway Canyon, which is about 60 miles (96.6 km) upstream of the Tucannon River and about 25 miles (40.2 km) downstream from the Clearwater River. Only one bull trout has been reported at Lower Granite since monitoring began. It is unlikely any bull trout would be at the Knoxway Canyon location or any of the other locations during disposal. If there were fish present, aside from turbidity, the action of disposal would allow time for fish to escape the area of disposal. Injury to fish from direct impact of dumping of dredged material is unlikely.

Dredging and disposal would cause temporary and localized impacts by increasing turbidity and suspended solids. Background turbidities in the lower Snake River reservoirs range from 10 to 200 nephalometric turbidity units (NTU's), depending on rainfall and runoff (Heaton, 2001).

During dry weather in the winter, background turbidity is expected to be at the low end of this range. Van Oosten (1945) concluded from a literature survey that average turbidities as high as 200 NTU's do not harm fish.

3.2.4 Conservation Measures

Conservation measures are identified on two tiers. The first tier includes measures specific to the potential impacts of the DMMP. The second includes conservation measures identified by USFWS in its Biological Opinion of December 2000. This Biological Opinion addressed impacts of the Federal Columbia River Power System on threatened and endangered species. Specific actions required for minimizing “take” of bull trout include conducting studies to determine presence of bull trout in the Snake River and implementation of measures needed to provide suitable upstream and downstream passage for bull trout. The Corps provided its plan to implement these measures in a Record of Consultation and Statement of Decision issued May 15, 2001. Measures specific to the impacts of the DMMP are listed below.

To minimize potential impacts to anadromous fish, the Corps has implemented dredging policies that require the use of mechanical dredging equipment for most of the dredging. More efficient, hydraulic dredges have potential to cause direct mortality to fish through use of a cutterhead and suction pump, which can pull fish into the equipment and damage or kill them in the process. Grab, bucket, or clamshell (mechanical) dredges, as proposed for this project, provide little or no potential for fish to become entrained or harmed. The Corps views the tradeoff in efficiency as worth the gain for protecting bull trout and anadromous fish. The Corps has used mechanical dredging in the District since 1987 and will continue to do so. In isolated cases where hydraulic dredging may be necessary, mitigation measures to reduce or eliminate impacts to fish will be implemented. These may include manipulation of project timing to exclude presence of salmonids or bull trout and/or use of exclusionary devices such as bubble screens.

Measures to minimize turbidity will be taken. The Corps will require the contractor to take water samples and measure turbidity using a nephalometer twice per day during active dredging. The contractor will take samples 1 hour after dredging begins and 1 hour before dredging ends each day. Samples will be taken 300 feet (91.4 m) upstream from the dredging operation and 300 feet (91.4 m) directly downstream from the point of dredging. The contractor will take two measurements at each location: 3.3 feet (1 m) below the water surface and 3.3 feet (1 m) above the river bottom. The contractor will be required to notify the Corps within 8 hours in the event that the turbidity levels measured at the dredging operation exceed allowable levels. These levels are defined as 5 NTU’s over background when background is 50 NTU’s or less, or more than a 10 percent increase in turbidity when the background is more than 50 NTU’s. Background is measured 300 feet (91.4 m) upstream of the dredging operation. Immediately upon determining any exceedence of this NTU limit, the contractor would alter the dredging operation in an attempt to decrease turbidity levels. Monitoring would continue at the downstream location to determine if the NTU levels either returned to an acceptable limit or failed to be reduced. If the NTU levels did not return to an acceptable limit within a time period defined by the Washington Department of Ecology, the contractor would stop dredging and wait for the NTU levels to drop below exceedence levels before resuming dredging under an additionally altered scenario. If the contractor were unable to alter the dredging operation to meet turbidity requirements, the Corps would be contacted for further instructions.

The Corps will also conduct monitoring using self-contained water quality recording devices (such as YSI Sondes®) to take hourly readings of turbidity, dissolved oxygen, pH, ammonia, and conductivity. The recording devices will be stationed 300 feet (91.4 m) upstream of the dredging operation, 300 feet (91.4 m) downstream of the dredge, upstream of the in-water disposal areas, and 300 feet (91.4 m) downstream of the disposal sites (one recording device at each site. The Corps will download the recording device information daily and analyze the data to ensure water quality standards are being met.

3.2.5 Determination of Effect

Both the 20-year plan and the 2002-2003 dredging activities are expected to have minimal impacts on bull trout. Dredging and disposal operations will occur during a time of year that bull trout may be present in the lower Snake River reservoirs. Numbers of bull trout in the vicinity of the dredging operation are likely to be small, and the potential for fish to avoid impacts is high. The Corps will comply with terms of the USFWS Biological Opinion on the Federal Columbia River Power System to monitor bull trout in the lower Snake River system. The dredging and disposal operations "*may affect, but are not likely to adversely affect*" bull trout.

3.3 Ute ladies' tresses (*Spiranthes diluvialis*)

3.3.1 Habitat Requirements/Population Status

Ute ladies' tresses, an orchid, is a lowland species, typically occurring beside or near moderate gradient medium to large streams and rivers in the transition zone between mountains and plains. It is not found in steep mountainous parts of the watershed, nor along slow meandering streams out in the flats. The communities where it is often found tend to be typical of riparian habitat in the area. The species tend to occupy graminoid (grasses, rushes, and sedges) dominated openings in shrubby areas. It occasionally occurs in spring-fed wetlands in broad valleys isolated from watercourses. Soil moisture must be at or near the surface throughout the growing season. The species tolerates periodic flooding, but does not occupy constantly inundated areas (USFWS, 1998).

Ute ladies' tresses occurs in a variety of settings, including floodplains; moist to wet meadows on floodplains; abandoned meander channels; moist to wet meadows irrigated by freshwater springs; riparian streambanks; borrow pits; and upper edges of river banks, islands, point bars, and various topographic positions up to 200 feet (61.0 m) horizontally and 0.5 to 4 feet (0.2 to 1.2 m) vertically from water's edge, but not on steep slopes (USFWS, 1998).

3.3.2 Known Occurrences in Project Vicinity

Ute ladies' tresses were discovered in Washington for the first time in 1997. They were also found in the Snake River Basin in southeastern Idaho in 1996. The plant is now known to be present in northern Washington, southern Idaho, and nearby parts of Montana. The USFWS has determined that, in the absence of adequate surveys, this species may be expected to occur in suitable habitat throughout Idaho and Washington (USFWS, 1998). It is unlikely, but possible, that the project areas along the lower Snake River include habitat suitable for this species. There are no known occurrences in the project area to date.

3.3.3 Effects of the Action

Project activities for both the 20-year plan and the 2002-2003 dredging that include shoreline disturbances have the potential to affect this species. These activities include use of the Joso site for upland dredged material disposal and raising of the west Lewiston levee. Any shoreline or wetland habitat that will be disturbed through these activities would be surveyed for Ute ladies' tresses prior to project implementation. Populations of Ute ladies' tresses will be protected from disturbance.

3.3.4 Conservation Measures

Primary project activities (dredging and beneficial or in-water dredge disposal) will not impact this species. Protocol surveys will be conducted prior to any activity at Joso or the west Lewiston levee that may impact suitable habitat. Any population of Ute ladies' tresses that is discovered will be protected with recommended buffers.

3.3.5 Determination of Effect

This project "*may affect, but is not likely to adversely affect*" Ute ladies' tresses.

3.4 Spalding's silene (*Silene spaldingii*)

3.4.1 Habitat Requirements/Population Status

Spalding's silene occurs primarily within open grasslands with a minor shrub component and occasionally with scattered conifers. It is found most commonly in the Idaho fescue/snowberry plant association at elevations of 1,900 to 3,050 feet. These sites are typically dominated by Idaho fescue and have sparse cover of snowberry. Total vegetative cover is greater than 100 percent. Some of these sites occur in a mosaic of grassland and ponderosa pine forest. Populations have been found on all aspects, although there seems to be a preference for slopes that face north. On drier sites, the species can be found on the bluebunch wheatgrass/Idaho fescue association. Associated species include prairiesmoke (*Geum triflorum*), sticky geranium (*Geranium viscosissimum*), Wood's rose (*Rosa woodsii*), white stoneseed (*Lithospermum ruderale*), yarrow (*Achillea millefolium*), northwest cinquefoil (*Potentilla gracilis*), and hawkweed (*Hieracum sp.*).

Spalding's silene generally occurs in native grasslands that are in reasonably good ecological condition, although populations have persisted in areas that have had moderate grazing pressure. Populations tend to be quite small and are currently quite fragmented, raising questions about their long-term viability. Fire may have historically played a role in maintaining habitat, particularly in sites that are interspersed with ponderosa pine forest.

3.4.2 Known Occurrences in Project Vicinity

There are no known occurrences of Spalding's silene in the project area.

3.4.3 Effects of the Action

None of the proposed activities for the 20-year plan or the 2002-2003 dredging will take place within suitable habitat for Spalding's silene. All proposed beneficial uses of dredged material will be reviewed for suitable habitat prior to selection. This project is expected to have "*no effect*" on Spalding's silene.

3.4.4 Conservation Measures

Due to the lack of suitable habitat, no conservation measures are necessary to protect Spalding's silene. Should beneficial uses be proposed in suitable habitat, conservation measures will be proposed and consultation with USFWS will be initiated.

3.4.5 Determination of Effect

An effect determination is not required for this species until it is formally listed; however, this project is expected to have "*no effect*" on Spalding's silene.

3.5 Other Species of Concern

The following discussion is cited from the Corps of Engineers "*Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement*" (USACE, 1999).

3.5.1 Wildlife

3.5.1.1 Black tern (*Chlidonias niger*)

Black terns are small terns that eat primarily insects and can occur statewide, in or near wetlands and sloughs. They usually nest in marshy wetlands in June. Black terns are periodically reported by birders in the project area, primarily at the mouth of the Walla Walla River, and are believed to use the area only during migration (Ackerman, 2001). The project is unlikely to impact black terns.

3.5.1.2 California floater (*Anodonta californiensis*)

These mussels are found in unpolluted fresh water, except in small creeks. They prefer lakes and slow streams with areas less than 6.6 feet (2 m) deep and sandy bottoms. Adults will also live on mud bottoms. Juveniles are parasitic on gills, fins, and barbels of host fish. It is unknown how the project will impact this species.

3.5.1.3 Columbia pebblesnail (*Flumincola columbiana*)

These snails are found in the main channels and free-flowing parts of rivers including the Columbia, Grand Ronde, Salmon, and Snake Rivers. More recent documentation indicates they are present just above the study area on the lower Snake River. They are often common at the edges of rapids or immediately downstream of whitewater areas, and they feed on diatoms and algae. It is unknown how this project will impact Columbia pebblesnail.

3.5.1.4 Columbia spotted frog (*Rana pretiosa*)

Columbia spotted frogs are found in warmwater marshes, overflow wetlands, and bogs with non-woody wetland vegetation. They are found scattered across most of eastern Washington, although they have not been observed in the study area (Ackerman, 2001; Loper and Lohman, 1998).

3.5.1.5 Ferruginous hawk (*Buteo regalis*)

These large hawks prefer open plains and brushy open country and avoid forested areas. They nest in trees along streams, bluffs, rock piles, and artificial structures. Ferruginous hawks feed primarily on ground squirrels, rabbits, and other small mammals. They are uncommon along the lower Snake River corridor, although some suitable nesting habitat may be present. Due to the low occurrence of ferruginous hawks in the project area, there is low potential for this project to impact this species.

3.5.1.6 Bats

Several species of bats are found in the area. These species include: Fringed myotis (*Myotis thysanodes*); Long eared myotis (*Myotis evotis*); Long legged myotis (*Myotis volans*); Pale Townsend's big-eared bat (*Plecotus townsendii pallescens*); Small footed myotis (*Myotis ciliolabrum*); and Yuma myotis (*Myotis yumanensis*).

They commonly forage near or over water and roost in trees and shrubs (riparian areas along the lower Snake River), rock crevices, and buildings. However, the small footed myotis forages along cliffs, rock outcrops, and dry canyons.

Depending on the size of interstitial spaces, bats may use riprap areas for roosting or hibernating (Anderson, 2001). Filling in of riprap with dredged material has potential to negatively impact bats.

3.5.1.7 Harlequin duck (*Histrionicus histrionicus*)

Harlequin ducks generally rely on fast, turbulent mountain streams as breeding habitat. They may be present in the study area in August and September (following the nesting season), although sightings are rare. They winter in coastal areas and, thus, would not be likely be present during the project work window of December 1 through March 31.

3.5.1.8 Little willow flycatcher (*Empidonax trailii brewsteri*)

This flycatcher uses open brushy areas, especially scrub-shrub wetlands comprised of willows. This project is not expected to impact this species.

3.5.1.9 Loggerhead shrike (*Lanius ludovicianus*)

Loggerhead shrikes are robin-sized birds that feed mainly on insects, with small birds and mammals taken in winter. Preferred habitat includes shrub-steppe and any semi-open area with shrubs, fences, powerlines, or small trees for perches. This project is not expected to impact loggerhead shrikes.

3.5.1.10 Margined sculpin (*Cottus marginatus*)

The former range of these sculpins is unknown; however, they currently inhabit the Walla Walla and Tucannon Rivers in Washington. They are a benthic species whose requirements are poorly known. Without competition, they seem to prefer cool [55 to 66 °F (12.8 to 18.9 °C)] water, moderate to rapid current, and rubble or gravel substrate. Margined sculpins spawn in the spring. It is considered unlikely that this species would occur in any of the areas proposed for dredging (Ackerman, 2001).

3.5.1.11 Mountain quail (*Oreortyx pictus*)

These uncommon birds prefer shrubby/forested areas and are found at lower elevations in the Blue Mountains. Project activities are not expected to impact any habitat suitable for mountain quail.

3.5.1.12 Northern goshawk (*Accipiter gentilis*)

These large hawks prefer mature and old-growth forests for nesting. No suitable nesting habitat occurs within the project area. They are aerial hunters, flying between trees and under canopy in search of grouse, smaller birds, and other prey. Goshawks may appear in the project area during migration. Due to lack of suitable nesting and foraging habitat, this project is not expected to impact northern goshawks.

3.5.1.13 Northern sagebrush lizard (*Sceloporus graciosus graciosus*)

These lizards are primarily shrub-steppe dwellers, but also use bouldered regions and forested slopes. They are typically ground lizards and rarely climb into shrubs. They prefer fine gravel soils, but are also found on sandy or rocky soil. They need rock crevices, mammal holes, and similar cover for refuge. Filling in of interstitial spaces in riprap could negatively impact this species.

3.5.1.14 Olive-sided flycatcher (*Contopus borealis*)

Olive-sided flycatchers are a contrast species using coniferous old forests for nesting and either openings or gaps in old forests for foraging (USDA and USDI, 2000). Their diet consists entirely of flying insects, which they search for from high snags and perches. They nest high in conifer trees. This project is not expected to impact olive-sided flycatchers.

3.5.1.15 Pacific lamprey (*Lampetra tridentata*)

Spawning habitat requirements for Pacific lamprey are similar to those of salmonids, including clean gravel and cold water. After hatching from fertilized eggs, these fish spend about 5 years as ammocoetes (blind filter feeders), and burrow in mud and fine sediments in pools, backwaters, and eddies, downstream from spawning riffles. The ammocoetes migrate slowly downstream, with their movement apparently triggered by high water flow. Between 4 and 6 years of age, ammocoetes metamorphose into adults and become parasitic on soft-scaled fish. The adults migrate to sea, where they remain until they return to fresh water to spawn and die.

Many questions have yet to be answered about Pacific lamprey in the Columbia River basin. Although ammocoetes settle out downstream from spawning riffles, it has not been determined how far downstream the ammocoetes will drift before settling out and burying into the substrate. If drift potential includes a substantial distance and ammocoetes migrate slowly downstream with flow, rearing Pacific lamprey would likely be present in some of the areas proposed for dredging. The area of primary concern would be the confluence of the Snake and Clearwater Rivers.

Although little is known about Pacific lamprey use of the main stem Snake and Columbia Rivers, if the preceding statements prove accurate, any type of dredging could have impacts on rearing Pacific lamprey. Both hydraulic and mechanical methods may entrain juvenile fish and the deposition of material could have the potential to bury fish in the reservoir. Monitoring may be required in the future to determine impacts to various life stages of these fish.

3.5.1.16 Washington ground squirrel (*Spermophilus washingtoni*)

These squirrels are found in steppe and open shrub-steppe, where they prefer deep, loose soil for digging burrows. One existing colony in Walla Walla County is within the study area, while five additional colonies are located nearby. Use of the Joso site for upland disposal of dredged material has the potential to negatively impact Washington ground squirrels during disposal operations through disturbance of habitat. Most of the ground to be disturbed is within the gravel pit, where soils are less suitable for ground squirrels. Most suitable habitat will remain undisturbed. Restoration of grassland habitat after disposal may benefit ground squirrels.

3.5.1.17 Western burrowing owl (*Athene cunicularia hypugea*)

These owls are generally found in open, broken, or flat areas, including shrub-steppe and agricultural areas. They are seen regularly in the Tri-Cities, Hanford, and Yakima Range areas (Ackerman, 2001). Opportunistic feeders, they prey primarily on insects and small mammals, but also on birds, fish, and amphibians when available. They use ground squirrel or other mammal burrows for shelter and nesting.

Artificial burrows were created at the Joso HMU in the early 1980's. No use by burrowing owls has been documented, although no formal monitoring plan has been implemented. Use of the Joso site for upland disposal of dredged material has potential to negatively impact burrowing owls through habitat disturbance. Most of the ground to be disturbed is within the gravel pit, where soils are less suitable for burrows. Most suitable habitat will remain undisturbed. Restoration of grassland habitat after disposal may benefit western burrowing owls.

3.5.2 Plants

3.5.2.1 Northwest raspberry (*Rubus nigerrimus*)

This is a Snake River endemic that is found in the Snake River canyon and adjacent tributaries (Washington Natural Heritage Program, 1981). It occurs along drainage bottoms and somewhat moist areas on the adjacent slopes along small tributaries to the Snake River, such as Nisqually John Canyon. It is known from less than two dozen sites, with some of the historic sites inundated with the construction of Lower Granite (Clegg, 1973). Whether it has become established along the current reservoir shorelines is unknown; however, it has become established on at least four of the intensive HMU's (Phillips, 1993). Use of the Joso site for upland disposal has potential to negatively impact this species if present. Botanical surveys to be conducted for Spalding's silene (at Joso and the west Lewiston levee) should include searching for this species where habitat conditions are appropriate.

3.5.2.2 Jessica's aster (*Aster jessicae*)

This tall perennial species has blue flowers and can be found in association with the northwest raspberry. It is found along streambanks and open places in the Palouse region and is currently known from only nine populations in Whitman County (Washington Natural Heritage Program, 1981). Use of the Joso site for upland disposal has potential to negatively impact this species. Botanical surveys to be conducted for Spalding's silene (at Joso and the west Lewiston levee) should include searching for this species where habitat conditions are appropriate.

3.5.2.3 Broad-fruit mariposa (*Calochortus nitidus*)

This very showy species has purple flowers and is found along the borders of seasonally wet meadows (Washington Natural Heritage Program, 1981). Although there is no documented presence within the study area, it has been found in Garfield and Whitman counties. Botanical surveys to be conducted for Spalding's silene (at Joso and the west Lewiston levee) should include searching for this species where habitat conditions are appropriate.

3.5.2.4 McFarlane's four o'clock (*Mirabilis macfarlanei)*

McFarlane's four o'clock is known to occur in three geographically isolated units occupying approximately 163 acres in Idaho and Oregon. The Snake River unit occupies approximately

25 acres along 6 miles (9.7 km) of Hells Canyon on the banks and canyonland slopes above the river. This plant is found on steep (50 percent) sandy slopes underlain by talus in canyonland corridors where the climate is regionally warm and dry with precipitation occurring mostly in a winter-to-spring period (Robinson, 1996).

There are no reported occurrences of McFarlane's four o'clock in the project vicinity (Robinson, 1996). This project is not expected to impact this species.

3.5.2.5 Washington polemonium (*Polemonium pectinatum*)

A member of the phlox family, this species has white or creamy flowers and has a characteristic skunk smell. Its habitat includes moist bottomlands and has been found in Whitman County. Botanical surveys to be conducted for Spalding's silene (at Joso and the west Lewiston levee) should include searching for this species where habitat conditions are appropriate.

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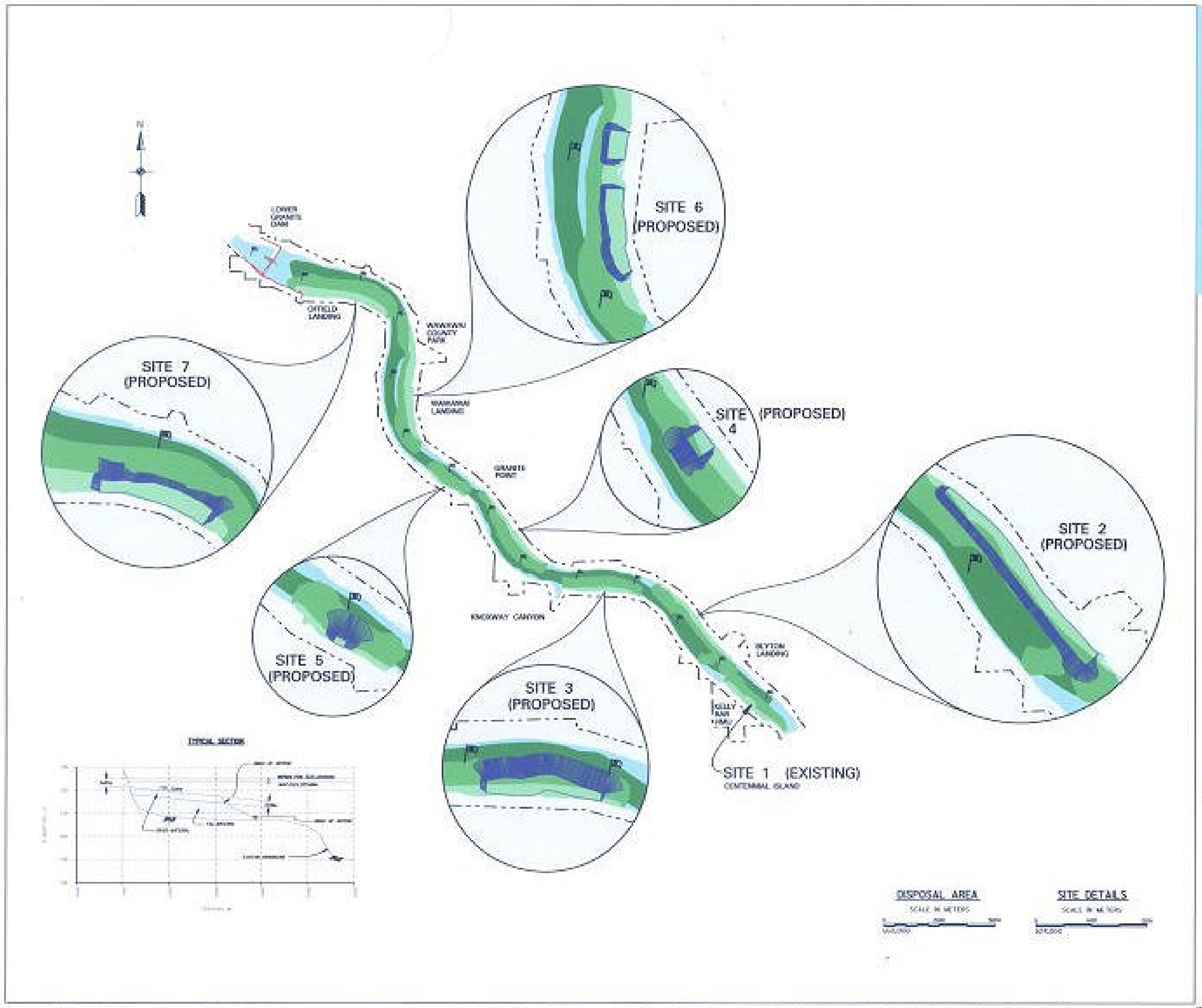


Conservation Pool

USACE Project Boundary

Shallow In–Water Disposal
Water Surface to 20 ft Below

Mid–Depth In–Water Disposal
20 ft Below Water Surface to 60 ft Below

Deep In–Water Disposal
60 ft Below Water Surface to Bottom of Reservoir

DRAFT

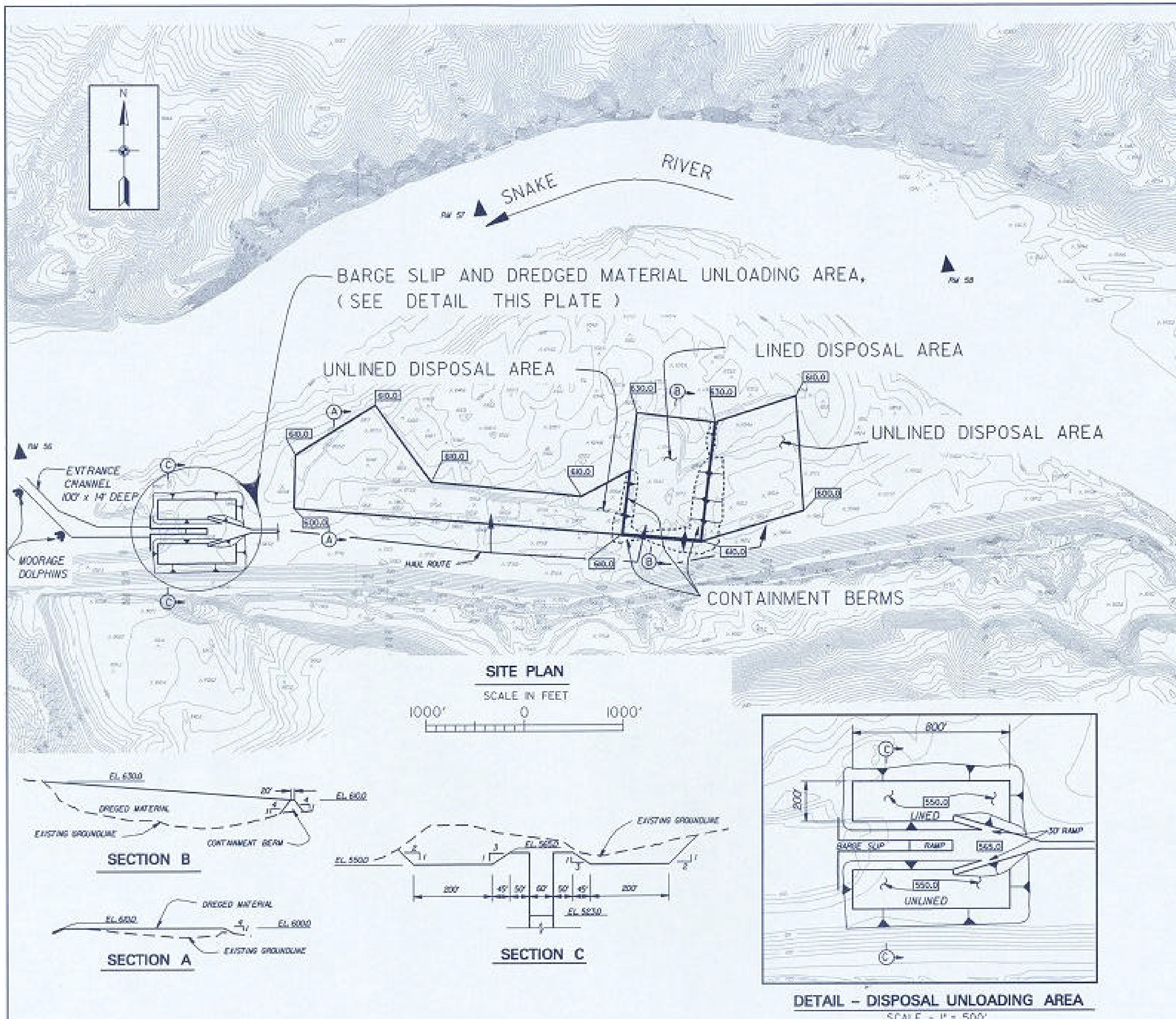
Walla Walla District

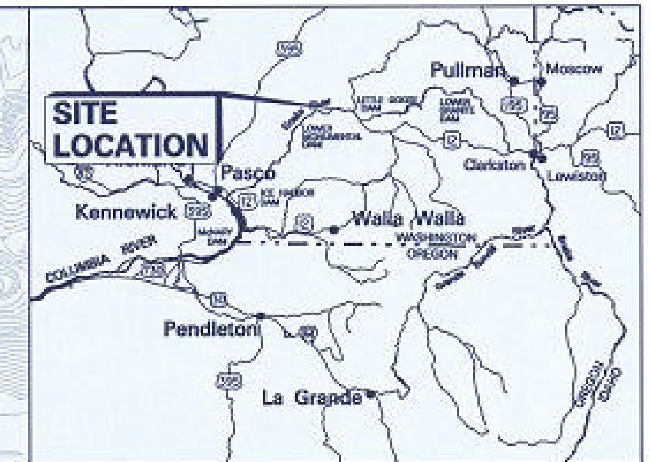
Dredged Material Management and Environmental Impact Statement

Lower Granite Reservoir

IN–WATER DISPOSAL AREAS

PLATE G–1





GEOGRAPHIC INFORMATION SYSTEMS
Corps of Engineers
Walla Walla District

DRAFT

Walla Walla District

Dredged Material Management Plan and Environmental Impact Statement

Lower Monumental Reservoir

JOSO CONTINGENCY UPLAND DISPOSAL

CONCEPTUAL SITE PLAN

2001

PLATE G - 2