



US Army Corps
of Engineers®

U.S. Army Corps of Engineers
Walla Walla District

Lower Snake River Programmatic Sediment Management Plan, Final Environmental Impact Statement

Appendix A - Programmatic Sediment Management Plan

August 2014



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1 INTRODUCTION

1.1 Purpose of the Programmatic Sediment Management Plan

The Programmatic Sediment Management Plan (PSMP) provides a comprehensive framework for U.S. Army Corps of Engineers (Corps), Walla Walla District, maintenance actions to manage sediment accumulation to meet the authorized purposes of the Lower Snake River Projects (LSRP). These purposes are commercial navigation, recreation, fish and wildlife conservation, and flow conveyance at Lewiston, Idaho. The PSMP does not attempt to address all sediment deposition in the LSRP. It addresses only sediment that interferes with existing authorized project purposes of the LSRP.

The PSMP is a long-term plan that forms the basis of the Corps' decision-making process for future sediment management activities needed to maintain and meet existing authorized project purposes of the LSRP. The PSMP is intended to be a proactive adaptive management plan, addressing both the immediate near term problems and anticipated future problems before they are critical and solutions become limited. Adaptive management is a systematic process designed to continually improve management policies and practices by learning from the results of implemented measures. The PSMP will be reviewed periodically by the Corps and modified if such changes become necessary to better address sediment accumulation that interferes with the Corps' ability to maintain the LSRP (see Section 4.3, PSMP Updates).

The PSMP does not prescribe site-specific solutions. Rather, it provides a set of potential measures that may be applicable for sediment accumulation that interferes with existing authorized purposes of the LSRP and a framework for selecting those measures. The Corps will select measures to effectively address problems in the least costly, environmentally acceptable manner, consistent with engineering requirements and in accordance with applicable laws and regulations. The PSMP will guide only those actions taken by the Corps within the project boundaries of the LSRP that are within the Corps' authority.

1.2 Authorities, Directives, and Obligations

As authorized by Congress, the Corps constructed and now operates and maintains the navigation system on the lower Snake and Clearwater rivers. This portion of the inland navigation system stretches from Lewiston, Idaho, to the Columbia River navigation channel. Congress authorized the reservoir system and the navigation channel that runs through the reservoirs with the River and Harbor Act of 1945 (Public Law [PL] 79-14), Section 2. This Act included authorization to construct Ice Harbor, Lower Monumental, Little Goose, and Lower Granite lock and dams for the purposes of inland navigation, power generation, and incidental irrigation water supply. The Flood Control Act of 1944 (PL 78-534) authorized the Chief of Engineers to construct, maintain, and operate recreational facilities in reservoir areas under Corps management. Compliance with the Fish and Wildlife Coordination Act of 1958

(PL 85-624) resulted in certain modifications to the LSRP during and after construction, and added fish and wildlife conservation/mitigation as an authorized project purpose under the Water Resources Development Act of 1976 (PL 94-587).

The Flood Control Act of 1962 (PL 87-874) mandated the establishment of the navigation channel within the LSRP at 14 feet deep by 250 feet wide at the minimum operating pool (MOP) level, and provided the Corps with authority to maintain the channel at those dimensions. PL 87-874 stated:

The projects and plans for the Columbia River Basin . . . are hereby modified . . . substantially in accordance with the recommendations of the Chief of Engineers in House Document Numbered 403, Eighty-seventh Congress: Provided, that the depth and width of the authorized channel in the Columbia-Snake River barge navigation project shall be established as fourteen feet and two hundred and fifty feet, respectively, at minimum regulated flow.

House Document (HD) 403 provided the basis for Congress’s designation of a 14-foot by 250-foot navigation channel. HD 403 included a letter from the Secretary of the Army, dated April 25, 1962, making recommendations and transmitting the Report of the Chief of Engineers, dated March 31, 1961, which recommended, “. . .the depth and width of the authorized channel in the Columbia-Snake River barge navigation project be established as 14 and 250 feet, respectively, at minimum regulated flow.” (Para. 31.e, p. 18).

Based on the authorizing legislation and associated congressional documents, Congress intended for the Corps to maintain the lower Snake River navigation channel at the dimensions specifically designated by Congress (i.e., 14 feet deep and 250 feet wide) and for slack water navigation to be possible on the lower Snake River on a year-round basis. The Corps lacks discretion to designate alternative channel dimensions.

In addition, the Corps is authorized to review and approve certain in-water actions, such as dredging, pursuant to the Rivers and Harbors Act of 1899 and the CWA. Under Section 10 of the Rivers and Harbors Act of 1899, Corps approval is required for work or structures in, over, or under navigable waters of the United States. Under Section 404, Corps approval is required for the discharge of dredged or fill material into waters of the United States.

The LSRP provide aquatic and shoreline recreational opportunities. There are 21 designated recreation sites located on the shores and adjacent areas of the Snake River between the confluence with the Columbia River and the upstream end of the Lower Granite Reservoir on the Snake River. These facilities include local and state parks, and marinas, which are managed and operated by the Corps and local and state recreation agencies. The PSMP would apply to sediment management actions at Corps maintained recreation areas/facilities. It does not apply to recreation facilities owned by others or leased from the Corps (e.g., marinas).

Although flood risk reduction is not an authorized purpose of the Lower Granite Project, the original enabling legislation for the project included construction and maintenance of levees as appurtenant facilities of the project. This means the levees provide for normal operating reservoir water levels from 733 to 738 feet above mean sea level in Lewiston – permitting commercial navigation without inundating portions of Lewiston. The levees were originally designed to have a 5-foot freeboard during the “standard project flood,” or SPF. This means that the top of the levee would be 5 feet higher than the water level during the SPF.

Design of the levees was consistent with applicable required standards at the time of the construction of the Lower Granite Project. Subsequently Engineer Regulation (ER) 1105-2-101 *Risk Analysis for Flood Damage Reduction Studies* (January 2006) provides guidance on analyzing risks of potential flooding associated with facilities like the Lewiston levee system. ER 1105-2-101 provides a revision to the design standard that required 5 feet of freeboard when passing the SPF, and directs the Corps to use risk analysis to determine the appropriate project approach. The Corps has now adopted risk-based methodology to assess the level of flood risk reduction provided by its facilities. The SPF and original design freeboard is no longer the only criterion used to evaluate the risk of flooding.

An important constraint currently affecting the Federal navigation channel is Reasonable and Prudent Alternative (RPA) Action 5 in the National Oceanic and Atmospheric Administration (NOAA) 2014 Supplemental Biological Opinion (BiOp) for the Federal Columbia River Power System (FCRPS) (NOAA 2014), hereinafter referred to as the NOAA FCRPS BiOp¹. RPA Action 5 states that the lower Snake River reservoirs will be operated within 1 foot of MOP from April through August each year to help move threatened and endangered juvenile salmonids through the river system to the ocean. Operating the reservoirs at MOP versus full pool (a drop in elevation of 3 to 5 feet) is intended to decrease the amount of time downstream migrating juvenile fish spend in the reservoirs, thereby increasing their overall survival rates. Over time, sediment deposition in the navigation channel reduces the water depth to less than 14 feet deep at MOP, which interferes with navigation. The reservoir level may be adjusted (i.e., raised) to meet authorized project purposes, primarily navigation, per RPA 5, but this deviation from MOP operation is not desirable. Regional fish managers and the Corps view it as an interim measure for addressing sediment deposition in the navigation channel until maintenance can be performed.

Finally, the Corps agreed to complete a long term plan for the management of sediments in the lower Snake River as part of the 2005 settlement agreement in *National Wildlife Federation v. US Army Corps of Engineers*.

¹ The supplement to the 2008/2010 FCRPS BiOp.

1.3 Sediment Management Guidance

The Corps' ER 1105-2-100, Planning Guidance Notebook (USACE 2000) provides policies and guidelines for sediment management planning. ER 1105-2-100 encourages the Corps to perform dredged material management planning for all federal harbor projects. The purpose of the planning is to “ensure that maintenance dredging activities are performed in an environmentally acceptable manner, use sound engineering techniques, [and] are economically warranted...” The ER includes guidance on the beneficial uses of dredged material. Further, the ER encourages incorporation of a “watershed perspective” in conducting civil works planning, which includes accounting for “...the interconnectedness of water and land resources...” The general guidance contained in the ER was applied in the development of the proposed PSMP and this Environmental Impact Statement (EIS). However, it should be noted that these documents were developed in part to fulfill the requirements of a settlement agreement and therefore, the document development process was different from the typical Corps planning process.

The Corps' Policy Guidance Letter #61 – Application of Watershed Perspective to Corps of Engineers Civil Works Programs and Activities (USACE 1999) provides policy direction to integrate a watershed perspective, including soliciting participation from the spectrum of agencies, tribes, and stakeholders with interests in the Corps' Civil Works programs and involving diverse technical experts. This policy is embodied in the principles of Regional Sediment Management, which stresses a “system based approach” to solve sediment-related problems (EPA 2011, USACE 2011).

The Sediment Evaluation Framework (SEF) for the Pacific Northwest (USACE 2009) provides guidance for assessing and characterizing sediments associated with dredging in Idaho, Oregon, and Washington. It was developed collaboratively by federal and state agencies with responsibility for sediment evaluation and management. The SEF describes the methods available for sediment characterizations related to management activities. While the SEF is geared toward determining the suitability of sediments for open water disposal, it also provides consistency for testing and evaluation procedures for sediment management projects in the LSRP.

The Dredged Material Evaluation and Disposal Procedures User Manual (USACE 2013) is also based on an interagency approach to the management of dredged material in Washington State. The sampling and analysis protocols presented in the User Manual are consistent with those in the SEF. The User Manual does not contain sediment freshwater screening limits or bioassay interpretive guidelines; these parameters need to be obtained from the SEF. However, if freshwater guidelines for certain chemicals of concern are not addressed in the SEF, the Dredged Material Management Program marine values are used.

The Corps' Environmental Operating Principles (included inside the front cover of this document) provide guidance for Corps activities. By following these principles, the Corps aims

to develop the scientific, economic, and sociological measures to judge the effects of its projects on the environment and to seek better ways of achieving environmentally sustainable solutions.

1.4 Watershed Perspective to Sediment Management

The Corps manages only a small portion (less than 1 percent) of the more than 32,000 square miles in the lower Snake River's sediment-contributing drainage area. Other branches of the Federal government control most of the drainage area, with 27 percent in Federal wilderness and another 35 percent as national forest (non-wilderness). Private ownership accounts for the final 34 percent of the drainage area.

Currently, other agencies are involved in the management of sediment through land use management practices [best management practices (BMPs)] on surrounding lands, soil conservation practices that limit erosion, and pollutant control programs that indirectly target sediment reduction. The US Forest Service (USFS) owns and manages about 56 percent of the land within the drainage area. Soil erosion results from disturbances on USFS lands, especially from post-wildfire conditions, landslides, and roads in forest areas. The USFS uses various structural and conservation measures to limit soil erosion, including road maintenance and removal, post-fire land treatments, stabilizing and improving channel stability, and protecting and restoring riparian areas. This PSMP anticipates that such BMPs will continue in the future, but could change in the future as funding and technology allow, but each agency individually controls implementation of its respective BMPs.

In agricultural areas (approximately 23 percent of the drainage area), Conservation Districts and other agencies are involved in managing soil resources. Conservation Districts work directly with agricultural users to implement soil conservation practices that limit the soil erosion caused by agricultural practices. In addition, the Idaho Department of Environmental Quality (IDEQ), Oregon Department of Environmental Quality (ODEQ), and the Washington State Department of Ecology (Ecology) address water-borne sediment primarily through their total maximum daily load (TMDL) water quality management plans. All three agencies implement a TMDL planning process, as required by the Clean Water Act (CWA), to develop strategies for the reduction of pollutants in water bodies that do not meet water quality standards. Sediment reduction is often targeted as a means to reduce other pollutants from entering streams. Some water quality management plans may also directly address sediment. Again, the PSMP anticipates that such BMPs will continue in the future, and possibly increase in the future as funding and technology allow.

1.5 Watershed Assessment

Through the PSMP EIS process, the Corps has undertaken a comprehensive watershed-based approach that investigates and analyzes sources of sediment from within the sediment-contributing area, how sediment moves through the tributaries, and how sediment moves and is deposited within the lower Snake River reservoirs. This approach was based on public and

stakeholder input gathered during scoping (in 2006 and 2007) and through extensive coordination and partnerships with the resource agencies and technical experts with the knowledge and tools to aid in the understanding of sediment yield and transport in the lower Snake River watershed. Understanding the sources of sediment and how it is transported allows the Corps to identify where to focus its efforts to manage the sediment. As part of this effort the Corps has conducted or sponsored intensive data collection and analysis of sediment yields and transport throughout the Snake River basin (Final EIS, Appendices B-F, M-N). Public comments on the Draft EIS provided further input on sediment-related issues in the LSRP and the Snake River basin. The Final EIS incorporates the findings of this data collection and analysis along with the stakeholder input to identify the range of alternatives for meeting the stated purpose and need.

As a result of the watershed approach and regional collaboration, the Corps developed a “toolbox” of potentially effective measures it may use to manage sedimentation and maintain the existing authorized purposes of the LSRP. These measures can be implemented on a site-specific basis, as applicable, and monitored for effectiveness. The Corps will continue to coordinate with other agencies to share information (regarding monitoring data, the measures implemented and their effectiveness) in order to expand knowledge regarding sediment migration within the drainage area and refine measures and sediment management as appropriate. See Section 1.7 below for a discussion on continuing upland sediment reduction efforts and use of the Local Sediment Management Group (LSMG).

1.6 Relationship to the PSMP EIS

All Federal agencies are required to consider potential effects to the environment from an agency action. In order to comply with the National Environmental Policy Act an EIS was prepared for the PSMP. Although the Corps did not identify any significant effects to the environment associated with adoption of the PSMP itself, or implementation of a current immediate need action, public controversy regarding potential environmental effects associated with ongoing management of the navigation channel and LSRP led the Corps to prepare an EIS. The PSMP is based on the preferred alternative [Alternative 7 – Comprehensive (Full System and Sediment Management Measures)] identified in the EIS.

The EIS process utilized a comprehensive, watershed-scaled approach to better understand the contributions of sediment from the watersheds and tributaries that flow into the LSRP. From 2006 through the present, the Corps has conducted or sponsored intensive data collection and analysis of sediment yields and transport throughout the Snake River Basin. The Corps also conducted outreach and coordinated with state and Federal agencies involved in land and water resource management to identify and evaluate methods for managing sediments that affect the existing authorized purposes of the LSRP. The PSMP EIS incorporated the findings of this outreach, analysis, and coordination to identify and evaluate the appropriate measures to integrate into the PSMP.

The PSMP EIS alternatives were composed of multiple measures, or types of actions, that could be taken to help the Corps address sediment accumulation that has interfered with the existing authorized project purposes of the LSRP. In accordance with the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA), future project-specific actions will require environmental reviews that build on the general information provided in the programmatic EIS, to the maximum extent practical. This subsequent environmental review process is referred to as “tiering.”

The PSMP is intended to serve as a decision-making tool in determining measures to be applied at project-specific locations once the need for action has been identified. Individual sediment management projects implemented through the PSMP will comply with all NEPA requirements, including preparation of a tiered environmental assessment (EA) or EIS, whenever necessary or application of a categorical exclusion (CATEX) [33 Code of Federal Regulations (C.F.R.) 230.9 (c)], as appropriate. The tiered analysis will concentrate solely on site-specific information relevant to specific measures to be implemented.

1.7 Role of the Local Sediment Management Group (LSMG)

The Corps originally established the LSMG in July 2000 as part of its Dredged Material Management Plan process. The LSMG is an information exchange forum comprised of the Corps and Federal and state regulatory agencies, tribal governments, local governments, and non-governmental organizations (e.g., barge operators, Ports, Pacific Northwest Waterways Association). The Corps reconvened the group in 2006 to assist in defining the scope for the PSMP. The group met throughout the EIS preparation process, providing input to the Corps on sediment management within the LSRP and sharing information with member agencies and stakeholders. The LSMG is expected to meet regularly in the future. The LSMG will:

- Update the LSMG Charter to reflect its ongoing role as an information exchange for long term sediment management planning and implementation of the PSMP.
- Meet at least once each year to review progress and exchange information on sediment management.
- Facilitate interagency communication and coordination regarding sediment management in the lower Snake River Basin.
- Provide a forum to address regional sediment issues regarding the lower Snake River drainage area

2 LOWER SNAKE RIVER SEDIMENT MANAGEMENT

2.1 Addressing Maintenance Needs

Based on historic data of sediment accumulation and dredging actions, as well as data collected while preparing the PSMP EIS, it is clear that sediment accumulation will continue to be a

maintenance issue within the LSRP – primarily at the confluence of the Snake and Clearwater Rivers. Studies conducted in association with development of the PSMP EIS indicates land BMPs within the watershed may be effective in reducing some sediment from entering the system (primarily in tributaries) at a localized level, but not on a scale that would reduce the need for sediment management in the LSRP. Therefore, the Corps would continue to address maintenance of the LSRP by managing sediment accumulation within the LSRP, in accordance with federal laws and Corps regulations.

The accumulation of sediment in some locations in the LSRP adversely affects existing authorized purposes of the LSRP, including commercial navigation, fish and wildlife conservation, recreation and flow conveyance. Managing problem sediments is an important part of maintaining the LSRP, pursuant to the authorities described in Section 1.2 above. The Corps has historically maintained:

- The Federal navigation channel at the congressionally authorized depth of 14 feet deep and 250 feet wide at MOP.
- Access and use of Corps managed recreation facilities.
- Irrigation water intakes for Corps maintained irrigated habitat management units (HMUs).
- Flow conveyance through the Lewiston levee system consistent with ER 1105-2-101.

Additionally, when the Corps dredging actions can be performed simultaneous with meeting needs of the Ports and the Ports contract (fund) the Corps to provide the service, the Corps has also maintained access to the ports and Port berthing areas.

2.2 Sediment Accumulation Problem Areas

The Corps evaluated locations where sediment accumulation could interfere with the LSRP existing authorized project purposes. The Corps identified 43 locations in the LSRP where sediment accumulation historically has affected authorized project purposes or where sediment accumulation may potentially be a problem in the future². Table A-1 lists these areas, their authorized project purpose, and their approximate river mile (RM) location. Of the locations identified, 21 sites are used for recreation, 16 are navigation sites³, and 5 sites are related to water intakes to irrigate HMUs (i.e., fish and wildlife). Flow conveyance (as it relates to flood risk management through the Lewiston levee system) and navigation are affected authorized project purposes at the Snake and Clearwater confluence.

² It should be noted that, to date, dredging has occurred at relatively few of the sites identified; however, the Corps has attempted to identify all areas where sediment accumulation could potentially affect authorized project purposes in the future.

³ Several of these sites are Port facilities. The Ports may apply for permits to conduct maintenance activities not covered in previous permits. The Corps has, at the request of the Ports, dredged accumulated sediments at these permitted locations to coincide with dredging to maintain the federal channel. In these cases, the federal government is reimbursed the additional cost of dredging the Port facilities by charging for that area of activity and disposal plus administrative costs.

Table A-1. Corps-identified Sediment Problem Areas in the Lower Snake River System

Reservoir	River	Approximate River Mile ¹	Site Name	Purpose
Lower Granite	Clearwater	1.0-2.0	Port of Lewiston*	Navigation
		3.0	Clearwater Boat Ramp*	Recreation
	Snake/ Clearwater	131.5-139.5/ 0.0-2.0	Snake River at Mouth of Clearwater River	Navigation, conveyance
	Snake	128-130	Silcott Island	Navigation
		137.0	Hells Canyon Resort*	Recreation
		139.0	Port of Clarkston*	Navigation
		139.5	Greenbelt Boat Basin	Recreation
		140.5	Southway Boat Ramp*	Recreation
		141.5	Swallows Park Boat Basin and Swim Beach	Recreation
		142.5	Hells Gate State Park*	Recreation
146.0		Chief Looking Glass Park*	Recreation	
Little Goose	Snake	83.0	Port of Garfield Access*	Navigation
		83.5	Port of Central Ferry*	Navigation
		88.0	Willow Landing HMU	Fish and wildlife
		100.0-102.0	Navigation Channel at Schultz Bar	Navigation
		103.5	Port of Almoda*	Navigation
		103.5	Illia Landing	Recreation
		105.5	Boyer Park and Marina*	Recreation
		107.0	Lower Granite Lock Approach	Navigation
Lower Monumental	Snake	48.0	Skookum HMU	Fish and wildlife
		51.0	Ayer	Recreation
		55.0	55-Mile HMU	Fish and wildlife
		56.5	Joso HMU	Fish and Wildlife
		59.5	Lyons Ferry Park	Recreation
		66.0	Texas Rapids Boat Basin	Recreation
		70.0	Little Goose Lock Approach	Navigation
Ice Harbor	Snake	10.0	North Shore Boat Ramp	Recreation
		11.5	Charbonneau Park	Recreation
		13.5	Levey Park	Recreation
		15.0	Big Flat Habitat Management Unit (HMU)	Fish and wildlife
		18.0	Fishhook Park	Recreation
		23.0	Lost Island HMU	Fish and wildlife
		24.5	Hollebeke HMU	Fish and wildlife
		29.0-33.3	Walker's Elevator*	Navigation
		39.0	Windust Boat Ramp	Recreation
41.0	Lower Monumental Lock Approach	Navigation		
0.0	Sacajawea State Park*	Recreation		

Reservoir	River	Approximate River Mile ¹	Site Name	Purpose
McNary	Snake	1.5	Hood Park Boat Ramp	Recreation
		9.2	Ice Harbor Lock Approach/ Nav Coffers Cells	Navigation
		0.0–1.5	Snake River Entrance	Navigation
		2.0–10.0	Nav Channel Below Ice Harbor	Navigation
		2.0–10.0	Nav Channel Below Ice Harbor	Navigation

1 “River Mile” indicates the number of miles upstream of the mouth of the Snake River at its confluence with the Columbia River.
 * Designates non-Corps managed facilities.

2.3 Historical Sediment Management Activities

The Corps’ past project maintenance program has been to monitor sediment accumulation through periodic surveys of the river bottom, coordinate with river users (e.g., navigators, recreation managers) regarding river conditions, and to dredge accumulated sediment that interferes with the authorized project purposes of the lower Snake River. Table A-2 details the Corps’ past dredging actions, most of which were conducted to maintain navigation or flow conveyance. The Corps has dredged problem sediment areas every 3 to 5 years on average, scheduling this dredging when river survey data or user reports indicated the sediment deposition was interfering with navigation or other authorized project purposes of the reservoirs.

Approximately 80 percent of the volume of material historically dredged from the LSRP system has come from Lower Granite Reservoir. Based on recent studies and historic data, it is anticipated that the majority of problem sediment management activities will continue to occur within Lower Granite Reservoir.

Table A-2. Partial History of Federal/Port Dredging in the Lower Snake River⁴

Dredging Location	Year	Purpose	Amount Dredged (cubic yards)	Disposal Method
Navigation Channel Ice Harbor, Part I and II, Channel Construction	1961	Navigation	3,309,500	Upland and in-water
Navigation Channel, Ice Harbor Part III, Channel Construction	1962	Navigation	120,000	Upland and in-water
Downstream Navigation Channel, Ice Harbor	1972	Navigation	80,000	Upland and in-water
Downstream Approach, Navigation Channel, Lower Monumental	1972	Navigation	25,000	Upland
Navigation Channel Downstream of Ice Harbor	1973	Navigation	185,000	Upland and in-water
Downstream Approach Channel Const., Lower Monumental Lock	1973	Navigation	10,000	Upland
Downstream Approach Channel Construction, Ice Harbor Lock	1978	Navigation	110,000	Upland and in-water
Downstream Approach Channel Construction, Ice Harbor Lock	1978 1981/82	Navigation	816,814	Upland and in-water
Various Boat Basins, Swallows Swim Beach, Lower Granite Reservoir (Corps)	1975- 1998	Recreation	20,000	Upland sites
Port of Lewiston – Lower Granite Reservoir (Corps)	1982	Navigation/Maintain Flow Conveyance Capacity	256,175	Upland sites
Port of Clarkston – Lower Granite Reservoir (Corps)	1982	Navigation	5,000	Upland sites
Downstream Approach Channel Construction, Ice Harbor Lock	1985	Navigation	98,826	In-water
Confluence of Clearwater and Snake Rivers (Corps)	1985	Maintain Flow Conveyance Capacity	771,002	Upland site
Port of Lewiston – Lower Granite Reservoir (Corps)	1986	Navigation/Maintain Flow Conveyance Capacity	378,000	Upland sites
Confluence of Clearwater and Snake Rivers (Corps)	1988	Maintain Flow Conveyance Capacity	915,970	In-water
Confluence of Clearwater and Snake Rivers (Corps)	1989	Maintain Flow Conveyance Capacity	993,445	In-water
Schultz Bar – Little Goose (Corps)	1991	Navigation	27,335	Upland site

⁴ Maintenance dredging unless specifically identified as construction.

Dredging Location	Year	Purpose	Amount Dredged (cubic yards)	Disposal Method
Confluence of Clearwater and Snake Rivers (Corps)	1992	Maintain Flow Conveyance Capacity	520,695	In-water
Barge Approach Lane, Juvenile Fish Facilities, Lower Monumental	1992	Navigation	10,800	Upland site
Ports of Lewiston (Lower Granite Reservoir), Almota & Walla Walla	1991/92	Navigation	90,741	Upland and in-water
Schultz Bar – Little Goose (Corps)	1995	Navigation	14,100	In-water
Confluence of Clearwater and Snake Rivers (Corps)	1996/97	Navigation	68,701	In-water
Confluence of Clearwater and Snake Rivers (Corps)	1997/98	Navigation	215,205	In-water
Greenbelt Boat Basin, Clarkston – Lower Granite Reservoir	1997/98	Recreation	5,601	In-water
Port of Lewiston – Lower Granite Reservoir (Port)	1997/98	Navigation	3,687	In-water
Port of Clarkston – Lower Granite Reservoir (Port)	1997/98	Navigation	12,154	In-water
Lower Granite Lock Approach	1997/98	Navigation	2,805	In-water
Lower Monumental Lock Approach	1998/99	Navigation	5,483	In-water
Lower Monumental Lock Approach (Ice Harbor Reservoir) Lower Granite Lock Approach (Little Goose Reservoir) Clearwater/Snake Confluence and Ports of Clarkston and Lewiston (Lower Granite Reservoir)	2005/2006	Navigation	335.898	In-water

2.4 The PSMP Management Measures

Through a collaborative process during scoping that included a series of workshops involving technical experts from the Corps and other agencies from the EIS scoping process (EIS Sections 6.1 through 6.4), the Corps developed a broad range of management measures that could address sediment accumulation problems.

The management measures fall within four general categories: dredging and dredged material management; structural management, system management, and upland sediment reduction (Table A-3). These categories are summarized in the following subparagraphs.

Table A-3. Management Measures

Measure	Description
Dredging and Dredged Material Management	
Navigation and Other Dredging	Dredging typically consists of excavation, transport, and placement of dredged sediments. The excavation process for the lower Snake River generally involves the removal by mechanical means (e.g., a barge-mounted “clamshell” dredge scooping sediments from the reservoir bottom) to restore the authorized dimension or use of the area where sediment has accumulated. Removal of material by hydraulic means (e.g., suction or water-induced vacuum) may also be considered for recreation and HMU irrigation facilities when potential adverse effects to Endangered Species Act (ESA)-listed fish are unlikely. This measure would also have ancillary benefit for flow conveyance through the Lewiston levee system.
Dredge to Improve Conveyance Capacity	This measure differs from the “Navigation Channel and Other Dredging” measure in that it involves removal of substantially greater quantities of sediments from areas outside the navigation channel, access channel and port berthing areas, and/or recreation facilities. The excavation process involves sediment removal by mechanical means at the Snake and Clearwater Rivers confluence to improve flow conveyance
Beneficial Use of Sediment	Beneficial use of dredged material includes a wide variety of options that utilize the dredged material for a productive purpose such as habitat restoration/enhancement, construction and industrial use, etc., and can apply to upland or in-water disposal options. The Corps views dredged material as a valuable and manageable resource and seeks opportunities to use it beneficially whenever possible. The Corps has beneficially used dredged material in the past to create fish habitat. Other potential beneficial uses include: habitat restoration/enhancement, beach nourishment, aquaculture, parks and recreation, agriculture, forestry, horticulture, strip mine reclamation, landfill cover for solid waste management, shoreline stabilization, erosion control, construction fill, and industrial use. Beneficial use of dredged material generally requires a cost-share sponsor (See ER 1105-2-100), unless it is the least-cost environmentally acceptable alternative.
In-water Disposal of Sediment	In-water disposal of dredged material is simply the discharge of dredged material into the waterway. Typically, dredged material is transported to a previously identified in-water location selected to minimize impacts where it is released into the water.
Upland Disposal of Sediment	In upland disposal of sediment, dredged material is placed on land, above high water, and out of wetland areas. The dredged material is typically placed in a cell behind levees that contain and isolate it from the surrounding environment. The dredged material is dewatered through evaporation and/or settling with the effluent discharged as clean water.. The Corps has identified multiple locations where upland disposal of dredged material could occur if it was a selected measure.

Measure	Description
Structural Sediment Management	
Bendway Weirs	Bendway weirs are rock sills located on the outside of a stream or river bend that are angled upstream into the direction of flow. With the weirs angled upstream, flow is directed away from the outer bank of the bend and toward the point bar or inner part of the bend. This redirection of flow occurs at all stages higher than the weir crest. Where there is sufficient velocity and volume, the redirection of flow generally results in a widening of the channel through scour of the point bar. Bendway weirs are typically used to maintain navigation channels.
Dikes/Dike Fields	Dikes are longitudinal structures used to maintain navigation channels through effects on channel depth and alignment. Dikes constrict low and intermediate flows, causing the channel velocity to increase within the reach, thereby scouring a deeper channel. Dikes are typically built of rock, but can also be constructed using other materials.
Agitation to Resuspend	This technique involves the deliberate agitation and resuspension of deposited sediment; the sediment is then carried downriver as part of the suspended load of the river. This technique requires both some form of agitation mechanism, and sufficient river flow (velocity and volume) to carry the additional sediment load away from the targeted area. There are numerous potential means to mechanically agitate and resuspend sediment, including high pressure air and water pumps and using propellers to move sediment.
Trapping Upstream Sediments (In-Reservoir)	This measure would involve excavating a pit in a depositional part of the upstream reach of a river or reservoir to trap incoming sediment, thus reducing the sediment available to deposit in other areas where it may interfere with existing authorized project purposes. Sediment would have to be periodically removed from the trap and managed by one of the measures described above (i.e., beneficial use, in-water or upland placement).

Measure	Description
System Management	
Navigation-Objective Reservoir Operation	This measure involves operating LSRP reservoirs at water surface elevations that would provide a depth of 14 feet within the federal navigation channel. The Corps would manage pool levels within the preset operating range for each reservoir to maintain 14 feet of water depth over areas where sediment deposition has occurred in the channel. Currently the Corps operates the LSRP at MOP, or as close to MOP as possible, during the juvenile salmonid outmigration season (typically from April through August, but as late as October in Lower Granite Reservoir), and at varying levels within each reservoir’s 3- or 5-foot operating range through the rest of the year. This measure would provide the Corps the option of operating above MOP and even at the upper end of the operating range year-round as needed to maintain the 14-foot-deep navigation channel.

Measure	Description
Reconfigure Affected Facilities	Corps facilities affected by sediment deposition may be reconfigured or otherwise modified to avoid the deposited sediment. This measure applies to Corps facilities only and could include a range of facility modifications. Examples include water intake structures, mooring facilities, docks, boat ramps, and loading/unloading facilities that could potentially be extended to reach out beyond nearshore areas where sediment deposition is occurring. In addition to reconfiguring water intake structures, alternative water sources for irrigation could be explored. Reconfiguration of a recreation facility may also include consideration of repurposing; temporarily, partially or fully closing; and/or reducing the scope of the facility.
Relocate Affected Facilities	Corps facilities affected by sediment deposition may be relocated to avoid recurring problems with sediment deposition. Moving or relocating affected facilities is potentially suitable for navigation facilities, recreational boating facilities, and water intake structures. In addition to relocating water intake structures, alternative water sources for irrigation could be explored. The Corps' ability to consider/study the feasibility of reconfiguring or relocating port facilities is limited and generally requires a cost-share sponsor and specific authority. The Corps could consider/study reconfiguration or relocation of port facilities, if requested by the Ports, subject to availability of authority and funding.
Raise Lewiston Levee to Manage Flood Risk	The Lewiston levee system is an upstream extension of Lower Granite Dam and was designed to protect parts of Lewiston, Idaho from inundation during the standard project flood (SPF). The confluence of the Snake and Clearwater Rivers at the upper reach of the Lower Granite Reservoir collects much of the sediment carried into the reservoir. Current analysis indicates that flood risk is within acceptable limits; however, if future sediment accumulation changes the flood risk to Lewiston by raising the water level in the reservoir, raising the levee would be an option for reducing flood risk. The location and height of change would be determined through detailed site- and time-specific studies.
Reservoir Drawdown to Flush Sediment	In this measure, flow would be temporarily modified to increase the capacity of the river system to scour and carry sediment, thereby flushing deposited sediments downstream. The ability of a river system to carry sediment is determined by the river's velocity and volume. Flow modification would be created by a drawdown of a reservoir to increase velocity. Drawdown of the pool elevation by 10 to 15 feet during a 30- to 45-day period would be conducted in an effort to flush sediments from the navigation channel and selected Port berthing areas. Lower Granite Reservoir is the only LSRP reservoir in which this measure would be effective. Flow modifications would be temporary and would be timed to take advantage of naturally occurring periods of high flows.

Measure	Description
Upland Sediment Reduction (Expanded)	
Local Sediment Management Group (LSMG) Coordination Meetings	The LSMG is an information exchange forum comprised of the Corps and Federal and state regulatory agencies, tribal governments, local governments, and non-governmental organizations (e.g., barge operators, Ports, Pacific Northwest Waterways Association). Also includes participation in other regional coordination concerning sediment management in the lower Snake River basin

2.4.1 Dredging and Dredged Material Management

Dredging involves the physical removal of sediments from one location, and placement of the dredged material in another location. The dredging process typically consists of excavation, transport, and placement of dredged sediments. Excavation would generally be by mechanical means (i.e., physically scooping sediments with a clamshell or backhoe). Removal of material by hydraulic means (e.g., suction or water-induced vacuum) may also be considered for recreation and HMU irrigation facilities when potential adverse effects to ESA-listed fish are unlikely. Once dredged, sediments are transported to a disposal or placement area. Dredged material may be disposed of in-water or upland, or may be beneficially used for other purposes, such as habitat creation. The disposal method is ultimately identified through evaluation of disposal alternatives under the substantive provisions of CWA Section 404(b)(1), guidelines established by the EPA (40 C.F.R. 230), and Corps regulations.

2.4.2 Structural Sediment Management Measures

Structural sediment management measures seek to control the location and rate at which sediment is deposited at a specific location to reduce or eliminate the magnitude of the sediment interference with existing authorized project purposes of the LSRP. Examples of structural management measures include weirs to prevent sediment from accumulating in certain areas and sediment traps to collect sediment that may otherwise interfere with existing authorized project purposes. Such measures would require site specific tier-off NEPA analysis and may require additional congressional authority and funding to implement.

2.4.3 System Management Measures

System management measures modify reservoir operations (such as pool depth) or facilities so that sediment deposition does not adversely affect existing authorized project purposes of the LSRP. Examples of system operations measures include reconfiguring or relocating facilities, managing reservoir water levels for navigation, and modifying flows to flush sediments from problem areas. These measures would occur within the lower Snake River. The Corps, public port authorities, and Corps' property lessees would be responsible for implementing system management measures for their respective facilities.

The Corps' ability to consider the feasibility of reconfiguring or relocating Port facilities is limited and generally requires a cost-share sponsor and specific authority. The Corps could consider reconfiguration or relocation of Port facilities only if requested by the Ports and would be subject to availability of authority and funding.

2.4.4 Upland Sediment Reduction Measures (Expanded)

Upland sediment reduction measures (USRM) are currently implemented throughout the watershed of the lower Snake River by various land managers. These measures include streambank erosion control projects, vegetation filter strips designed to reduce erosion of soil

from land into area waterways, and programs aimed at encouraging or requiring such projects. USRM are carried out by the Corps and other land managing entities through implementation of existing best management practices and agency programs aimed to prevent erosion and/or reduce the amount of sediment that enters into the lower Snake River system. This PSMP assumes that agencies and land owners responsible for land management in the basins (including federal and state agencies, tribes, and conservation districts) would continue to implement existing land management programs and practices (BMPs) related to erosion control, at current or increased levels of implementation as funding and technology allow. The Corps would continue implementing erosion and sediment control on its lands adjacent to the LSRP, although these efforts are primarily for wildlife habitat creation and land management, not specifically for sediment control.

Data collected from the studies identified in Section 1.5 of the PSMP EIS indicate at present there are no specific opportunities identified to implement additional USRM that will appreciably reduce/prevent the predominant coarse sediment (i.e., sand) generated from mass wasting events from entering the rivers and interfering with existing authorized purposes of the LSRP. Although the studies indicate there may be opportunities for limited additional USRM (e.g., road and vegetation management) for further reducing the amount of fine sediment (i.e., silt) entering tributaries, fine sediments are a minor problem in the LSRP as compared to sand. Additionally, the Corps has not identified a practical way to quantify or confirm the relationship/nexus between increased USRM and reduction of fine sediment that interfere with existing authorized purposes of the LSRP (primarily recreation areas and HMU irrigation intakes).

Continued coordination of the LSMG meetings was retained as a measure and incorporated into this PSMP as a useful tool for exploring potential USRM in the future. LSMG meetings will serve as a forum for communication regarding sediment management. The Corps will continue to coordinate with LSMG, as described in Section 1.7 above and 4.2 below, and other land managing agencies to explore opportunities to implement additional (feasible) USRM. The Corps participation in any other future USRM efforts will be subject to authority and funding. The Corps (Walla Walla District's Planning Branch) intends to explore opportunities for other regional coordination concerning sediment management in the lower Snake River basin (e.g., provision of staff expertise under the Regional Sediment Management Program), which are hosted/facilitated by other agencies or stakeholders.

Table A-4 identifies the existing authorized project purposes and the applicable measures that may be used to manage sediment.

Table A-4. Management Measures¹

Measure	Applicability to Authorized Purpose			
	Navigation	Recreation	Fish & Wildlife	Flow Conveyance
Dredging and Dredged Material Management				
Navigation and Other Dredging	Yes (I & F) ²	Yes (I & F)	Yes (I & F)	No (ancillary benefit only)
Dredge to improve conveyance capacity	Yes (I & F)	No	No	Yes (I & F)
Beneficial use of dredged material	Yes (I & F)	Yes (I & F)	Yes (I & F)	Yes (I & F)
In-water disposal of dredged material	Yes (I & F)	Yes (I & F)	Yes (I & F)	Yes (I & F)
Upland disposal of dredged material	Yes (I & F)	Yes (I & F)	Yes (I & F)	Yes (I & F)
Structural Sediment Management				
Bendway weirs	Yes (F)	No	No	No
Dikes/dike fields	Yes (F)	No	No	No
Agitation to resuspend	No	Yes (I & F)	Yes (I & F) (partial need flow)	No
Trapping Upstream Sediments (In-Reservoir)	Yes (F)	No	No	Yes (F)
System Management				
Navigation Objective Reservoir Operation	Yes (I & F)	Yes (I)	No	No
Reconfigure affected facilities	Yes (F)	Yes (F)	Yes (F)	No
Relocate affected facilities	Yes (F)	Yes (F)	Yes (F)	N/A
Raise Lewiston Levee to Manage Flood Risk	No	No	No	Yes (F)
Reservoir Drawdown to flush sediment	Yes (F)	No	No	Yes (F)
Upland Sediment Reduction Measures (Expanded)				
Local Sediment Management Group (LSMG) Coordination Meetings	Yes	Yes	Yes	Yes

1. Listed by measure type, but not in order of priority.
2. I = Immediate Need Measure; F = Future Forecast Need Measure.

2.5 Emergency Sediment Management Actions

Emergency procedures apply when the Corps determines it is necessary to declare an emergency condition requiring sediment management to prevent or reduce imminent hazard to human life, health, or property, or due to severe economic losses posed by the conditions. The District Commander ultimately determines if emergency conditions exist. Generally, an emergency condition results from an unexpected event. In lieu of the environmental review process contained within this plan, the District Commander would be responsible for considering the probable environmental consequences resulting from the proposed action, and determine the appropriate documentation. An emergency declaration allows the agency to proceed under alternative environmental compliance procedures. It does not eliminate such compliance. As stated in 33 CFR 230.8, “NEPA documentation should be accomplished prior to initiation of emergency work if time constraints render this practicable. Such documentation may also be accomplished after the completion of emergency work, if appropriate.” (See also, 33 CFR 337.7) Likewise, ESA regulations state, “Formal consultation shall be initiated as soon as

practicable after the emergency is under control” [50 CFR 404.05(b)]. The District will use the least environmentally damaging option to address the emergency condition. For navigation channel emergencies, the District will consider interim system management measures (e.g., pool raise) when possible to allow time to complete applicable environmental reviews.

3 IMPLEMENTATION OF THE PSMP

3.1 Introduction

This section presents the process for monitoring, identifying, and forecasting sediment management actions to address sediment accumulation that interferes with existing authorized project purposes of the LSRP. Decisions to pursue sediment management measures will be based on review of monitoring reports and feedback from the Corps’ Engineering and Construction and Operations Divisions. Action will be taken when information indicates a need (trigger) for immediate or future sediment management to address sediment accumulation that could interfere with existing authorized project purposes of the LSRP. The decision-making process is discussed further in Section 3.3.

3.2 Monitoring

The overall purpose of monitoring is to provide a framework to ensure LSRP facilities meet their authorized purpose; comply with applicable environmental laws and regulations; and provide feedback to the Corps for improving maintenance of the project and the long-term sediment management program (adaptive management). Monitoring is also intended to foster a working relationship with regulators and stakeholders to aid in timely review and increased credibility for the application of individual measures.

3.2.1 “Plan-Level” System Monitoring (Ongoing)

The Corps will continue to monitor known problem areas within the system. Through this monitoring, the Corps will be able to determine when and where management actions should be implemented. The data gained through monitoring will also indicate the need for adaptive management under the PSMP.

3.2.1.1 Navigation Bathymetric Surveys and Reports

The Corps conducts routine bathymetric surveys of the Federal navigation channel both in the lower Snake River and in the confluence of the Snake and Clearwater Rivers to determine whether the channel meets congressionally-authorized dimensions. If warranted, the Corps can arrange to have special surveys of isolated sites where problems develop, but the routine surveys are designed to monitor those areas where sediment is expected to impair the navigation channel. The bathymetric data is maintained by the Corps’ Operations Division Navigation Coordinator, and is used by the Corps to prioritize maintenance needs. The Corps also periodically surveys

fixed sediment range cross sections to monitor long-term sediment accumulation in the reservoirs.

Port authorities and shipping companies file reports on an as-needed basis when navigation channel conditions impact navigation or result in unsafe conditions for navigation. The Coast Guard also reports on areas of concern for navigation, when encountered. These reports are received and maintained by the Corps and used to identify survey requirements and potential need for maintenance action.

3.2.1.2 Recreation Boater/Recreational User Reports/Complaints

Reports of obstructions to boating facilities (e.g., boat basins, marinas) are made occasionally to the Corps' Natural Resources Offices at Ice Harbor Dam and Clarkston, Washington. These reports are maintained by the Natural Resource Offices, and are used by the Corps to prioritize maintenance needs. The PSMP addresses sediment that interferes with recreation facilities operated and maintained by the Corps.

3.2.1.3 Fish and Wildlife Operations Reports on Water Intakes

The Corps' Natural Resource Managers are responsible for preparation of routine reports of conditions at HMUs, including an assessment of the water intake for irrigation facilities and sediment accumulation. These reports are maintained by the Natural Resource Offices and used by the Corps to prioritize maintenance needs. The PSMP addresses sediment that interferes with irrigation intakes operated and maintained by the Corps.

3.2.1.4 Flow Conveyance

The Corps is responsible for preparation of routine reports of sediment conditions within the Lewiston levee system. These reports are maintained by the Corps' Hydrology and Hydraulics Branch and Dam Safety Officer, and used by the Corps to prioritize maintenance needs.

3.2.1.5 Lower Snake River Monitoring by Others

Other agencies regularly monitor conditions and produce reports used for preparation of sediment management actions. The U.S. Geological Survey (USGS) monitors water surface levels and flow volumes in the lower Snake River and its major tributaries. Other state and local agencies, many represented in the LSMG, also monitor and record information useful for planning and implementing sediment management measures.

3.2.2 Use of Monitoring Reports

It is the goal of the PSMP to be “proactive” rather than “reactive.” The Corps wants to plan and implement actions to reduce the magnitude and frequency of sediment problems affecting the LSRP, and minimize the environmental effect of needed actions. Therefore, the Corps has

identified conditions to serve as triggers for undertaking action pursuant to the plan. Management actions result in a solution to a problem(s) far enough in advance of a critical phase to allow for planning, design, consultation, and implementation of the corrective measure. Plan-level monitoring will be reviewed on an annual basis to determine where and when action is needed and measure implementation should be initiated.

3.3 PSMP Measure Implementation Process

The PSMP implementation process involves problem sediment identification (3.3.1), triggers for action (3.3.2), actions in response to triggers (3.3.3) and the planning process for actions (3.3.4) for evaluating measures/actions to address sediment that interferes with existing authorized project purposes.

3.3.1 Sediment Problem Identification

The Corps will review all monitoring reports to identify locations experiencing sediment accumulation that potentially interfere with existing authorized purposes, thus requiring corrective action. Problem identification will include location description; site type/authorized use affected; magnitude of the problem; history of previous management/monitoring actions taken; observed trends; and the timeframe for action. Problem identification will allow the Corps to determine specific steps of planning, design, and implementation. For each problem location identified, the Corps will note whether sediment is currently affecting an existing authorized project purpose or is likely to do so in the future. The forecast of future conditions will be used in selecting appropriate corrective measures and evaluating the potential effectiveness of those measures. The forecast will also consider the timeframe to address the problem. If there is time to develop a solution prior to the problem reaching a critical state, the potential list of correction measures may include solutions requiring a longer implementation time.

3.3.2 Triggers for Action

Problem identification may “trigger” the need for action(s) to address problem sediment. There are two (2) trigger levels (immediate need and future forecast need), which are described below.

- **Immediate Need.** An immediate need action is warranted when sediment accumulation is currently impairing an existing authorized project purpose of the LSRP.
- **Future Forecast Need.** A future forecast need warranting initiation of an analysis of long-term solutions to reoccurring sediment deposition problems occurs when sediment accumulation that impairs an existing authorized project purpose has occurred at a particular location(s) more frequently than once in the past 5 years⁵ or is anticipated to reoccur more

⁵ Five years was selected as the appropriate time period for establishing future forecast needs based on historical dredging actions (see Table A-2).

than once in the next 5 years. The PSMP does not restrict the Corps ability to initiate other future forecast need studies when warranted.

The following sections describe the triggers for each of the four existing authorized project purposes. Triggers for both an immediate need action and future forecast action can exist simultaneously at the same location, and monitoring and future forecasting are designed to limit repeated immediate need actions at such locations. Section 3.2.3 describes the actions that may be implemented in response to such triggers.

3.3.2.1 Navigation Triggers

Situations triggering the need to take action for navigation include:

- Navigable depth in the Federal navigation channel is less than 14 feet deep at MOP and is impairing the safe movement of tug and multi-barge tows and other commercial vessels through the navigation system.
- Navigable depth is less than 14 feet deep at MOP within the Federal navigation channel and is impairing access to any of the four navigation locks on the lower Snake River.

3.3.2.2 Recreation

Situations triggering the need to take action for recreation include:

- Boat basin depths at MOP are less than the original design criteria and boats are having difficulty maneuvering within the basin.
- Sediment has built up at the entrance to boat basins blocking access.

3.3.2.3 Fish and Wildlife

Situations triggering the need to take action for fish and wildlife include:

- Sediment has buried an irrigation intake at a Corps-managed HMU.
- Sediment is clogging an irrigation intake at a Corps managed HMU.

3.3.2.4 Flow Conveyance

Situation triggering the need to take action for flow conveyance include:

- Consecutive surveys show an accelerated rate of sediment accumulation in the channel near Lewiston *and*
- Hydraulic modeling indicates a heightened risk of overtopping the Lewiston levees during extreme floods within 5 years if the rate of accumulation continues *and*
- The risk of flooding cannot be reduced to acceptable levels with normal reservoir operations prescribed in the authorized water control manual.

3.3.3 Actions in Response to Triggers

The way in which the Corps responds to triggers will differ based on the existing authorized project purpose and the two trigger levels. Measures implemented to address both immediate need and future forecast need shall be the least cost, technically feasible and environmentally acceptable, in accordance with Corps regulations (33 CFR 335-338 and Engineer Regulation 1105-2-100). Below is stated the process and description of actions to be taken for both immediate need and future forecast need for each of the four existing authorized project purposes. The process identified below for both immediate and future forecast needs is stated (generally) in the order such actions will be implemented to manage problem sediment.

3.3.3.1 Navigation

- **Immediate Need Actions for Navigation.**

Actions:

1. Use Navigation Objective Reservoir Operation (Interim), in accordance with operational requirements.
2. Dredge area(s) of problem sediment deposition and dispose of dredged material (3 options – Beneficial, In-water or Upland), in accordance with applicable laws and regulations including the Federal Standard).

Description: The Corps would first implement appropriate operational changes, (i.e., raising the reservoir elevation, adjusting spill patterns, or releasing water at one or more of the dams) as in interim action, in accordance with any FCRPS BiOp in effect at the time as needed to provide a 14 foot navigation channel. These actions could remain in effect until the Corps could implement a dredging action to remove the accumulated sediment. During preparation of the EIS/PSMP, the Corps evaluated a wide range of alternatives and identified only one (1) measure that can effectively manage sediment once it has deposited and is interfering with navigation – i.e., dredging. The interim action could continue for a period of 1 to 3 years, allowing time for the Corps to secure funding, prepare plans and specifications, perform necessary environmental compliance, award a contract, and get a contractor onsite. The dredging method would probably be mechanical, with clamshell dredging the most likely. The disposal site would be decided on a case-by-case basis in accordance with Corps regulations, but could be upland or in-water. The Corps would dredge the problem areas to the congressionally authorized depth [14 feet deep at MOP plus up to two additional feet (one foot for inaccuracy of the bucket and one foot for advanced measure)]. The disposal method would be selected based on the Federal Standard (33 CFR 335.7) and would consider beneficial use of dredged material, either in-water or upland subject to authority and funding.

- **Future Forecast Actions for Navigation.**

Actions:

1. Subject to availability of funds, the Corps would conduct a tier-off NEPA analysis (see Section 3.3.4.3) of all measures identified for the navigation authorized project purpose, listed below in the order presented in Table A-4 (not in order of preference) subject to availability of funding:
 - i. Dredging.
 - ii. Disposal (consider a range of alternatives, in-water and upland. Beneficial uses will be considered consistent with applicable authorities and guidelines).
 - iii. Bendway weirs.
 - iv. Dikes/Dike fields.
 - v. Sediment traps.
 - vi. Reservoir Drawdown to flush sediment.
 - vii. Reconfigure affected facilities.
 - viii. Relocate affected facilities.
2. Complete the tier-off NEPA analysis of applicable measures applying the PSMP process for future forecast need actions (Section 3.3.4.3).
3. Address any necessary immediate need action [i.e., pool manipulation (Interim), dredge and disposal] until the long-term solution identified during the analysis can be implemented.

Description: The Corps would seek to initiate and implement a tier-off NEPA analysis when an area in the Federal navigation channel exhibits (chronic/recurring) sediment deposition and the situation is expected to continue. This analysis would follow the process described above and in Section 3.3.4. The analysis would determine the most cost-effective, technically acceptable and environmentally acceptable action(s) to manage the sediment depositing in that area. It may take several years to complete the analysis and accompanying environmental compliance and implement the recommended action, subject to authority and funding. While that analysis is being conducted, the Corps may need to go through one or more instances of interim operations with possible dredging as described for the immediate need.

3.3.3.2 Recreation

- **Immediate Need Actions for Recreation.**

Actions:

1. If necessary for safety, post warnings or close boat ramp/basin (Interim)⁶.
2. Use agitation to resuspend problem sediment; or.
3. Dredge area(s) of problem sediment deposition and dispose of dredged material (3 options – Beneficial, In-water or Upland), in accordance with applicable laws and regulations including the Federal Standard).

Description: As an interim action, the Corps may possibly post warnings that the boat basin/ramp is experiencing shallow water conditions caused by sediment accumulation. If the boat basin or marina becomes too hazardous for boaters, the Corps may close the facility and direct boaters to other nearby facilities. These actions would remain in effect until funding could be secured to perform the planning, environmental compliance and award a contract for a more permanent solution (i.e., agitation to resuspend or dredging action).

- **Future Forecast Actions for Recreation.**

Actions:

1. Subject to availability of funds, the Corps would need to conduct a tier-off NEPA analysis of all measures identified for the recreation authorized project purpose, listed below in the order presented in Table A-4:
 - i. Dredging.
 - ii. Disposal (3 options – Beneficial, In-water or Upland).
 - iii. Agitation to resuspend.
 - iv. Reconfigure affected facilities.
 - v. Relocate affected facilities.
2. Complete the in-depth analysis of applicable measures applying the PSMP process for future forecast need actions (Section 3.3.4.3).
3. Address any necessary immediate need actions (i.e., agitation to resuspend or dredge and disposal) until the long-term solution identified during the analysis can be implemented.

Description: The Corps would perform a tier-off NEPA analysis when a problem area in a Corps-managed boat basin/ramp exhibits chronic sediment deposition and is expected to continue to have a problem. This analysis would follow the process described above and in

⁶ The EIS identified that Navigation Objective Reservoir Operation could be effective as an interim measure to address sediment deposition interfering with recreation facilities (See Table A-4). The PSMP does not list it as a viable measure for recreation, but changes in reservoir operation for navigation could provide ancillary benefits for recreation.

Section 3.3.4. The analysis would determine the most cost-effective, technically acceptable, and environmentally acceptable action(s) to manage the sediment depositing in that area. The measures would include reconfiguring, relocating or closing the facilities. It may take several years to complete the analysis and environmental compliance and to implement the recommended action. While that analysis is being conducted, the Corps may implement immediate need actions to address problem sediment.

3.3.3.3 Fish and Wildlife Conservation

- **Immediate Need Actions for Fish and Wildlife Conservation.**

Actions:

1. Routine operation and maintenance (O&M) of existing irrigation intake facility in place by lifting/raising intake out of the sediment to clear sediment, move/shift intake, or limited excavation (e.g., by hand).
2. Install temporary irrigation intake line or use other available water source (Interim).
3. Dredge area(s) of problem sediment deposition and dispose of dredged material (3 options – Beneficial, In-water or Upland, in accordance with applicable laws and regulations).

Description: If an irrigation intake becomes buried by or clogged with sediment during the irrigation season, the Corps would likely take immediate action to restore the flow of water to the intake. These actions could include lifting the intake out of the sediment if possible, move/shift intake, or limited excavation/agitation (e.g., by hand). If immediate routine O&M action is unsuccessful, restore irrigation flow by installing temporary irrigation intake line, truck in water or use other available water source (interim). Last, dredge problem sediment and dispose of dredged material in accordance with applicable laws and regulations.

- **Future Forecast Actions for Fish and Wildlife Conservation.**

Actions:

1. Initiate future forecast action by requesting (budgeting for) funding to conduct an a tier-off NEPA analysis of all measures identified for the fish and wildlife conservation authorized project purpose, listed below in the order presented in Table A-4:
 - i. Dredging.
 - ii. Disposal (Beneficial, In-water, or Upland).
 - iii. Agitation to resuspend.
 - iv. Reconfigure affected facilities.
 - v. Relocate affected facilities.
2. Complete the tier-off NEPA analysis of applicable measures applying the PSMP process for future forecast need actions (Section 3.3.4.3).

3. Address any necessary immediate need actions (i.e., routine O&M, interim actions, or dredge and disposal) until the long-term solution identified during the analysis can be implemented.

Description: The Corps would begin a tier-off NEPA analysis when an irrigation intake exhibits chronic sediment deposition and is expected to continue to have a problem. This analysis would follow the process described later in Section 3.3.4.3, and would evaluate a variety of potential sediment management measures to determine the most cost-effective, technically feasible and environmentally acceptable alternative. The analysis would include consideration of all measures identified in Table A-4 as applying to the authorized fish and wildlife conservation purpose, including relocating the affected irrigation facility or reconfiguration (e.g., identification of an alternate, permanent, water source such as a groundwater well). It may take several years to obtain funding, complete the analysis and environmental compliance, and implement the recommended action. While that analysis is being conducted, the Corps may implement immediate need actions to address problem sediment.

3.3.3.4 Flow Conveyance

- **Immediate Need Actions for Flow Conveyance.**

Actions:

1. Use reservoir operations during high flow event to lower reservoir water surface and increase capacity, in accordance with the Lower Granite Project Water Control Manual (Interim).
2. Conduct bathymetric surveys and develop new hydraulic models for the confluence area.
3. Perform conveyance dredging and dispose of dredged material.

Description: Immediate need actions for flow conveyance could include extraordinary reservoir operations, such as advanced lowering of the reservoir water surface, in accordance with the Lower Granite Project Water Control Manual. Following the high flow event, the bathymetry of the confluence area would be surveyed and new hydraulic models developed. If the hydraulic modeling indicates that an unacceptable risk of overtopping the levees remains, conveyance dredging would be performed as soon as practicable to reduce the risk during subsequent high flow events. Conveyance dredging would be similar to that for navigation, but would involve much greater quantities of material and would consider beneficial use of the dredged material subject to authority and funding.

- **Future Forecast Action for Flow Conveyance.**

Actions:

1. Initiate future forecast action by requesting (budgeting for) funding to conduct an in-depth analysis of all measures identified for flow conveyance, listed below in the order presented in Table A-4:
 - i. Conveyance dredging.
 - ii. Disposal (3 options – beneficial use, in-water or upland).
 - iii. Upstream (in reservoir) sediment traps.
 - iv. Raise height of Lewiston Levees.
 - v. Reservoir drawdown.
2. Complete the in-depth analysis of applicable measures applying the PSMP process for future forecast need actions (Section 3.3.4.3).
3. Address any necessary immediate need actions (i.e., routine O&M, interim actions, or dredge and disposal) until the long-term solution identified during the analysis can be implemented.

Description: The Corps would begin a tiered-off NEPA analysis when flow conveyance is being adversely affected by sediment deposition and hydraulic modeling indicates that the risk of overtopping the levees is unacceptable. This analysis would follow the process described in Section 3.3.4.3 and would evaluate the applicable management measures, including dredging and raising the levees, to determine the most cost-effective, technically feasible and environmentally acceptable action(s) to manage the sediment deposition affecting flow conveyance. It may take several years to obtain funding, complete the analysis and environmental compliance, and implement the recommended action. While that analysis is being conducted, the Corps may need to implement immediate need actions to address problem sediment.

3.3.4 Planning Process for Sediment Management Actions

The Corps will follow the process outlined below when planning and implementing sediment management actions identified in the PSMP, subject to availability of authority and funding.

3.3.4.1 Routine or Interim Actions

This plan identifies a number of routine O&M or interim actions (e.g., raising/lowering reservoirs; posting warnings or closing boat ramps/basins, lifting/raising/shifting irrigation intakes, conducting bathymetric surveys), to be implemented before site-specific immediate/future need actions can occur. These actions do not require a tier-off NEPA analysis, as they are currently addressed under existing LSRP construction or operations documentation/reviews.

3.3.4.2 Immediate Need Actions

Development and consideration of alternatives for immediate need actions will use the NEPA review planning process – tiered from the EIS. The Corps anticipates tiered NEPA documentation for immediate need actions will generally be an EA, but minor actions may be covered by a CATEX⁷. The tiered NEPA review process will consider only measures identified in Table A-4 above (or combination of such measures) for the applicable authorized project purpose when developing alternatives. Given the immediate need measures identified in the PSMP, the NEPA review process for immediate need actions will generally include only the “No action” and proposed action alternative (i.e., dredging), with alternative dredged material disposal options (beneficial use upland or in-water). The tiered NEPA review process will follow the process outlined in CEQ regulations (40 CFR 1500-1599), and Corps regulations (33 CFR 230), and include documentation establishing compliance with other applicable environmental laws, including:

- The ESA, Section 7.
- The National Historic Preservation Act (NHPA), Section 106.
- The Clean Water Act (CWA), Section 404 and 401.

The dredged material disposal option for such immediate need actions will be consistent with all applicable laws and regulations.

3.3.4.3 Future Forecast Need Actions

Development and consideration of alternatives for future forecast need actions will use the NEPA review planning process, tiered from the EIS. The NEPA review will follow the same process identified in 3.3.4.2 above. When a problem area meets a trigger for a future need action, location-specific alternatives for addressing the problem will be formulated and will draw from the list of measures in Table A-4. An alternative may be composed of a single measure or a combination of measures. It may take several years to obtain funding, complete the analysis and environmental compliance, and implement the recommended action. While that analysis is being conducted, the Corps may need to implement immediate need actions to address problem sediment. The evaluation of alternatives will consider the least costly, technically feasible and environmentally acceptable alternatives to implement. Following evaluation and comparison of alternatives, which will be summarized in the project-specific tier-off NEPA analysis, the District Commander will select the alternative to be implemented. This decision will be documented in either a Finding of No Significant Impact (FONSI) if an EA is prepared or a Record of Decision (ROD) (signed by the Division Commander) if a supplemental EIS is prepared. The selected alternative will then be advanced into final design and implementation.

⁷ See Footnote 1 to Section 1.5.

Once an alternative has been selected for implementation, final design and modeling would be conducted as appropriate, plans and specifications developed, and contract documents prepared as applicable. The Corps, in coordination with other parties as applicable, will implement the alternative selected to address sediment accumulation at the subject location(s). Project-specific monitoring will be conducted in order to evaluate effectiveness of the alternative implemented and compliance with applicable environmental laws/regulations.

4 MONITORING, ADAPTIVE MANAGEMENT AND PSMP UPDATES

4.1 Monitoring and Adaptive Management

The Corps will use the “Plan Level” monitoring described in Section 3.1, as well as any project-specific monitoring, as an adaptive management tool to guide future project maintenance including sediment management actions and updates to the PSMP. Project-specific monitoring includes any monitoring identified to ensure the effectiveness of the project-specific action and compliance with regulatory and environmental laws/regulations.

The overall purpose of the Corps’ monitoring actions is to provide a framework that identifies problems affecting existing authorized project purposes and will ensure compliance with applicable environmental laws and regulations, assess the effectiveness of an action, and provide feedback to the Corps on existing conditions to improve the long-term sediment management program. Monitoring is also intended to facilitate a working relationship with regulators and stakeholders that will aid in timely review and increased credibility for application of site-specific actions.

Monitoring is an important adaptive management tool for improving management policies and practices by learning from the results of implemented actions. Updates to the PSMP (discussed in Section 4.3 below) would be made as indicated by monitoring program results.

After an action has been implemented the Corps will monitor and assess the effectiveness of the measure. The Corps will also consider the results of project-specific monitoring in terms of the performance of the measure within the overall program. After a measure is applied and the project and its project-specific monitoring are completed, the Corps will review the performance of the measure to determine its continued applicability within the overall program.

Project-specific applied measures will also be monitored for compliance with applicable environmental regulations and requirements. Specific monitoring requirements and protocols will be identified in the environmental compliance documentation associated with NEPA, ESA, CWA and NHPA compliance. Specific requirements or protocols may be established based on the selected measure and its site specific application.

The Corps will conduct status and trend monitoring to identify sediment conditions and deposition within the LSRP. The purpose is to provide the Corps with an understanding of how critical sediment resources (particularly unwanted sediment deposition) are generally trending under the influences of PSMP implementation, other human activities, and environmental factors. The Corps will use the LSMG to discuss basin land use trends, natural and/or man-made disturbances that affect sediment recruitment, landslides, or forest fires, and watershed sediment management efforts.

4.2 Coordination with Agencies and Stakeholders

Coordination and information sharing with other land management agencies and groups within the watershed is an integral part of long term planning and the adaptive management approach to the PSMP. As such, the Corps will organize annual meetings with all applicable land use management agencies and groups through the annual LSMG meeting. The purpose of the meeting will be to share data and compare trends observed by each agency, identify potential opportunities to improve sediment reduction BMPs, and analyze trends on a watershed basis. Information gained from meeting participants may result in adapting measures for the implementation process within the PSMP. Where appropriate, the LSMG, and federal, state, and local agencies and Tribes may be involved in coordination of monitoring activities. The Corps (Walla Walla District's Planning Branch) intends to explore opportunities for other regional coordination concerning sediment management in the lower Snake River basin (e.g., provision of staff expertise under the Regional Sediment Management Program), which are hosted/facilitated by other agencies or stakeholders.

4.3 PSMP Updates

The PSMP will be reviewed periodically by the Corps and modified if necessary to better address sediment accumulation that interferes with the Corps ability to maintain the LSRP. The PSMP may also be updated whenever the Corps determines that conditions (physical, political, or budgetary) in the area covered by the PSMP have changed significantly enough to warrant an update to the plan or when monitoring and/or agency-stakeholder coordination identify needed changes. The Programmatic Sediment Management Plan will be modified as necessary to reflect the changing circumstances, requirements, or performance. Modification of the PSMP could include:

Modifying how a measure is applied (e.g., adapting where, when, how, or why a measure is applied).

Changing which management measures are considered for possible implementation, e.g., some measures may be dropped from further consideration or use, and other measures added as necessary.

Describing compliance with applicable project-specific engineering and environmental reviews in accordance with federal, state, local requirements and Corps guidelines.

The Corps will initiate and facilitate the reviews, as well as oversee the plan updates. Plan updates may require additional environmental compliance.

5 REFERENCES

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- U.S. Army Corps of Engineers. 2011. Regional Sediment Management website. <http://rsm.usace.army.mil/>. Accessed June 1, 2011.
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