



U.S. Army Corps of Engineers
Walla Walla District

Lower Snake River Programmatic Sediment Management Plan Final Environmental Impact Statement

EXECUTIVE SUMMARY

August 2014



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Introduction

The Walla Walla District of the U.S. Army Corps of Engineers (Corps) has identified and evaluated sediment management strategies for the lower Snake River. Based on the analysis presented in this Environmental Impact Statement (EIS) and stakeholder and public comments, the Corps will adopt and implement a Programmatic Sediment Management Plan (PSMP) (see proposed PSMP in Appendix A) for management of sediment within the lower Snake River system to meet existing authorized project purposes.

As a part of its Congressional authorization, the Corps operates and maintains the navigation system on the lower Snake River, which is part of an inland navigation system from Lewiston, Idaho, to the Pacific Ocean and includes the Columbia River.

The Corps constructed four dams on the Snake River in Washington State (Ice Harbor, Lower Monumental, Little Goose, and Lower Granite) between 1961 and 1975. The Corps' sediment management area includes the lower Snake River from the confluence with the Columbia River¹ to the upstream limits of Lower Granite Reservoir, including the lower portion of the Clearwater River. For the purposes of this EIS, the sediment management area, including the four dams and their associated locks and reservoirs, is referred to as the Corps' Lower Snake River Projects (LSRP).

The existing authorized project purposes of the LSRP include commercial navigation, recreation, fish and wildlife conservation, and flow conveyance. Sediment accumulation in the lower Snake River can interfere with these authorized project purposes of the LSRP.

The Corps has historically used dredging as its primary method of removing accumulated sediment that interferes with the authorized project purposes of the LSRP. Dredged sediments were moved to and placed in areas where they would no longer interfere with the authorized project purposes, either in-water within the reservoirs or on upland sites.

Between 1999 and 2002 the Corps prepared a Dredged Material Management Plan (DMMP) EIS, which evaluated alternatives for managing dredged sediments in the LSRP. Following the September 2002 publication of the Record of Decision for the DMMP EIS, a group of environmental and fishing interests (collectively referred to as the "plaintiffs") filed a lawsuit in November 2002, alleging compliance failures by the National Marine Fisheries Service (NMFS) with respect to the Endangered Species Act (ESA) and by the Corps with respect to the National Environmental Policy Act (NEPA). The U.S. District Court, Western District of Washington,

¹ The lower Snake River between the confluence with the Columbia River and Ice Harbor Dam is within the reservoir formed by McNary Dam on the Columbia River.

granted a preliminary injunction, halting further action by the Corps. The Corps withdrew the Record of Decision and in 2005 prepared an EIS for a one-time navigation channel maintenance action (dredging). The litigation was ended in 2005 through a settlement agreement between the plaintiffs and the Corps. In the settlement agreement the Corps was allowed to perform a one-time dredging of the federal navigation channel and related port berthing areas in the winter of 2005/2006. The Corps also agreed to “...initiate and complete a NEPA analysis on a long-term plan for the management of sediment in the lower Snake River, to be designated the Programmatic Sediment Management Plan....” The PSMP is designed to evaluate future actions for sediment management to meet existing authorized project purposes. This Final EIS presents the NEPA analysis of the long-term plan (PSMP) for sediment management directed by the settlement agreement and the current immediate need action (including related regulatory reviews) consistent with the PSMP.

Purpose of and Need for the Proposed Action

The purpose of the proposed action is to maintain the existing projects (the LSRP) by managing sediment that interferes with the existing authorized project purposes by adopting and implementing a PSMP, which includes actions for long-term and immediate needs. The purpose also includes re-establishing the federal navigation channel to the congressionally-authorized dimensions of 14 feet deep by 250 feet wide to address sediment accumulation that is currently interfering with commercial navigation. Coinciding with the current immediate need action is a related need to restore depths necessary to support commercial navigation at non-federal berthing areas of local ports.

The PSMP will provide a programmatic framework to evaluate and implement sediment management measures to address the accumulation of sediment that interferes with existing authorized project purposes. The PSMP is needed to maintain the LSRP by managing, and preventing if possible, sediment accumulation in areas of the lower Snake River reservoirs that interfere with the following existing authorized project purposes:

- *Commercial navigation* by reducing the depth of the federal navigation channel to less than the congressionally-authorized dimensions (14 feet deep by 250 feet wide) when operating at minimum operating pool (MOP), thereby impairing access to port berthing areas, access to navigation locks, and safe movement of tugs and multi-barge tows;
- *Recreation* by limiting water depth at recreation areas to less than original design dimensions and thereby impairing access;
- *Fish and wildlife conservation* by sediment accumulation interfering with irrigation water intakes at Habitat Management Units (HMUs), juvenile ESA-listed fish barge access to loading facilities, and fish barge passage through the reservoirs and locks within the LSRP;

- *Flow conveyance* at Lewiston² by reducing the capacity of the river channel between levees to pass high flows. Sediment management at the confluence of the Snake and Clearwater Rivers may be needed in the long-term to manage the risk of flooding consistent with applicable Corps policies.

Historically within the LSRP, the Corps has approached project maintenance by identifying areas where sediment interfered with authorized project purposes and then taking action to remove the sediment, usually by dredging. The PSMP identifies and evaluates a wide range of measures to accomplish the purpose of maintaining the LSRP and provides a decision-making process to manage and, if possible, prevent sediment accumulation that interferes with authorized project purposes, including addressing the current immediate need action to re-establish the federal navigation channel to congressionally-authorized dimensions of 14 feet deep by 250 feet wide at MOP. Future actions under the PSMP may require project-specific environmental reviews tiered off of this programmatic EIS, and may involve additional studies and authorities.

The Corps has identified a current immediate need action to address sediment accumulation that is interfering with commercial navigation. Sediment accumulation has reduced the congressionally-authorized federal navigation channel depth by several feet (at MOP) at two locations across much of its width:

- The downstream navigation lock approach at Ice Harbor Dam
- The confluence of the Snake and Clearwater rivers at the upstream end of Lower Granite Reservoir

A current immediate need action is necessary to reestablish the federal navigation channel to its congressionally-authorized dimensions at these locations.

Coinciding with the current immediate need action for reestablishing the congressionally-authorized dimensions of the federal navigation channel is a related need for a maintenance action at the non-federal berthing areas for the ports of Lewiston and Clarkston to restore depths necessary to support commercial navigation. Both ports are located at the upstream end of Lower Granite Reservoir at the confluence of the Snake and Clearwater rivers and are adjacent to the federal navigation channel. The Port of Lewiston is on the right bank of the Clearwater River while the Port of Clarkston is on the left bank of the Snake River. The Ports are responsible for CWA Section 404 and Rivers and Harbors Act Section 10 compliance for their maintenance actions and must apply to the Corps for the necessary regulatory permits (Sections 404/10) to perform this maintenance. As stated above, the EIS also includes the evaluation of potential environmental effects associated with the permit applications for related berthing area maintenance at the ports of Lewiston and Clarkston. The berthing area maintenance is related to the Corps' purpose of re-establishing the congressionally-authorized dimensions of the federal

² Although flood risk management is not an authorized project purpose of the LSRP, ensuring adequate flow conveyance through the Lewiston levee system supports the original Lower Granite Project design and all associated project purposes.

navigation channel and would coincide with federal navigation channel maintenance, pending the outcome of any necessary permit evaluations for the ports' maintenance actions.

The sediment deposition is also currently interfering with the Corps' ability to operate the Lower Granite reservoir within one foot of MOP from April through August for ESA listed threatened and endangered juvenile salmon passage. This operation is called for in the NOAA 2014 Supplemental Biological Opinion for the Federal Columbia River Power System (NOAA FCRPS BiOp³) Reasonable and Prudent Alternative (RPA) Action 5.

In addition, the Corps has developed this PSMP EIS to fulfill the relevant portion of the 2005 settlement agreement referenced above.

A Programmatic Approach

A federal agency may enact a programmatic approach versus a project-specific approach for a broad program of management activities under their authority (40 CFR 1502.4(b)). The purpose of programmatic management is to provide consistency in and a roadmap for future project-specific decision-making. The associated programmatic management plan developed by a federal agency requires preparation of a programmatic EIS. This PSMP programmatic EIS includes alternatives that define broad programs for managing sediments through implementation of future actions as they relate to maintaining the authorized project purposes of the LSRP. Actions taken to address the current immediate need action (consistent with the PSMP) to reestablish the navigation channel, including regulatory review by the Corps of related port actions, are covered in this EIS at a site-specific level. Future actions would require project-specific environmental reviews, including preparation of appropriate NEPA documents tiered off of this programmatic EIS.

The Corps and other agencies conducted extensive analysis of sediment loads and transport to support decision making on the management of sediment deposition that interferes with authorized purposes of the LSRP. This research and analysis represents the most comprehensive assessment of sediment sources, loading, transport, and deposition conducted for the Snake River system. It provides information to support decision making about long-term strategies for managing sediment deposition that interferes with authorized purposes of the lower Snake River.

Alternatives

Past sediment management efforts by the Corps have focused largely on site-specific actions within the reservoirs, particularly dredging, to remove sediment deposits that interfere with authorized purposes of the reservoirs. Through the PSMP EIS, the Corps identified dominant sediment sources within the watershed and evaluated the potential for reducing sediment input from upland sources rather than focusing solely on sediment management within the lower Snake River reservoirs. Therefore, in developing and evaluating alternatives, the Corps identified

³ The supplement to the 2008/2010 FCRPS BiOP.

and evaluated methods of managing sediment through structures or reservoir operations in addition to dredging, as well as methods for reducing sediment entering the reservoirs from tributaries and upland sources. The programmatic alternatives can be thought of as variations on a “toolbox” that contains a group of techniques, or measures, for managing sediments.

The Corps used the following process to develop and evaluate the PSMP alternatives presented in this EIS:

1. Areas were identified where sediment accumulation has adversely affected or is likely to adversely affect navigation, water intakes, recreation, or flow conveyance.
2. A broad range of sediment management measures were developed that could potentially address identified problems in accordance with the purpose and need. Measures did not need to completely solve all sediment-related problems identified by the Corps, but they would have to reasonably contribute to resolving the problems. Measures considered were actions that could be taken by the Corps or by other agencies.
3. Technical, environmental, and economic criteria were developed to determine the feasibility and effectiveness of the measures.
4. Measures were screened during technical workshops for potential inclusion in the PSMP alternatives based on criteria noted above.
5. A range of PSMP alternatives was developed by assembling feasible and effective measures into groups that would meet the purpose and need and provide effective strategies for sediment management.
6. The PSMP alternatives were each evaluated to determine if implementation of the alternative would meet the project purpose and need, if the alternative comprehensively addressed identified problems, and if the alternative provided an effective means of managing sediment over a long term period. Alternatives that did not meet these criteria were eliminated from detailed analysis, and the retained alternatives were evaluated in detail.

Measures

Through a collaborative process that included a series of workshops involving technical experts from the Corps and other agencies, and input from scoping and stakeholders, the Corps developed a broad range of management measures that could address identified sediment accumulation problems. Sediment management measures were grouped as follows:

Dredging and Dredged Material Management – Dredging involves 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 may be by mechanical means (i.e., physically scooping sediments with a clamshell or backhoe) or hydraulic dredging, which removes sediment by suction. Once dredged, sediments are transported to a disposal or placement area. Dredged material may be placed in-water or upland, and may be beneficially used for other purposes, such as habitat creation.

Disposal options available to the Corps for dredged materials are identified in accordance of Corps regulations (33 CFR 335-338). The “Federal standard” for disposal of dredged material is defined as “[T]he least costly alternatives consistent with sound engineering practices and meeting the environmental standards established by the 404(b)(1) evaluation process. . . .” (33 CFR 335.7).

Structural Sediment Management Measures – Structural sediment management measures seek to control the location and rate at which sediment is deposited at a specific location, in order to reduce or eliminate the magnitude of the sediment interference with authorized purposes of the LSRP. Examples of structural management measures include weirs to prevent sediment from accumulating in certain areas, and sediment traps provide a place to collect sediment that may otherwise interfere with authorized purposes. Structural sediment management measures could be considered by the Corps subject to authority and funding.

System Management Measures – System management measures modify reservoir operations (such as pool depth) or facilities so that sediment deposition does not adversely affect authorized purposes. Examples of system operations measures include reconfiguring or relocating navigation 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 and public port authorities would be responsible for implementing system management measures for their respective facilities.

Upland Sediment Reduction Measures – Upland sediment reduction measures are land management actions intended to reduce the amount of sediment that enters into the lower Snake River systems. Upland sediment reduction measures include site-specific projects such as sediment traps or vegetation filter strips designed to reduce erosion of soil from land into area waterways, and programs aimed at encouraging or requiring such projects. Upland sediment reduction measures are currently implemented throughout the watershed of the lower Snake River. For the purposes of this EIS, the expansion or increase of practices beyond current levels of implementation is assumed. Sediment reduction measures would be implemented on public and private lands in contributing drainage areas through programs and actions by agencies other than the Corps. In addition, the Corps also implements upland sediment reduction measures on land it manages adjacent to the LSRP.

Range of Alternatives

The Corps formulated a range of alternatives by assembling the feasible and effective measures into groupings based on how measures could be implemented and what agencies could implement them. In accordance with NEPA, the Corps included a No Action Alternative, defined here as no change in current practices. As noted previously, the alternatives are programmatic and describe broad categories of actions that could be implemented to meet the purpose and need.

Each alternative represents a plan that the Corps (or potentially other agencies) would implement over time, and thus contains both action to address the immediate need to reestablish the authorized navigation channel and a framework for decision-making on future actions. For any alternative, the Corps would monitor sediment accumulation in the LSRP and assess conditions with respect to sediment accumulation that would affect authorized purposes. Those conditions are:

- Immediate needs:
 - ◆ Federal navigation channel (including channel, lock approaches, and port berthing areas) is less than authorized dimensions at MOP.
- Future needs:
 - ◆ Sediment accumulation that interferes with an authorized purpose recurs at the same location more frequently than every five years.
 - ◆ Sediment accumulation that interferes with an authorized purpose is anticipated at a particular location (or locations) in less than five years.

When any of those conditions exist, the Corps (or others) would initiate actions to address them. For the immediate need, the Corps would initiate action to reestablish the authorized dimensions of the navigation channel; for future needs, the Corps (or others) would initiate planning and evaluation of applicable measures, consistent with the framework of the adopted plan. Currently, the immediate need exists at several locations within the LSRP. In addition, several sites within the LSRP have recurring sediment accumulation conditions that represent future needs.

Table ES-1 presents the alternatives considered. Several alternatives were removed from further consideration because they did not meet the criteria noted above. The alternatives considered in detail are described below.

Table ES -1: Range of Alternatives Screening

Alternative	Does the alternative		Retain for further evaluation in EIS?
	Provide long-term solution(s) to sediment that interferes with existing authorized project purposes of LSRP?	Provide immediate need solutions to sediment that interferes with existing authorized project purposes of the LSRP?	
1 – No Action	No	No	Yes
2 - Increased Implementation Sediment Reduction Measures	No	No	No
3 - System Management	Partial	No	No
4 - Non-Dredging Sediment Management Measures	Partial	No	No
5 - Dredging-Based Sediment Management	Yes	Yes	Yes
6 - System Management and Non-Dredging Sediment Management	Partial	No	No
7 - Comprehensive (Full System and Sediment Management Measures)	Yes	Yes	Yes

Alternative 1: No Action (Continue Current Practices)

The No Action alternative represents a continuation of the Corps' current operational practices of managing the LSRP. The Corps would not adopt the proposed PSMP or implement any new sediment management actions (e.g., channel maintenance dredging). The Corps would continue its ongoing monitoring of accumulated sediment that affects the existing authorized project purposes of the LSRP.

Measures

The following measures would be considered under this alternative:

- Navigation objective reservoir operation

Implementation

Alternative 1 would address all future needs (immediate and forecasted) in the same manner as current practice. The Corps would continue to use the actions described above to address sediment accumulation that interferes with the existing authorized project purposes. Navigation objective reservoir operations would continue to be implemented in the lower Snake River, consistent with the terms and conditions of the NOAA FCRPS BiOp or subsequent ESA consultation and other applicable requirements, to address sediment accumulation that interferes

with commercial navigation. For Corps-managed recreation areas (boat basins or ramps) the Corps may post warnings or close affected facilities if either of these actions was needed for safety. The Corps would perform routine maintenance on existing irrigation intakes (e.g. lifting or shifting the intakes, or doing limited excavation), install a temporary intake, or use another available water source to address sediment accumulation at HMU intakes. Reservoir operations would be used during high flow events, in accordance with the Lower Granite Project Water Control Manual (USACE 1987b), if needed to provide flow conveyance at the Snake/Clearwater Rivers confluence.

Alternative 5 – Dredging-Based Sediment Management

The Dredging-Based Sediment Management alternative represents a continuation of the Corps' historical practices of using dredging as the primary tool for managing sediment that interferes with existing authorized project purposes of the LSRP. The Corps would continue its current program of monitoring sediments that affect the existing authorized project purposes of the LSRP. Sediment management would consist of dredging and dredged material management. Sediment management activities would be undertaken in response to or anticipation of sediment accumulation problems.

Agencies and land owners responsible for land management in the basins that drain into the LSRP (including federal and state agencies, tribes, and conservation districts) would continue to implement existing land management programs and practices related to erosion control, consistent with their current authorizations and funding. The Corps would continue implementing erosion and sediment control on lands adjacent to the LSRP.

Measures

The following measures would be considered under this alternative:

- Navigation-objective reservoir operation (on a temporary basis until dredging is implemented)
- Navigation channel and other dredging
- Dredging to improve conveyance capacity
- Beneficial use of dredged material
- In-water disposal of dredged material
- Upland disposal of dredged material

Implementation

Based on Corps regulations, the Corps would evaluate disposal options to identify the least-costly, engineeringly feasible, environmentally acceptable option. The disposal method would ultimately be identified through evaluation of disposal alternatives under the substantive provisions of CWA Section 404(b)(1), guidelines established by the EPA (40 CFR 230) and

Corps regulations. Disposal options include consideration of beneficial use of dredged material, in-water disposal, and upland disposal. Beneficial use refers to utilizing dredged sediments as resource materials in productive ways. Potential beneficial use of dredged materials would include creating submerged fish habitat, establishing riparian habitat consistent with the Lower Snake River Fish and Wildlife Compensation Plan or using the material as fill for future development. Dredged material could also be disposed of in upland areas or in-water. Similar to Alternatives 2, 3, and 4, the Corps would perform the actions described in Alternative 1 as interim measures until the dredging actions could be completed. The Corps would continue monitoring sediment in the LSRP, as well as the effectiveness of habitat created by placement of dredged material and other beneficial uses of dredged material that it may undertake.

Alternative 7 – Comprehensive (Full System and Sediment Management Measures)

The Comprehensive (Full System and Sediment Management Measures) alternative is a combination of Alternatives 5 and 6 and provides a suite of all available dredging, system management, and structural sediment management measures for the Corps to use to address sediments that interfere with the existing authorized project purposes of the LSRP. Agencies and land owners responsible for land management in the basins that drain into the LSRP (including federal and state agencies, tribes, and conservation districts) would continue to implement existing land management programs and practices related to erosion control, consistent with their current authorizations and funding. The Corps would continue implementing erosion and sediment control on lands adjacent to the LSRP.

Measures

The following measures would be considered under this alternative:

- Navigation-objective reservoir operation (on temporary basis until dredging is implemented)
- Navigation channel and other dredging
- Dredging to improve conveyance capacity
- Beneficial use of dredged material
- In-water disposal of dredged material
- Upland disposal of dredged material
- Reservoir drawdown to flush sediments (drawdown)
- Reconfigure affected facilities
- Relocate affected facilities
- Raise Lewiston levees to manage flood risk
- Bendway weirs
- Dikes and dike fields

- Agitation to resuspend sediments
- Trapping upstream sediment (in reservoir)

Implementation

Implementation of Alternative 7 would be based on which trigger was reached and the authorized project purpose affected. To address an immediate need for navigation, the Corps would perform a dredging action similar to Alternative 5, as this would be the only measure that would effectively re-establish the federal navigation channel to its congressionally authorized dimensions. As an interim measure until dredging could be performed, the Corps may implement the same actions described in Alternative 1. For an immediate need for irrigation intakes, recreation, and flow conveyance the Corps would implement the same routine maintenance actions described in Alternative 1 before considering dredging.

When the trigger for future forecasted needs is reached, the Corps would initiate review of site-specific conditions, screening of alternative measures (including consideration cost, engineering, and environmental factors), and determine which measure (or measures) to implement to address sediment accumulation. While that analysis was being conducted, the Corps may implement the actions described in Alternative 1 to address problem sediment in the interim. The Corps would continue monitoring sediment in the LSRP, as well as the effectiveness of habitat created by placement of dredged material and other beneficial uses of dredged material that it may undertake.

Environmental Effects of Alternatives

Table ES-2 presents a summary of the effects of the plan alternatives on environmental resources.

Table ES-2. Environmental Effects Summary Table

Discipline	Alternative 1: No Action (Continue Current Practices)	Alternative 5: Dredging-Based Sediment Management ¹	Alternative 7: Comprehensive (Full System and Sediment Management Measures) ¹
Aquatic Resources	<p>Future Actions: Short-term adverse effects on listed salmonid species during implementation of Navigation Objective Reservoir Operation.</p> <p>Current: Immediate Need Action: Same effects as those described for Future Actions.</p>	<p>Future Actions: Short-term adverse effects on aquatic resources during implementation of dredging-based sediment management activities. Long-term beneficial effects from beneficial use of dredged material.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions from dredging and in-water beneficial use of dredged material.</p>	<p>Future Actions: Some short-term and longer-term adverse effects on aquatic resources during implementation of various measures. Long-term beneficial effects through beneficial use of dredged material. Potential adverse effects from weirs and dike fields that may provide habitat for predators on juvenile salmonids.</p> <p>Current Immediate Need Action: Same effects as those described under Current Immediate Need Action for Alternative 5.</p>
Terrestrial Resources	<p>Future Actions: Minor adverse effects on plant/wetlands at the margins of reservoirs due to fluctuating reservoir levels of navigation objective reservoir operations.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions.</p>	<p>Future Actions: Minor short-term adverse effects on wildlife during implementation of dredging-based sediment management. Upland beneficial use could have long-term benefits through habitat creation or enhancement.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions from dredging and in-water beneficial use of dredged material.</p>	<p>Future Actions: Minor to moderate short-term adverse effects on wildlife during construction activities associated with implementation of measures. Relocated or reconfigured facilities and upland disposal could have long-term adverse effects from loss of wetlands and habitat; upland disposal could also have long-term benefits to wildlife from habitat creation.</p> <p>Current Immediate Need Action: Same effects as those described under Current Immediate Need Action for Alternative 5.</p>

Table ES-2. Environmental Effects Summary Table

Discipline	Alternative 1: No Action (Continue Current Practices)	Alternative 5: Dredging-Based Sediment Management ¹	Alternative 7: Comprehensive (Full System and Sediment Management Measures) ¹
Recreation	<p>Future Actions: Beneficial effects on recreational boating.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions.</p>	<p>Future Actions: Minor short-term adverse effects on boating/fishing and land-based recreation during dredging and dredged material placement.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions from dredging and in-water beneficial use of dredged material.</p>	<p>Future Actions: Minor short-term adverse effects on boating/fishing and land-based recreation during measure implementation. Potential short-term adverse effects to recreation on Lewiston levee system during measure implementation. Measures could have long-term beneficial effects on recreation by restoring design dimensions of recreational facilities.</p> <p>Current Immediate Need Action: Same effects as those described under Current Immediate Need Action for Alternative 5.</p>
Cultural Resources	<p>Future Actions: Potential adverse effect on shoreline archaeological sites due to potentially prolonged exposure to water.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions.</p>	<p>Future Actions: Potential adverse effects to cultural resources from implementation of dredging-based sediment management measures.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions from dredging and in-water beneficial use of dredged material.</p>	<p>Future Actions: Potential adverse effects to cultural resources from construction activities associated with implementation of sediment and system management measures.</p> <p>Current Immediate Need Action: Same effects as those described under Current Immediate Need Action for Alternative 5.</p>
Socioeconomics	<p>Future Actions: Benefit to commercial navigation by providing for safe navigation. Duration of benefit is limited to the point where pool levels can no longer be raised. Potential long-term adverse effects on boating basins and marinas due to sediment accumulation, shifting local economic benefit away from effected facilities. Potential long-term adverse effects behind the Lewiston levee system due to increased flood risk.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions.</p>	<p>Future Actions: Temporary benefits to employment and income during dredging related activities. Long-term economic benefit by providing for safe commercial navigation and recreation opportunities.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions from dredging and in-water beneficial use of dredged material.</p>	<p>Future Actions: Temporary adverse effects on socioeconomics if navigation channels and associate facilities are modified or closed during measure implementation. Temporary benefits to employment and income during construction activities. Long-term economic benefit by providing for safe commercial navigation and recreation opportunities.</p> <p>Current Immediate Need Action: Same effects as those described under Current Immediate Need Action for Alternative 5.</p>

Table ES-2. Environmental Effects Summary Table

Discipline	Alternative 1: No Action (Continue Current Practices)	Alternative 5: Dredging-Based Sediment Management ¹	Alternative 7: Comprehensive (Full System and Sediment Management Measures) ¹
Water Quality and Sediment Quality	<p>Future Actions: Minor localized effects on water quality in the vicinity of boating activity due to prop wash and in the vicinity irrigation intake maintenance. No effect on sediment quality.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions.</p>	<p>Future Actions: Temporary adverse effects on water quality during dredging activities. No long-term effect on water quality or sediment quality.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions from dredging and in-water beneficial use of dredged material.</p>	<p>Future Actions: Temporary adverse effects on water quality during construction activities associated with measure implementation. Drawdown to flush sediments would adversely affect water quality temporarily by increasing turbidity and suspended sediments.</p> <p>Current Immediate Need Action: Same effects as those described under Current Immediate Need Action for Alternative 5.</p>
Hydrology and Sediment	<p>Future Action: No effect on sediment loading or transport dynamics of the lower Snake River.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions.</p>	<p>Future Actions: Small, localized change in channel cross section and in location of sediment due to beneficial use activities. No long-term effects on sediment loading or transport dynamics of the lower Snake River.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions from dredging and in-water beneficial use of dredged material.</p>	<p>Future Actions: Long-term or short-term localized change in flow velocity and sediment suspension/transport associated with measure implementation. No effect on sediment loading in the lower Snake River. Beneficial localized effect of creating conditions to avoid or minimize long-term accumulation of sediment in specific problem areas.</p> <p>Current Immediate Need Action: Same effects as those described under Current Immediate Need Action for Alternative 5.</p>
Hazardous, Toxic, and Radioactive Waste (HTRW)	<p>Future Actions: No effect from HTRW.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions.</p>	<p>Future Actions: No HTRW sites in LSRP. Minor short-term adverse effect if hazardous substances are released during dredging and dredged material management.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions from dredging and in-water beneficial use of dredged material.</p>	<p>Future Actions: No HTRW sites in LSRP. Minor short-term adverse effect if potentially hazardous substances are released during implementation of sediment or system management measures.</p> <p>Current Immediate Need Action: Same effects as those described under Current Immediate Need Action for Alternative 5.</p>

Table ES-2. Environmental Effects Summary Table

Discipline	Alternative 1: No Action (Continue Current Practices)	Alternative 5: Dredging-Based Sediment Management ¹	Alternative 7: Comprehensive (Full System and Sediment Management Measures) ¹
Air Quality	<p>Future Actions: No effect on air quality.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions.</p>	<p>Future Actions: Minor short-term adverse effect from construction equipment operation during dredging and dredged material placement.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions from dredging and in-water beneficial use of dredged material.</p>	<p>Future Actions: Minor short-term adverse effect from construction equipment operation during sediment and system management measures implementation.</p> <p>Current Immediate Need Action: Same effects as those described under Current Immediate Need Action for Alternative 5.</p>
Aesthetics	<p>Future Actions: Localized adverse impact on aesthetics of recreational facility due to potential closure or lack of use. .</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions.</p>	<p>Future Actions: Minor short-term adverse effect on visual quality during dredging and dredged material placement.</p> <p>Current Immediate Need Action: Same effects as those described for Future Actions from dredging and in-water beneficial use of dredged material.</p>	<p>Future Actions: Minor short-term adverse effect to aesthetic resources during sediment and system management measures implementation. Major short-term adverse effects to visual quality in the Lower Granite Reservoir due to river bottom exposure during drawdown. Minor long-term benefits to visual quality of recreation facilities due to relocation and reconfiguration.</p> <p>Current Immediate Need Action: Same effects as those described under Current Immediate Need Action for Alternative 5.</p>

The Corps' Preferred Alternative

In comparing the best available information with regard to each alternative, the Corps determined that Alternative 7 - Comprehensive (system and sediment management measures), best satisfies the project purposes of managing sediments that interfere with the authorized purposes of the LSRP and reestablishing the authorized navigation channel at MOP. Therefore, the Corps identified Alternative 7 as the preferred alternative. In addition to fully addressing immediate needs, the alternative provides for proactive monitoring and planning for addressing potential sediment accumulation rather than reacting to accumulation once it becomes an identified problem. It also provides a broad array of measures the Corps could implement to address sediment accumulation within the LSRP. The proposed future and immediate actions and associated measures comprise the framework of the PSMP.

Any sediment and system management measures associated with Alternative 7 would be implemented by the Corps subject to authority and funding. The Corps assumes sediment reduction measures would continue to be implemented by other land use agencies and authorities at current levels.

Because Alternative 7 provides nondredging options for the Corps to evaluate when planning sediment management actions, and provides measures for the immediate need action that uses dredged material to create fish habitat, the Corps also determined it was the environmentally preferred alternative.