PUBLIC NOTICE

REVISED DRAFT ENVIRONMENTAL ASSESSMENT

US Army Corps of Engineers ®
Portland District

Mount St. Helens Sediment Retention Structure Spillway Raise Project, Cowlitz County, Washington

CENWP-PM-E-12-02

15 Day Notice

Issue Date: May 11, 2012
Expiration Date: May 26, 2012

Interested parties are hereby notified that the U.S. Army Corps of Engineers, Portland District, has issued a revised draft Environmental Assessment (EA) addressing the impacts associated with the proposal to raise the spillway crest elevation of the Sediment Retention Structure (SRS) associated with the Mount St. Helens Project in Cowlitz County, Washington. The reasons for reissuing the draft EA is clarify the information provided in the initial draft EA, to share the initial EA public comments and responses, and provide the public an opportunity to provide additional input. Substantial portions of Section 1.1 (Purpose and Need), Section 3.1 (Affected Environment), and Section 4.1 (Environmental Consequences) have been revised.

The purpose of the proposed SRS Spillway Raise Project is to increase sediment storage capacity behind the existing SRS located on Corps property at River Mile 13.2 of the North Fork Toutle River. The SRS is a single purpose structure constructed in 1987-1989 to trap and control downstream movement of volcanic sediments eroding from the debris avalanche on Mount St. Helens. The SRS consists of an earth and rock fill embankment dam, a non-operational outlet works, and a 2,200-foot long spillway excavated in bedrock. The SRS is a key component of the Corps' Mount St. Helens project, and maintenance of its sediment management capabilities are necessary to reduce downstream flood risk by maintaining authorized levels of protection for communities along the lower Cowlitz River.

The sediment storage capacity of the SRS will be increased by constructing the Roller-Compacted-Concrete (RCC) structure on the existing spillway, thereby raising the overall spillway crest elevation by up to 10 feet. A plunge pool and low flow channel, designed to meet fish passage criteria, will also be excavated in subsurface bedrock within the existing spillway footprint between the new RCC structure and existing spillway crest. All construction activities, including equipment staging, removed sediment and/or excavated rock storage and other ground disturbing activities will take place on the existing structures, roadways, and/or in adjacent, reconfigured surfaces and locations that have been heavily disturbed and/or constructed on in the past. Overall, the 10-ft spillway rise is anticipated to form a shallow, 2-million-cubic-yard pool behind (i.e., upstream of) the SRS that will span approximately 294.5 acres within the North Fork Toutle River floodplain, extending roughly up to the 950 ft contour level. The resulting water and sediment level rise will be contained within the broader sediment plain/floodplain adjacent uplands. No other modifications to existing structures or features of the SRS are proposed at this time. Post construction plan will include monitoring and restoration of wetlands just upstream of the SRS and monitoring of streams within the existing sediment plain upstream of the SRS Construction work is tentatively planned for the summer and fall of 2012 or 2013, with in-water work proposed from July 1 to October 7.

The Corps prepared the draft Environmental Assessment (EA) in accordance with the Council on Environmental Quality's National Environmental Policy Act (NEPA) regulations [Federal Register 40 CFR 1508.9(a)]. The Corps will consider all comments on the assessment received by the Public Notice expiration date and make a determination of the significance of impacts resulting from the proposed action.

Environmental Document: The draft Environmental Assessment for the proposed activity is available for public review and comment on the Corps' Web site: https://www.nwp.usace.army.mil/pm/e/en_plan_assess.asp.

Endangered Species Act: The Corps of Engineers has completed section 7 consultation with the National Marine Fisheries Service and received a Letter of Concurrence that the proposed Spillway Raise Project is not likely to adversely

effect ESA-listed species under their jurisdiction. The Corps determined that there will be no effect to ESA-listed species under the jurisdiction of the U.S. Fish and Wildlife Service

State Water Quality Certification: Pursuant to Section 401 of the Clean Water Act, the proposed project is consistent with the NWP 31 (*Maintenance of Existing Flood Control Facilities*) and NWP 33 (*Temporary Construction, Access, and Dewatering*). The Washington State Department of Ecology (WDOE) anticipates issuing their State Water Quality Certification for the 2012 NWPs in the month of June, 2012. If NWP 31 and/or 33 are denied water quality certification, the Corps shall obtain an individual water quality certification. All General and Region Conditions associated with NWP 31 and NWP 33 will be followed, including pre-construction notification, review, and revegetation.

Additional Information and Comments: Questions or comments regarding the draft EA should be directed to Mr. Gregory Smith, (503) 808-4783, Gregory.M.Smith@usace.army.mil, or at the address below. Mailed comments must be postmarked by the above closing date and sent to:

District Engineer
U.S. Army Corps of Engineer District, Portland
Attn: CENWP-PM-E/Greg Smith
P.O. Box 2946, Portland, Oregon 97208-2946

In your response, please refer to the above public notice number, title, and date.
A "no comment" response will be assumed if no response is received prior to or postmarked by the above expiration date.

US Army Corps of Engineers ®
Portland District

Revised Draft Environmental Assessment

SEDIMENT RETENTION STRUCTURE (SRS) SPILLWAY RAISE PROJECT

MOUNT ST. HELENS SEDIMENT MANAGEMENT FOR FLOOD RISK REDUCTION

Sediment retention structure (SRS) and upstream sediment plain on North Fork Toutle River (1990 photo).

Revised Draft May 10, 2012

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Abbreviations and Acronyms

APE	area of potential effect
BiOp	Biological Opinion
cfs	cubic feet per second
cy	cubic yard(s)
Corps	U.S. Army Corps of Engineers
DAHP	Department of Archaeology and Historic Preservation
EA	Environmental Assessment
EFH	essential fish habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FCF	fish collection facility
FEDS	future expected deposition scenario
FONSI	Finding of No Significant Impact
GBS	grade-building structure(s)
LCFRB	Lower Columbia Fish Recovery Board
mcy	million cubic yard(s)
mg/L	milligrams per liter
MSHWA	Mount St. Helens Wildlife Area
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NMFS	National Marine Fisheries Service
NWP	Nationwide Permit
RCC	roller-compacted concrete
RM	river mile(s)
SRS	sediment retention structure
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife

1. INTRODUCTION

As part of the effort to maintain authorized levels of flood damage reduction benefits to the communities along the lower Cowlitz River, the U.S. Army Corps of Engineers, Portland District (Corps), is proposing to raise the spillway of the existing sediment retention structure (SRS) by up to 10 feet to increase its sediment storage capacity. The SRS was constructed from 1987 to 1989 on the North Fork Toutle River for the single purpose of trapping sediment eroding from the debris avalanche on Mount St. Helens, which was necessary to reduce flood risk to communities along the lower Cowlitz River (see cover photo and Figure 1). Sediment from the debris avalanche is transported through the North Fork Toutle River, mainstem Toutle River, and into the lower 20 miles of the Cowlitz River. As sediment accumulated behind the SRS, the rows of outlet works pipes were buried and closed. Since 1998, all flow passes over the SRS spillway, allowing more sediment to deposit in the lower Cowlitz River.

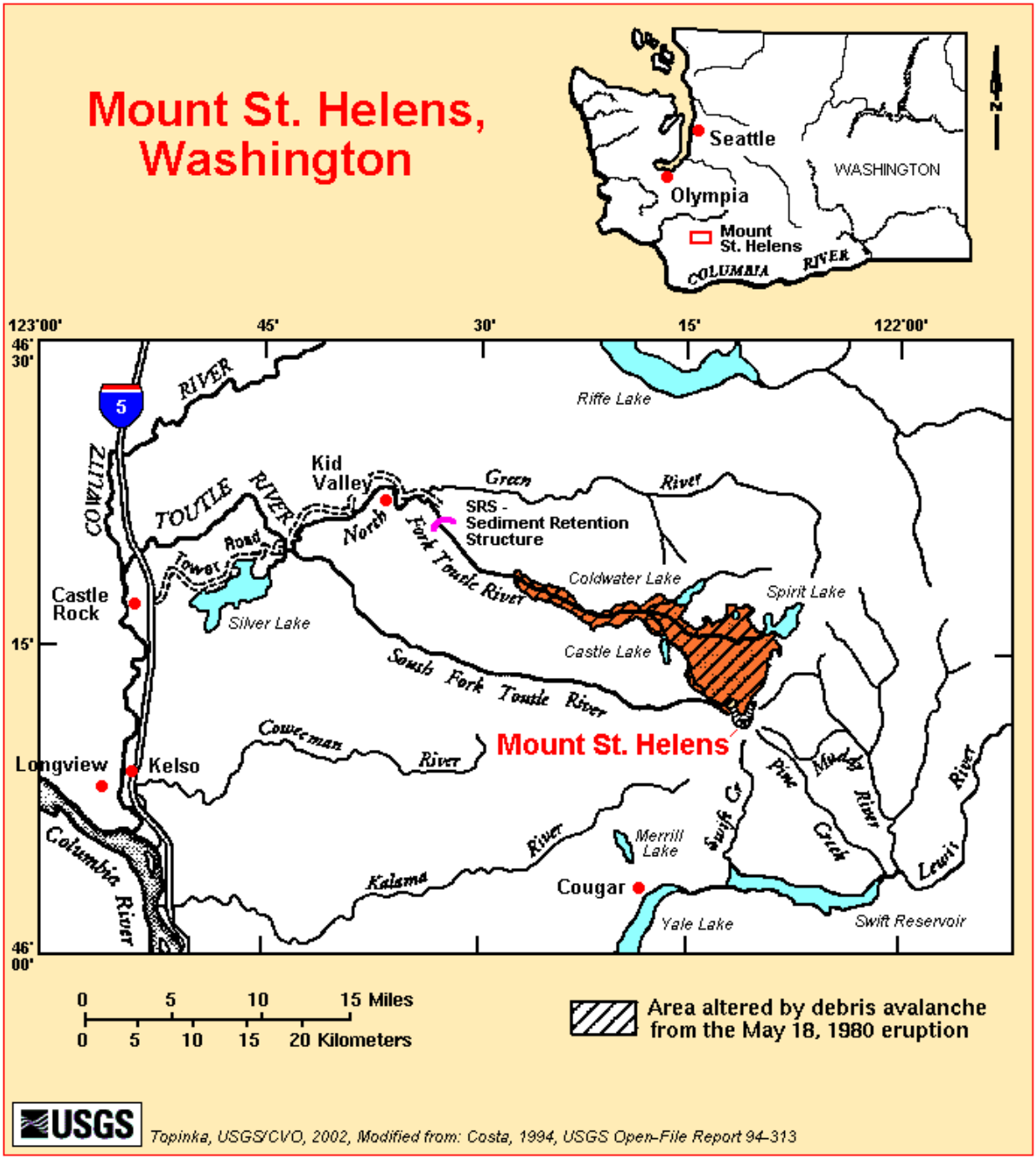
1.1. Purpose and Need for Action

Note to readers: This entire section has been revised in response to public review comments.

The purpose of raising the SRS spillway by up to 10 feet is to increase the sediment storage capacity of the SRS. This action is needed to increase the efficiency of sediment deposition above the SRS and decrease the volume of sediment available for deposition in the lower Cowlitz River to maintain required flood risk reduction benefits to communities along the lower Cowlitz River. The existing SRS has proved successful in trapping sediment, limiting sediment deposition in the Toutle and Cowlitz rivers, and maintaining the authorized level of flood damage reduction benefits to the communities of Kelso, Longview, Lexington and Castle Rock. Since the SRS has become run-of-river, more sediment is passing and the levels of flood damage reduction benefits are decreasing. Raising the SRS spillway is a reliable method of managing sediment in terms of flood damage reduction along the Cowlitz River.

Continued work on the Mount St. Helens project will be accomplished under the existing open construction project originally authorized in August 1985. The State of Washington is the non-federal sponsor of the project, and cost-sharing requirements are outlined in a 1986 Local Cooperation Agreement between the Department of the Army and State of Washington and Cowlitz County diking districts. Based on this agreement and subsequent language in Section 339 of the Water Resources Development Act of 2000, the Corps is authorized to maintain the authorized flood damage reduction benefits for the Longview, Kelso, Lexington, and Castle Rock levees as specified in the October 1985 report of the Chief of Engineers titled, *Mount St. Helens, Washington, Decision Document (Toutle, Cowlitz, and Columbia Rivers)*, published as House Document No. 135, 99th Congress.

Figure 1. Mount St. Helens and Vicinity



The Water Resources Development Act of 2000 authorized the Corps to maintain the flood damage reduction benefits described in the 1985 Decision Document for the four communities along the lower Cowlitz River through the end of the Mount St. Helens project planning period, which is 2035. The Corps is specifically required to take the following actions to maintain these flood damage reduction benefits: (1) if the level of flood damage reduction benefit in any of the four areas specified in the Decision Document is diminished to a point that it is at or below the authorized level during the period November through April of any year, the Corps will take immediate action to restore the authorized level and to assure that the authorized level is maintained; or (2) if the level of flood damage reduction benefit in any of the four areas specified in the Decision Document is diminished to a point that it is at or below the authorized level during the period of May through October of any year, the Corps will take such actions necessary to restore the level to 5 years above authorized level so as to assure that the authorized level is maintained during the following flood season. The authorized levels of flood damage reduction benefits are shown in Table 1.

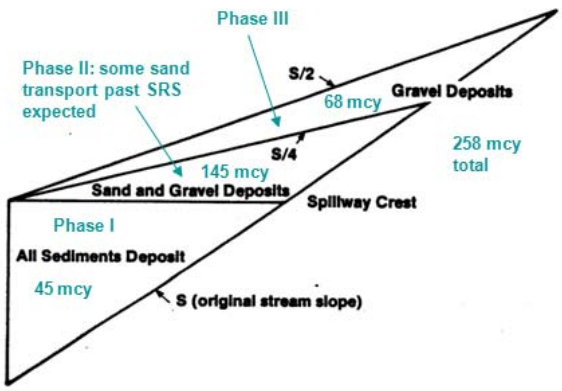
Table 1. Authorized Levels of Flood Damage Reduction Benefits

Location	Levels of Flood Damage Reduction Benefits	
	Authorized	**Year 2011**
Castle Rock	118 years	157 years
Lexington	167 years	173 years
Kelso	143 years	453 years
Longview	167 years	> 500 years

As stated earlier, for the Mount St. Helens project the Corps is authorized to maintain specified levels of flood damage reduction for communities along the Cowlitz River in response to sediment eroding from the debris avalanche. A portion of this sediment deposits in the Cowlitz River, increasing flood risk. The Decision Document for the Mount St. Helens project was published in 1985. The SRS was constructed on the North Fork Toutle River, downstream of the debris avalanche, from 1987 to 1989. All flow passed through an outlet works structure while sediment built up behind the dam, with a sediment trapping efficiency of approximately 92%. This corresponds to Phase I in Figure 2. In 1998, the outlet works was closed and since then, all flow passes over the spillway with a reduced trapping efficiency and more sediment depositing in the Cowlitz River. The current trapping efficiency is approximately 31%. The SRS is currently in Phase II of sediment retention. Approximately 115 million cubic yards (mcy) of sediment have been trapped to date. Though the rate of sediment deposition behind the SRS has decreased, sediment is continuing to deposit. The long-term total storage capacity is 258 mcy.

In the 1985 Decision Document, it was envisioned that when the Phase II condition is reached, dredging in the Cowlitz River, or some other measures, would be implemented to maintain the authorized levels of flood damage reduction benefits through year 2035. Figure 3 shows that the authorized levels of flood damage reduction benefits for the communities of Lexington and Castle Rock are trending down and increasing the risk of flooding damages.

Figure 2. SRS Sediment Retention Phases and Other Information from 1985 Decision Document



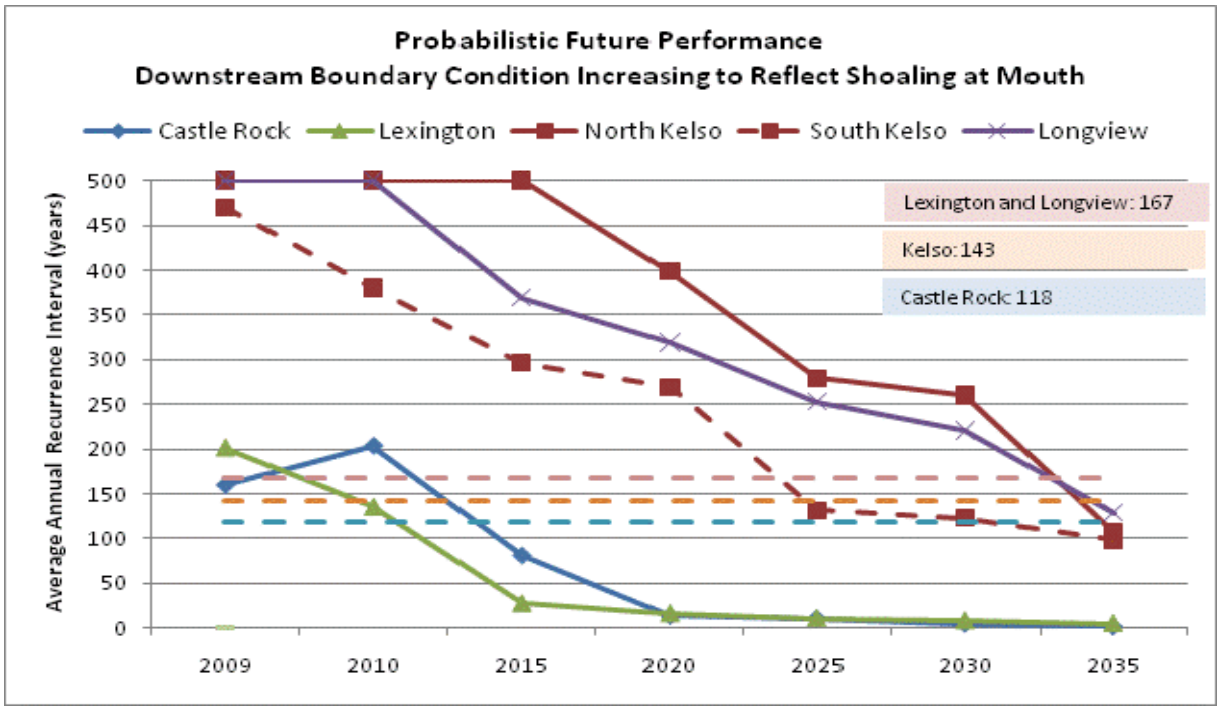
SRS sediment retention phases figure from 1985 Decision Document

- 550 mcy erosion from debris avalanche through 2035.
- Kelso levee was improved.
- SRS designed to trap 258 mcy.
- Cowlitz outyear dredging begins when SRS in Phase II.

"Requirements for annual … dredging … will be analyzed each year. A comparison of the cost of this dredging versus raising the [SRS] should be undertaken."

- At 2035, erosion from avalanche would be 6 mcy/yr and declining.

Figure 3. Probabilistic Future Performance of Lower Cowlitz Levees



In order to address the increased flood damage risks, the Corps is proposing to raise the SRS spillway up to 10 feet over the next 2 years. This proposed spillway raise will create an immediate pool with a volume of approximately 2 mcy. This is a small pool volume compared to the average annual load from the debris avalanche, which was 6 mcy from 2000 to 2007. As a result, the pool behind the spillway raise will likely fill with sediment in 1 to 2 years. After initial filling of the pool, the trapping efficiency of the SRS/sediment plain system will be greater than the current 31% due to the reduction in average slope of the sediment plain, so the sediment management benefit of the spillway raise may last for a total of 5 to 10 years from the date of construction.

1.2. Project Area Description

The SRS is located at river mile (RM) 13.2 on the North Fork Toutle River, 30.5 miles above the mouth of the Toutle River in Washington State (see cover photo). The site is about 45 miles north/northeast of Portland, Oregon. The SRS is a single-purpose structure designed to trap sediment eroding off the debris avalanche on Mount St. Helens. The structure consists of an earth and rock fill embankment dam, an outlet works, and an ungated spillway excavated in rock. The sediment plain above the SRS is characterized by highly braided and mobile stream network with shallow flow. Through the course of the winter season, surface water can be seen covering a large portion of the sediment plain. During the low flow summer months, channel mobility reduces and the reduction in flow results in less surface water. Groundwater remains near the surface during all seasons due to the presence of the SRS, which holds a pool of both sediment and water. The sediment plain is finest in composition and flattest in slope immediately upstream of the SRS. A minimal amount of deposition is currently occurring immediately upstream of the SRS.

1.3. Authority

Under the authority of Public Law 84-99, Flood Control and Coastal Emergencies (33 U.S.C. 701n), the Corps immediately responded to the Mount St. Helens disaster with dredging of the rivers and emergency levee improvements. Congress also authorized interim protection measures in 1983 (Public Law 98-63) for the Corps to maintain at least 100-year protection along the Cowlitz River until an overall solution was in place. These interim measures included construction of temporary debris or check dam type structures across the North and South Fork Toutle rivers to immediately reduce the volume of sediment, raising the Cowlitz River levees, and dredging of the Columbia River to eliminate the threat to navigation. Long-term sediment control facilities were constructed under Supplemental Appropriations Act of August 15, 1985 (Public Law 99-88). The Corps was authorized to construct and operate a SRS near the confluence of the Toutle and Green rivers.

The Corps was directed by Congress to maintain an authorized flood damage reduction benefits for the four communities along the Cowlitz River that is not less than described in the 1985 Decision Document. These levees are the Castle Rock levee (RM 16.10 to 17.55), Lexington levee (RM 6.95 to 9.60), Kelso levee (RM 2.6 to 6.8), and Longview levee (RM 3.1 to 5.5). The Water Resources Development Act of 2000 authorized the Corps to maintain these Flood damage reduction benefits through the end of the Mount St. Helens project planning period, which is 2035.

In addition, the Committee on Transportation and Infrastructure of the United States House of Representatives adopted the following Resolution on September 24, 2008 that authorized the Corps to investigate modifications to flood damage reduction for the Coweeman River and levee:

> Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That the Secretary of the Army review reports for Mt. St. Helens including: Lower Cowlitz and Coweeman River Level of Protection Analysis, including Hydrologic Analysis (unpublished analysis/model USACE, Portland District) November 2006, Mount St Helens Engineering Reanalysis, Hydrologic, Hydraulics, Sedimentation & Risk Analysis, Design Document Report April 2002, Mount St. Helens, Washington Decision Document, Toutle, Cowlitz & Columbia Rivers, Oct. 1985, and House Document 2577, Supplemental Appropriations for fiscal year 1985, 99th Congress, and other pertinent reports, to determine whether any modifications of the recommendations contained therein are advisable at the present time in the interest of flood damage reduction for Kelso, Washington.

The Corps' Mount St. Helens, Washington Feasibility Report and Environmental Impact Statement (Volumes 1 and 2) describe the process of identifying alternatives and analyzing the environmental consequences associated with the construction, operation, and maintenance of the MSH project over the life of the project and is herein incorporated by reference.

1.4. Background/History

The May 18, 1980 catastrophic eruption of Mount St. Helens dramatically altered the hydraulic and hydrologic regimes of the Cowlitz and Toutle River valleys. Ash fall and lateral blast from the eruption produced immediate and long-term effects on the hydrology of the Toutle watershed by changing its land cover and runoff characteristics. The excessive amount of sediment produced by the eruption and its aftermath was deposited downstream in the lower Toutle, Cowlitz, and Columbia rivers. The rapid influx of sediment reduced the channel capacities of the rivers affected. This left the communities of Castle Rock, Lexington, Kelso, and Longview with the potential for major flooding even with normal runoff.

Emergency measures were implemented by the Corps under authority of Public Law 99-88 (August 15, 1985) and interim flood control measures were implemented under authority of Public Law 98-63 (July 30, 1983). Temporary debris or check dam type structures were constructed across the North Fork Toutle River (N-1) and South Fork Toutle River (S-1) to immediately reduce the volume of sediment delivered to the Cowlitz River. Levees were raised along the lower Cowlitz River to prevent flooding, and the Columbia River was dredged to eliminate the threat to navigation.

A Comprehensive Plan (Corps 1983) contained the first in-depth analysis by the Corps of the flooding and sedimentation problems resulting from the eruption of Mount St. Helens. A sediment budget and a deposition analysis were developed as a base for quantifying the size and duration of potential flooding and navigation blockage. A total of 1 billion cubic yards (cy) was estimated to erode in the 50-year study period. From initial 13 potential measures, some of which were expansions of those used during emergency operations, the following five alternatives were proposed to permanently solve the sedimentation problem:

1. Limited permanent evacuation.
2. Sediment stabilization basins.
3. Multiple SRS with dredging.
4. Multiple SRS without dredging.
5. Single SRS.

An optimization analysis based on least-cost equal outputs was performed on the five alternatives identified in the 1983 Comprehensive Plan (Corps 1983) for solving the sediment problem. A single SRS on the North Fork Toutle River upstream from the Green River was the most cost-efficient on the basis of

the then predicted erosion rates and timing, and was selected as the National Economic Development plan. A subsequent sensitivity analysis confirmed that the SRS remained the most cost-effective option, if the sediment budget was greater than approximately 54% of the predicted amount. This finding, as part of the Comprehensive Plan, was transmitted to the President in October 1983.

In a Memorandum to the Secretary of the Army dated November 3, 1983, the Assistant Secretary of the Army for Civil Works requested that further analysis concentrate on one or more SRS structures at the lowest feasible site in the Toutle River Basin. It was further directed that other stages or structures be planned for construction, if and when needed. The rationale for proceeding with the feasibility stage was founded in the unique nature of the problem created by the eruption. Consequently, the uncertainty of predicting erosion rates with field data from a very short post-eruption period necessitated a series of assumptions to predict the sediment budget. The Assistant Secretary stated that notwithstanding the Corps' best estimates of erosion rates, the actual stabilization of the basin by natural processes might occur more rapidly than anticipated. Thus, any programmed solution should provide flexibility to adjust to actual conditions. Although the SRS was cost-effective over a wide range of sediment budgets, this did not constitute flexibility as it required a large initial cost. If sediment movement was less or slower than predicted, a smaller second stage would allow for significant cost savings.

A feasibility study was initiated to recommend a permanent solution to the sedimentation and flooding problems. The sediment budget was revised to indicate erosion of 650 mcy of material from the debris avalanche during the 50-year economic project life. A sensitivity analysis again concluded that the SRS was the best plan for handling erosion from the debris avalanche above 65% of the estimated sediment budget. After reviewing the Feasibility Report and Environmental Impact Statement (EIS; Corps 1984), the Acting Assistant Secretary of the Army concluded that the concerns expressed in the November 3, 1983 Memorandum were still valid. As a result, three options – SRS, staged SRS, and dredging – were to be evaluated during continuing planning and engineering.

The 1985 Decision Document, which recommended the construction of the SRS, also identified dredging in the Cowlitz River as a means to maintain flood risk levels once the SRS became a run-of-river project. The conditions in and around the Cowlitz River are different now from what they were in 1985. The Endangered Species Act (ESA) and a lack of readily available dredge disposal sites have increased the difficulty and cost of dredging, as well as the potential for adverse environmental effects. As a result, a long-term sediment management plan for flood risk reduction was initiated to reevaluate the sediment conditions and sediment management alternatives.

Interim measures were implemented by the Corps to reduce flood risk on the Cowlitz River while the long-term sediment management plan is developed. Because of heavy sedimentation during 2007, the lower 5.7 miles of the Cowlitz River was dredged in 2007, 2008 and 2009 to provide a short-term increase in channel and sediment transport capacity and to maintain the authorized Flood damage reduction benefits on the lower Cowlitz River. The Castle Rock levee upstream of the Arkansas Valley Road Bridge fell below its authorized flood damage reduction benefits and was improved in 2009 by installing a cement-bentonite seepage cutoff wall to raise its flood damage reduction benefits.

A pilot project was built and monitored during 2010-2011 to help determine how efficient grade-building structures (GBS) would be to trap sediment in the sediment plain. There were three major components of the pilot project: a river diversion structure, island forming structures (engineered log jams), and a cross-valley structure. The pilot project proved that construction can be performed in the sediment plain. Additionally, it allowed examination of construction methods and different design ideas. The final results of the pilot project, due in 2012, are important for understanding if the GBS measures could be applied as a long-term tool for sediment management.

2. ALTERNATIVES

Note to readers: In response to public review comments, Section 2.1 has been entirely revised and Section 2.2 has been added. Revised or added text in other sections has been underlined.

2.1. No Action Alternative

Under the No Action alternative, the SRS spillway raise project would not be implemented. Downstream Flood damage reduction benefits at the Castle Rock, Lexington, Kelso, and Longview levees would continue to decline, and if diminished in any of the four areas, the Corps will be required to take immediate action to restore the authorized Flood damage reduction benefits or restore the Flood damage reduction benefits to 5 years above authorized levels so as to assure that the authorized Flood damage reduction benefits are maintained during the following flood season, depending on when diminished flood damage reduction benefits was detected (Corps 2002). Immediate action may include emergency dredging of the lower Cowlitz River.

There would be no immediate ground disturbance or construction activities on the SRS. All North Fork Toutle River flow would continue to pass over the SRS, and its sediment trapping efficiency would continue to decline, although sediment would continue to accumulate within the existing footprint of the sediment plain. Sediment passing over the SRS will continue to deposit in the lower 20 miles of the Cowlitz River at an increasing rate, which would continue to increase the flood risk to communities of Castle Rock, Lexington, Kelso, and Longview by diminishing required flood damage reduction benefits for those areas. Dredging of the Cowlitz River might become necessary to remove sediment until other longer-term sediment management measures could be funded and implemented (e.g., raising the SRS or additional grade-building structures in the sediment plain) to maintain the required Flood damage reduction benefits. Because the flood damage reduction benefits are currently diminished at Castle Rock and Lexington (see Figure 3), the No Action alternative does not meet the purpose and need of the project to ensure that flood damage reduction benefits are maintained for downstream residents.

2.2. Alternatives Considered But Not Evaluated Further

The Corps is currently developing a long-term sediment management plan for sediment originating from the Mount St. Helens debris avalanche, and a number of possible alternatives have been identified. During the public comment period on the February draft Environmental Assessment (EA), the Corps received requests to consider and evaluate some of these alternatives in lieu of raising the SRS spillway by up to 10 feet. Unfortunately, while some alternatives may meet long-term sediment management goals, they are not yet fully developed nor do they address the immediate need to maintain authorized flood damage reduction benefits for the Cowlitz River levees. Provided below is a brief discussion of alternatives that were considered but rejected during the planning process, which resulted in identifying the spillway raise project (up to 10-foot raise) as the preferred alternative to maintain authorized Flood damage reduction benefits in the lower Cowlitz River in the near term.

2.2.1. Cowlitz River Dredging

The Corps conducted interim dredging of the lower Cowlitz River to maintain authorized flood damage reduction benefits for lower Cowlitz River communities in 2007 and 2008 in response to increased sediment accumulation in the lower river following high water events in 2006. While that dredging action was successful in maintaining required flood damage reduction benefits for these areas at the time, it is not currently a viable option in the short term. The 2007 and 2008 dredging activities only addressed

the lower Cowlitz River from the mouth to RM 2.5 and had existing upland dredged material placement sites available to receive sediments. To maintain required Flood damage reduction benefits at Castle Rock and Lexington will require more systematic dredging that extends up the Cowlitz River to near the confluence with the Toutle River near Castle Rock. Upland placement sites for dredged materials in these upper reaches of the lower river are currently not available and, by agreement, will require the State of Washington to acquire and maintain these sites (Local Cooperative Agreement 1986).

Availability of upland dredged material placement sites is uncertain at this time, making maintenance of required flood damage reduction benefits uncertain in the short term. Time required to acquire upland dredged material placement sites notwithstanding, based on preliminary cost estimates, dredging alone could easily exceed $20 million for these areas.

Further, the Washington Department of Fish and Wildlife (WDFW) in-water work period for the Cowlitz River is limited to July 15 to August 16 (WDFW 2010), which limits the amount of sediment that can be effectively dredged and placed in an upland location in a short time. In addition, since the Corps' previous dredging efforts on the Cowlitz River, Pacific eulachon (*Thaleichthys pacificus*) are now listed as threatened under the ESA. Dredging the Cowlitz River now presents additional challenges to avoid conflicts with the ESA-listed fish species present in the lower Cowlitz River. Therefore, due to the potential conflicts with ESA-listed fish, the lack of available upland sediment placement sites, and the high costs, interim dredging was not considered feasible to meet the short-term purpose and need, and was not evaluated further in this EA.

2.2.2. Sediment Plain Sump Development

The concept of a sediment plain sump was initially evaluated in the *Progress Report for the Mount St. Helens Long-term Sediment Management Plan* (Corps June 2010, located at http://www.nwp.usace.army.mil/locations/mountsthelens.asp). The concept involved maintaining a 4 mcy sump above the SRS at a removal and disposal/stabilization cost of $5/cubic yard. If implemented as an interim measure, this would cost $20 million. If the sump size was reduced to be comparable to the initial pool volume behind the 10-foot spillway raise option, 2 mcy, the cost would be $10 million, which is over twice the cost of the spillway raise. More importantly, the one-time sump operation would not have the out-year benefits of the spillway raise because the sump operation *would not reduce the average slope of the sediment plain*.

The sediment plain sump concept was revisited after the Progress Report. Further refinement of the concept led to an average removal and disposal/stabilization cost of $17 per cy. This is much greater than the original estimate of $5 per cy, making the sediment plain sump concept not cost effective.

During public review of the draft EA, the Corps received a suggestion that multiple [smaller] sumps be developed instead of as single sump. Many of the logistical and costs issues associated with development of a single sump are anticipated to occur with development of multiple sump sites. Development of multiple sump sites within the sediment plain will likely result in additional access issues, may need additional road construction, and as a result will likely be more expensive than a single sump site. Finally, because of these issues and the current need to address diminishing Flood damage reduction benefits in the lower Cowlitz River now, the development of sumps, whether a single site or multiple sites within the sediment plain, will not meet the purpose of assuring required Flood damage reduction benefits in the near term. Therefore, the sediment plain sump concept was not evaluated further in this EA.

2.2.3. LT-1 Sump Development

The concept of reusing the LT-1 sump location near the mouth of the Toutle River was also evaluated in the Progress Report (Corps June 2010). The concept was to stabilize the existing tall sediment disposal pile on the right bank of the river and develop a 1 to 2 mcy sump. The estimated cost of stabilizing the existing sediment disposal pile and operating the sump for 1 year was $10 million, which is over twice the cost of the spillway raise. Similar to the sediment plain sump, the one-time LT-1 sump operation would not have the out-year benefits of the spillway raise. Therefore, the LT-1 sump concept was not evaluated further in this EA.

2.2.4. Levee Raises

Levee raises would increase the flood damage reduction benefits (decrease flood risk) for the areas protected by levees, but would increase the flood risk for the remainder of the areas along the river not protected by levees. The benefit of raising the levees is that the river bottom can aggrade while the areas behind the levees remain protected by the higher levees. However, if the river bottom is allowed to aggrade, flood events will be more likely to leave the banks of the river in the areas not protected by levees. The concept of levee raises does not meet the purpose and need of maintaining the authorized flood damage reduction benefits in the short term, and also creates additional adverse consequences by increasing flood risk to the areas not protected by levees. Therefore, levee raises were not evaluated further in this EA.

2.2.5. Sediment Plain Grade-Building Structures

The Corps constructed a grade-building structures pilot project in 2010. The project consisted of three main features: a diversion berm, island-forming structures (look like large log jams), and a wooden weir structure. The pools that formed behind the diversion berm and the wooden weir structure allowed sediment in the flows to settle and deposit. However, it is difficult to determine if the amount that deposited is significantly greater than the amount that would have deposited if the structures had not been built. The island-forming structures have not yet caused significant deposition but have provided protected areas for vegetation to grow. The Corps continues monitoring the performance of the pilot project. More data will be required to determine whether or not the method is a reliable sediment management measure. Therefore, grade-building structures were not evaluated further in this EA.

2.3. Preferred Alternative

At the time of the Progress Report (Corps June 2010), the concept of raising the spillway elevation without also raising the top of dam elevation was not considered feasible due to the need to pass the probable maximum flood and the operating basis mudflow events without overtopping the dam. Since the Progress Report was published, the Corps reevaluated the probable maximum flood event and the U.S. Geological Survey reevaluated the operating basis mudflow event. Due to uncertainties in the 1980s, the original probable maximum flood and operating basis mudflow events were conservatively evaluated, leading to the very large SRS spillway (400 feet wide and 60 feet tall). The reevaluated probable maximum flood and operating basis mudflow events are significantly lower. As a result, the spillway elevation can be raised while still safely passing these events.

The features of the preferred alternative include a roller-compacted concrete (RCC) structure up to 10 feet in height and founded on rock, and low flow channel/plunge pool excavated in rock from the new RCC structure to the existing spillway crest to maintain and improve downstream fish passage conditions. The project does not preclude the potential for volitional upstream fish passage in the future. The entire

project will be constructed on Corps' property. The preferred alternative is discussed in more detail in the following sections.

2.3.1. Existing SRS

The SRS consists of an embankment dam, concrete outlet works, and spillway. Figure 4 is a general plan showing the location of these features (all figures are located at the end of this section). The preferred alternative will modify only the spillway; the embankment dam and outlet works will not be modified. Figure 5 shows the embankment dam to the left, outlet works pipes in the middle, and spillway to the right. The embankment dam consists of a central impervious clay core supported by upstream and downstream rockfill sections. The upstream embankment is protected against the potential scour action with RCC facing. The outlet works consist of an approach channel, a concrete gravity monolith structure containing thirty 3-foot-diameter gated pipe outlets (five pipes at each of six levels) that spill into a plunge pool, and an exit channel. All outlet works pipes are now closed and all flow passes over the spillway. The spillway is a 2,200-foot long, ungated, unlined, rough-bed rock channel with a 7% slope. The crest elevation is 940 feet using the National Geodetic Vertical Datum of 1929 (NGVD29; all elevations use this datum) and the downstream end elevation is 800 feet. The width of the spillway is 400 feet for the upper 200-foot length of channel, then tapers to a width of 250 feet at the downstream end.

2.3.2. In-water Work Period

The proposed project will include work below ordinary high water on the North Fork Toutle River to be conducted from July 1 to October 7 in either 2012 or 2013, during which time the flows in the North Fork Toutle River are at their lowest. This is also generally the time period when fish abundance is low in the project vicinity; this time period was used most recently to construct the grade building structures upstream from this project, and was agreed to be an appropriate time to construct the spillway raise (personal communication, S. West, WDFW email, May 5, 2012). No in-water work is proposed to occur outside of this time period.

2.3.3. RCC Structure

The RCC structure will be constructed up to 10 feet in height. Roller-compacted concrete is a concrete mix that is placed and compacted using earth moving equipment. It was used in 1997 to repair erosion occurring when flow first passed over the spillway, and has performed well in terms of durability.

Figure 6 shows the plan, profile and section views of the RCC structure. The downstream end of the structure will be located approximately 300 feet upstream of the existing spillway crest elevation. The average width of the structure is approximately 500 feet and the length in the upstream-downstream direction is approximately 100 feet. The upstream slope is 1 horizontal to 0.9 vertical, and the downstream slope is 10 horizontal to 1 vertical (10%). Key elevations are as follows: top of structure at 952.0 feet, main channel invert at 950.0 feet, and low flow channel invert at 948.5 feet. The structure will be built directly on top of the relatively flat basalt bedrock shelf at elevation 940 feet. There is currently a layer of sediment on this bedrock shelf (about 3 feet, 20,000 cy) that will need to be removed prior to construction. Removal will likely be accomplished using dozers or similar equipment. Removed sediment may be used in the contractor's cofferdam system or placed back into the sediment plain immediately upstream of the SRS (disposal area 8). Figure 8 shows disposal and staging areas for the preferred alternative (disposal area 8 is only for sediment removed).

The RCC berms will be constructed on the downstream slope. The berms, shown in Figure 6, will maintain a minimum flow depth in the low flow channel and will drain overflows toward the low flow channel. The berms will be 1.5 feet high in the vicinity of the low flow channel. The low flow channel is designed to maintain a minimum 1 foot of water depth at a minimum flow rate of 140 cubic feet per second (cfs). The total volume of RCC to be used is approximately 15,000 cy. The RCC will likely be mixed in a batch plant set up on top of the dam. Aggregate for the RCC will come from an off-site commercial location. Water will come from on-site; the contractor will be allowed to draw groundwater from behind the dam, but not water directly from the river. Placement rates for past RCC projects of similar size generally ranged from 2,000 to 3,000 cy per day. At these rates, the proposed RCC structure could be built in about 2 weeks, well within the proposed in-water work period.

2.3.4. Rock Excavation

Rock excavation will occur from the downstream toe of the RCC structure to the existing crest of the spillway to maintain and improve downstream fish passage conditions. Rock will be excavated by mechanical methods (no blasting). A short (50 feet), wide (300 feet) plunge pool will be excavated immediately downstream of the RCC structure in line with the low flow channel. The bottom elevation of the plunge pool will be 931.0 feet. A low flow channel about 400-feet long will be excavated in the rock from the plunge pool to the existing crest of the spillway at a slope of 1%. The purpose of the low flow channel is to safely and swiftly convey fish across about 400 feet of level terrain and prevent stranding that would otherwise occur. The channel will be approximately 40-feet wide at the bottom and at least 5.5-feet deep with 2:1 side slopes. The plunge pool and low flow channel are shown in Figure 7. The approximate volume of rock excavation is 9,000 cy. Excavated rock will be stockpiled for future use in disposal sites located on grassy upland areas downstream of the dam (see Figure 8 and cover photo). All stockpile areas will be revegetated following construction to restore forage for elk and other wildlife species.

2.3.5. River Management During Construction

River diversion will occur within the spillway. The Corps will not specify the river diversion method to be used by the contractor, but will provide performance-based requirements. The temporary water diversion will be implemented under the criteria for Nationwide Permit (NWP) 33 (*Temporary Construction, Access, and Dewatering*). All General and Region Conditions associated with NWP 33 will be followed such as the maintaining aquatic life movement, removal of temporary fills, and implementing a post-construction vegetation restoration plan. In order to maintain aquatic life movement, we will require: (1) maintenance of a minimum continuous flow in the spillway of 140 cfs (to provide continuous flow in the river), and (2) maintenance of a minimum flow depth of 1 foot from the upstream extent of the contractor's operations to the existing spillway crest (for potential downstream fish passage occurring during the in-water work window). The contractor will be required to submit a river diversion plan meeting the performance requirements.

The following approach is provided as an example to demonstrate that temporary river diversion may be accomplished within the spillway meeting the performance-based requirements. A river diversion berm (combination cofferdam/construction access road) may be built from the existing access road coming down the spillway approach pier to the right wall of the spillway, upstream of the new RCC structure footprint (Figure 8). The diversion berm would have a temporary culvert system through it on the left side to pass the river flow. With the river diverted down the left side of the RCC structure footprint, the right half of the RCC structure, including the low flow channel, would be constructed in the dry (Phase 1 in Figure 8). The diversion berm upstream of the finished right half of the RCC structure would be

removed. Flow through the culvert system would then be reduced, building a pool, until flow is both through the culvert system on the left and through the low flow channel of the RCC structure on the right, *maintaining the minimum continuous flow in the spillway*. Once there is flow over the low flow channel, the culvert system would be closed entirely so that the left half of the RCC structure could be constructed in the dry (Phase 2 in Figure 8). Throughout this process, temporary features, such as sandbags, may be required in the upstream/downstream direction to contain flow from the cofferdam/road to the existing spillway crest, *maintaining the minimum flow depth of 1 foot*. Several approaches may be used for cofferdam/road construction including, for example, sediment berms or Hesco baskets (linked wire-mesh and fabric-lined baskets) filled with sediment.

2.3.6. Post-Construction Conditions

Upon completion of the spillway crest raise, a pool would be created in the sediment plain upstream of the SRS. Figure 9 shows the approximate area of the pool. Over time, sediment will deposit in the pool and it will fill to the spillway crest height. Total volume of the flat water pool will be approximately 2 mcy. Over time, the reservoir will fill with sediment with the North Fork Toutle flowing through it. The time period for this to occur is estimated at 1 to 5 years. Flows over the new spillway will be concentrated through the 250-foot wide main channel of the new RCC structure. Modeling predicts that a 10-foot spillway raise would increase total trapping of sediment above the SRS by about 15 million tons.

Figure 4. General Plan of Existing SRS

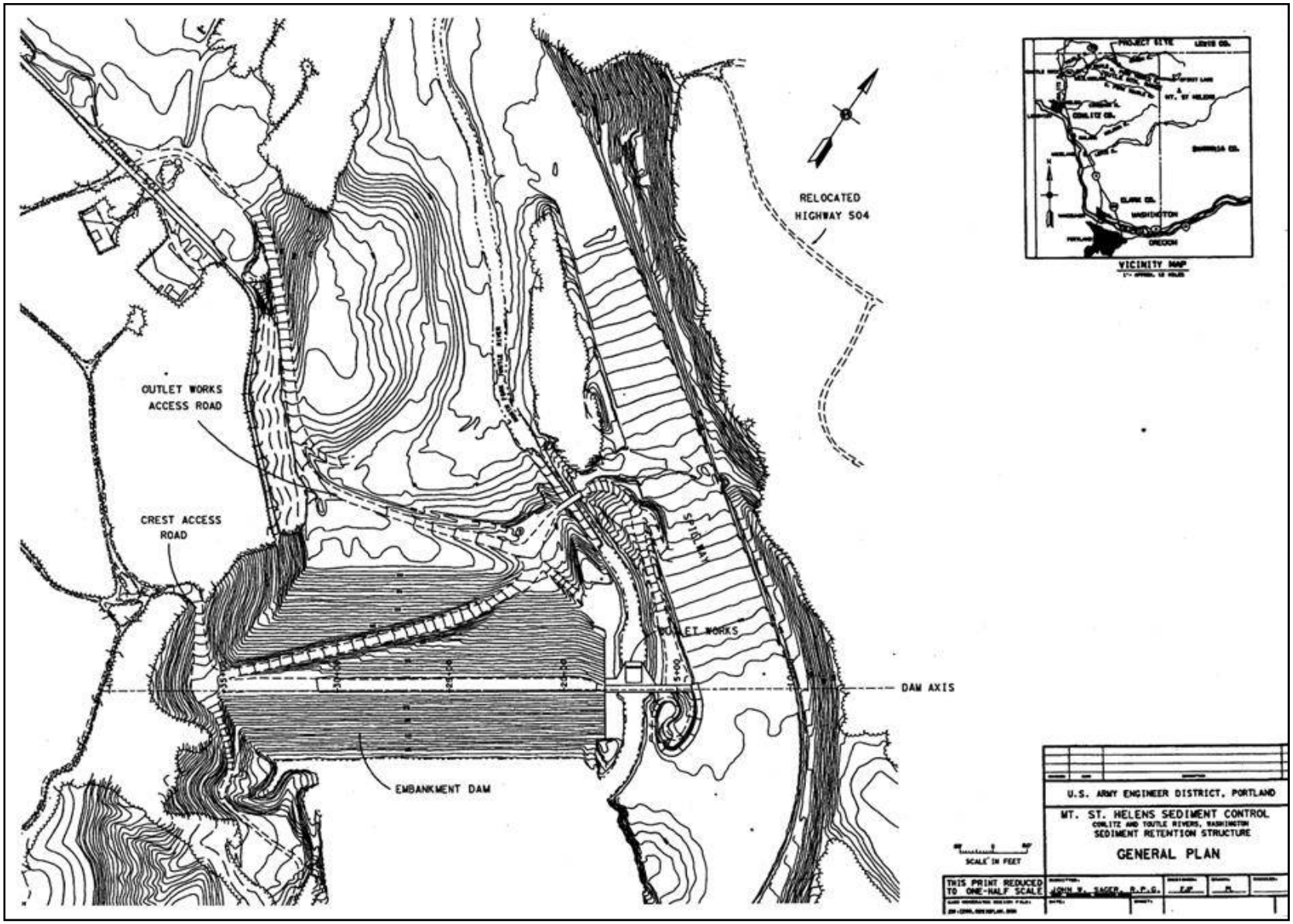


Figure 5. Upstream Elevation of Existing Outlet Works

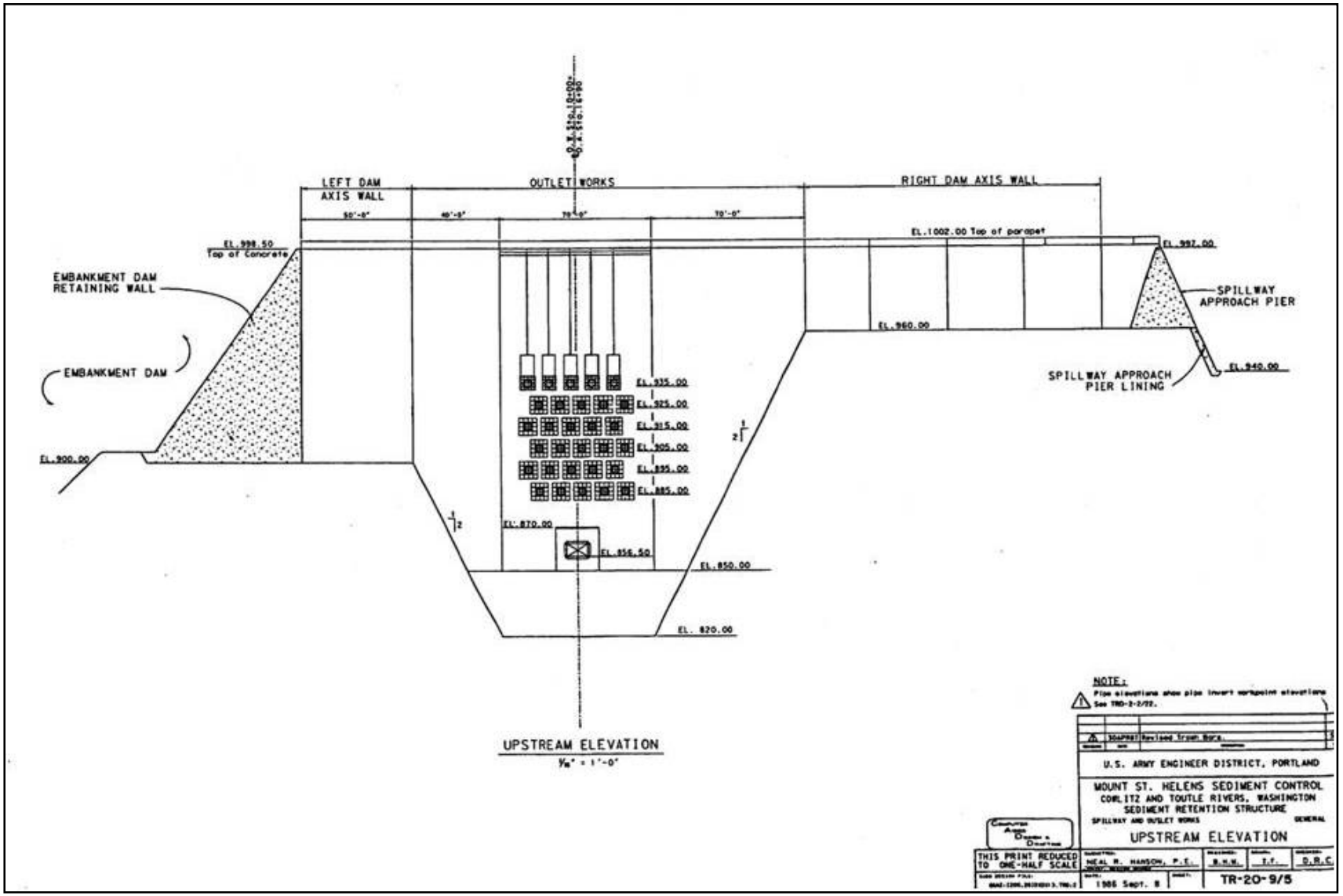


Figure 6. Plan, Profile and Section Views for the RCC Structure

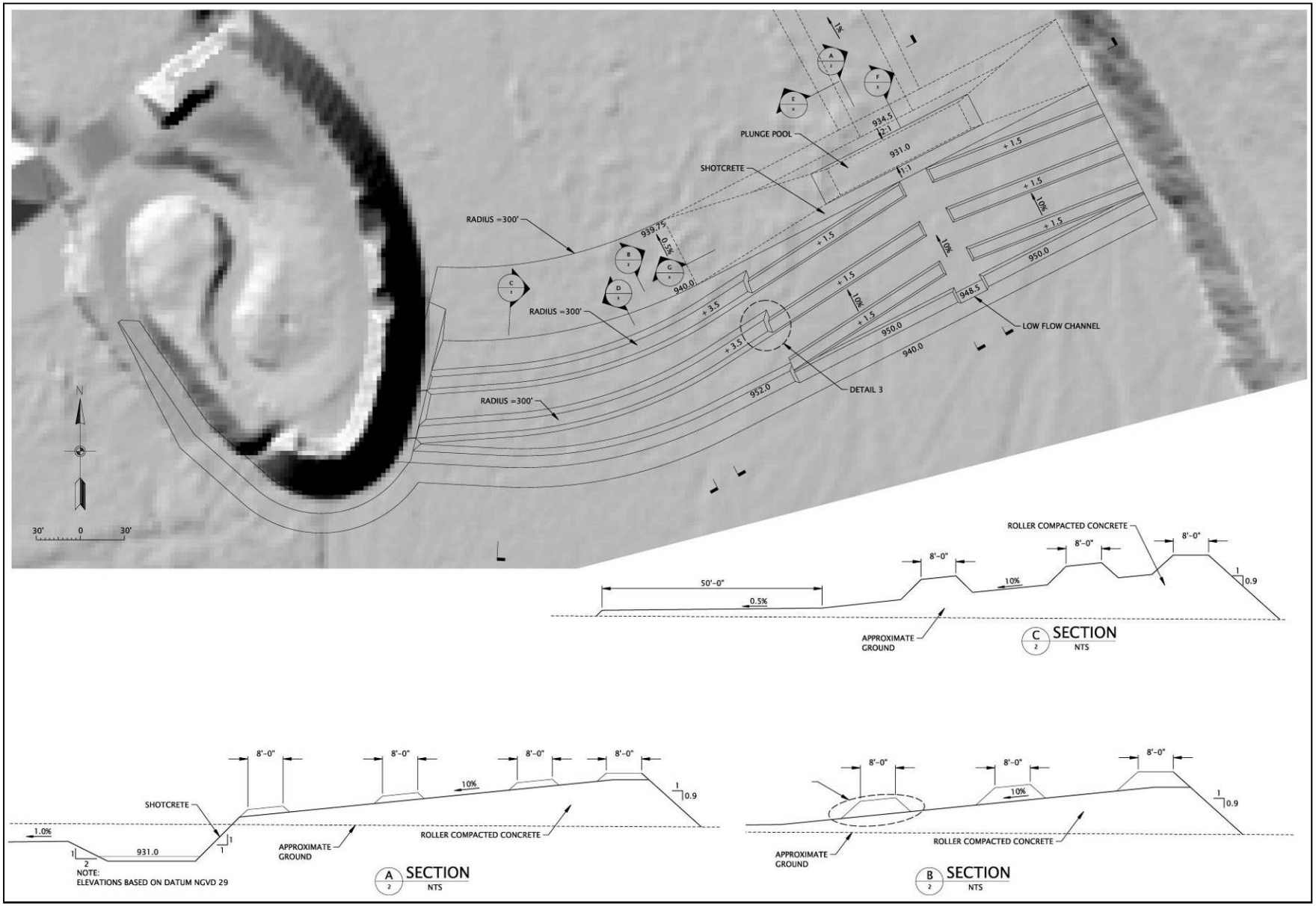


Figure 7. Plunge Pool and Low Flow Channel in Rock

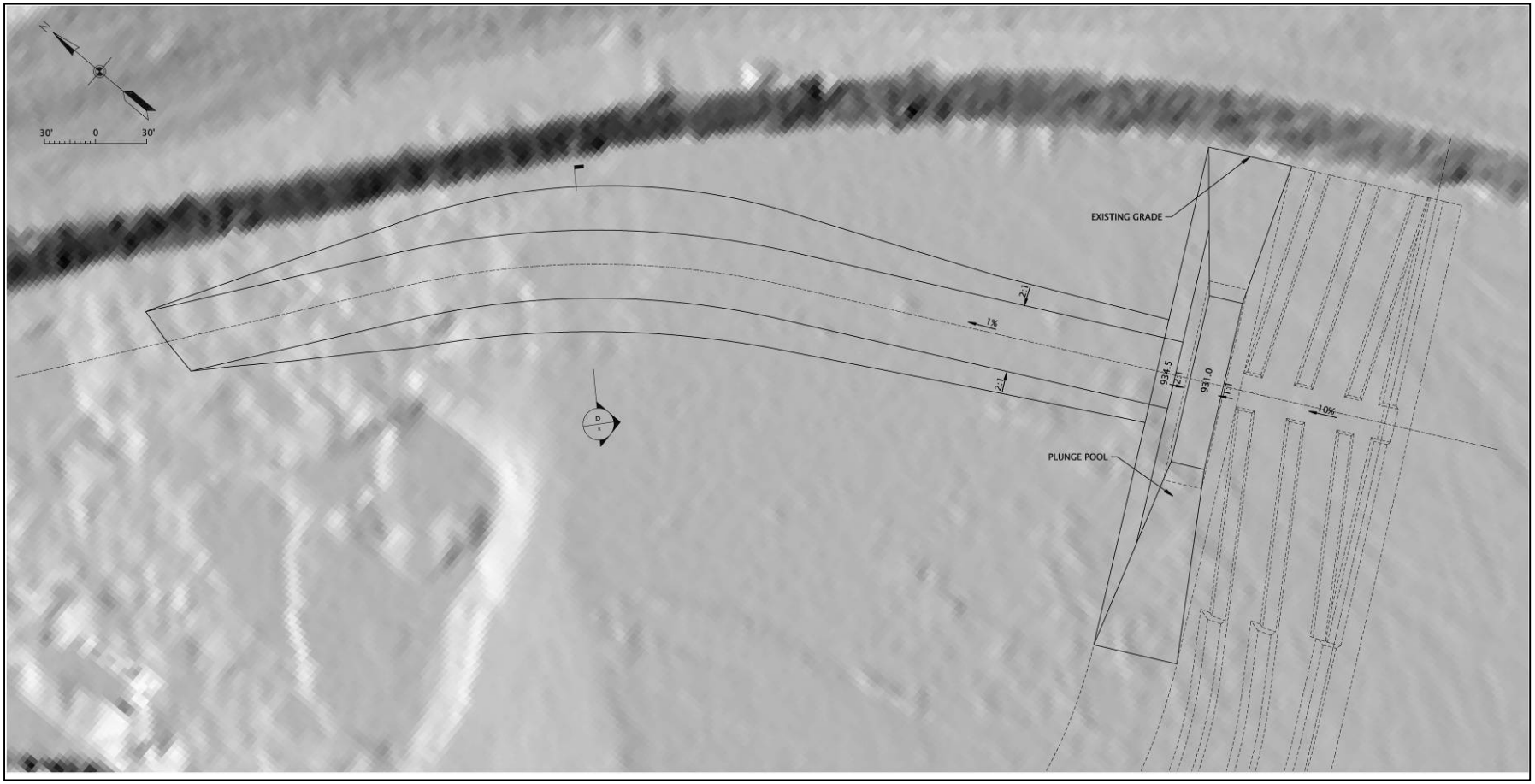
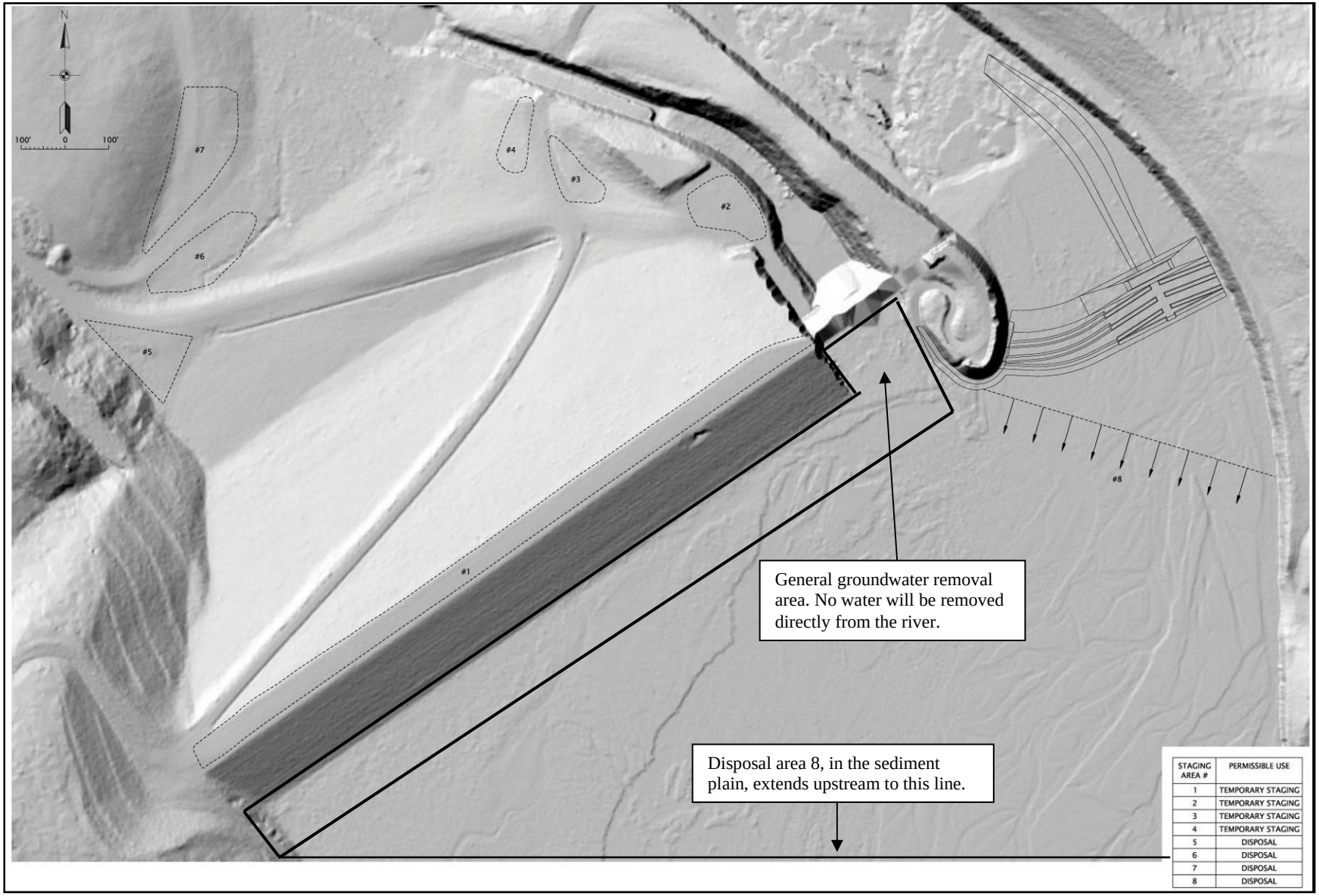


Figure 8. Staging and Disposal Areas



STAGING AREA #	PERMISSIBLE USE
1	TEMPORARY STAGING
2	TEMPORARY STAGING
3	TEMPORARY STAGING
4	TEMPORARY STAGING
5	DISPOSAL
6	DISPOSAL
7	DISPOSAL
8	DISPOSAL

Figure 9. Pool Behind Raised Spillway Prior to Filling with Sediment

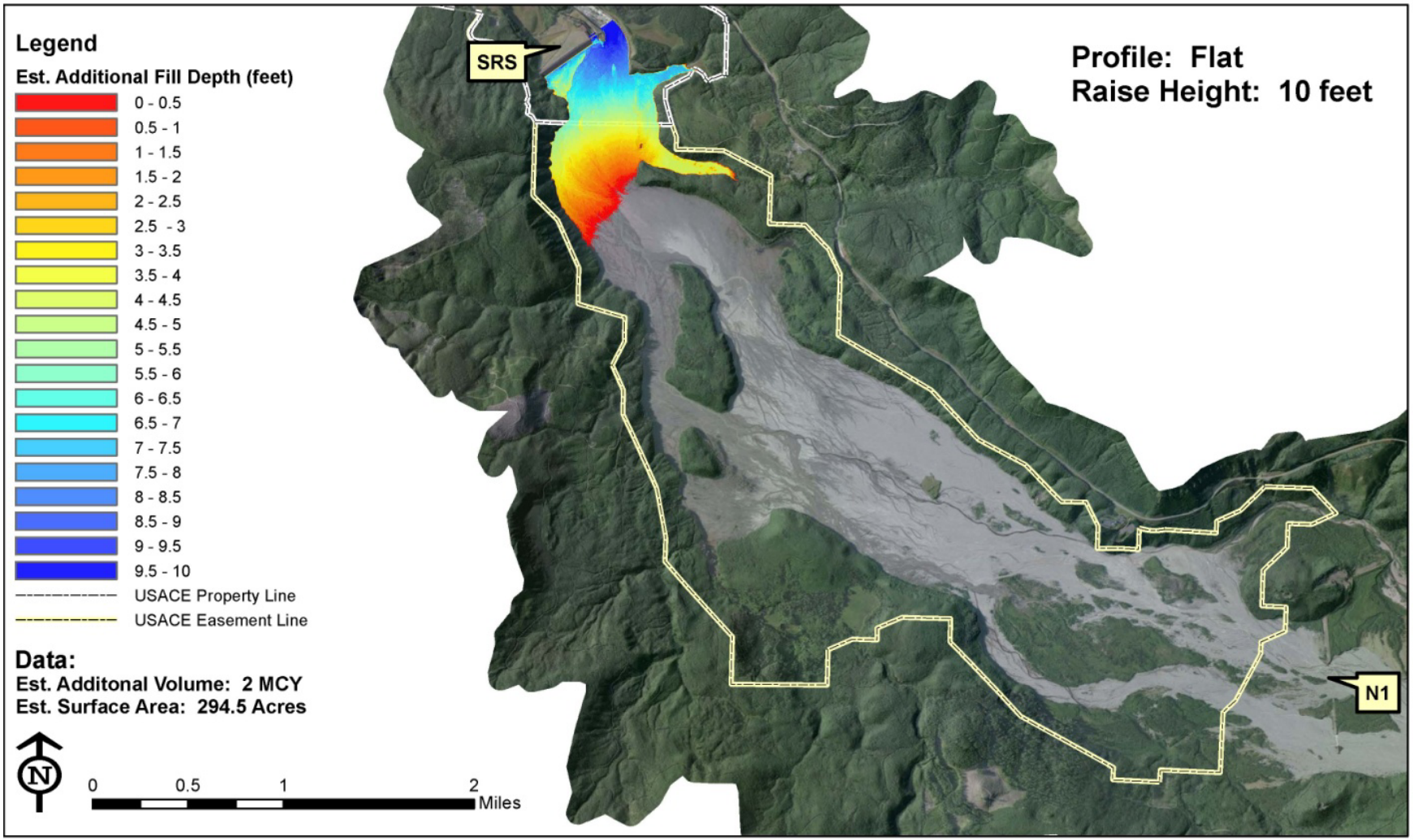
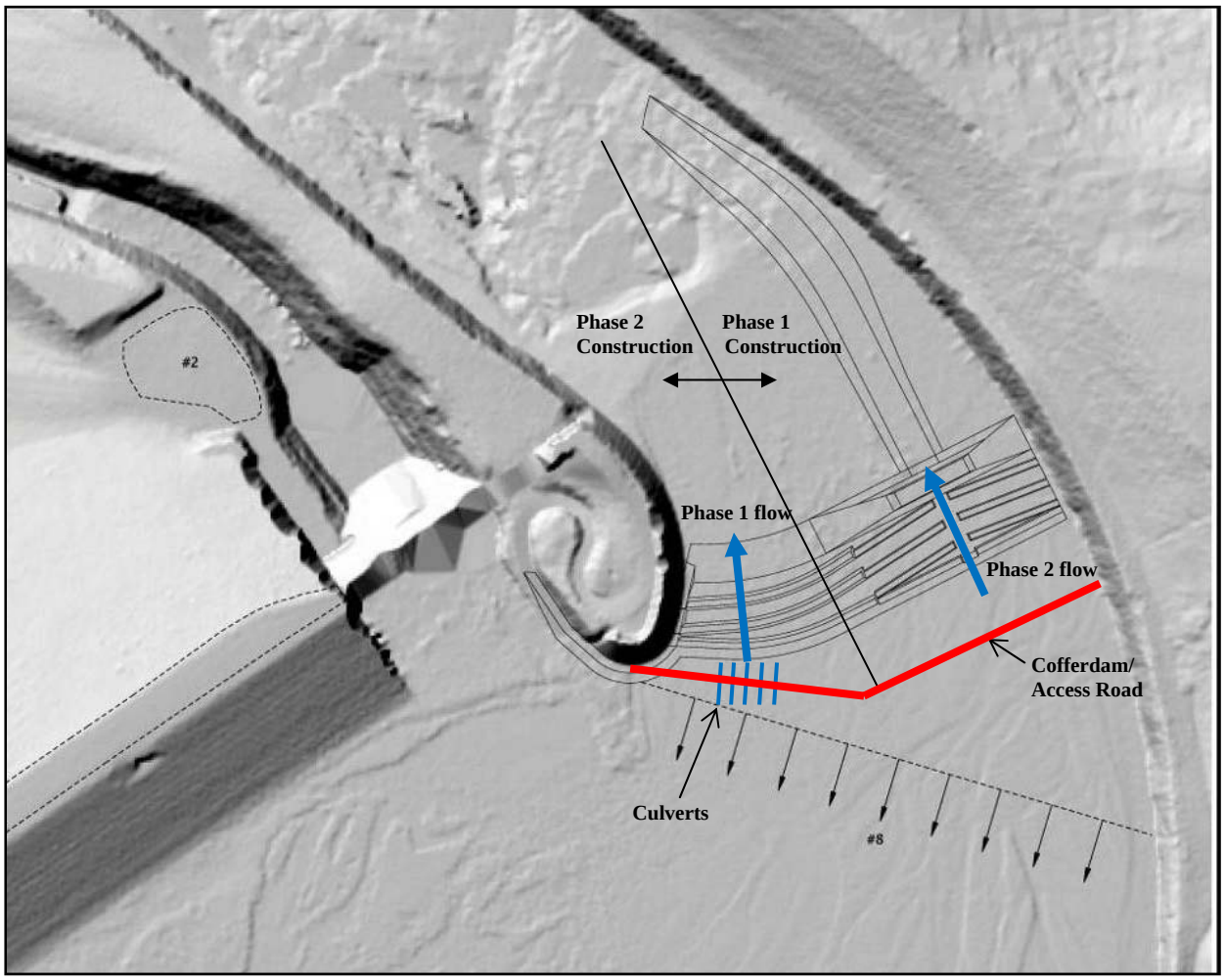


Figure 10. Example of River Diversion Approach



3. AFFECTED ENVIRONMENT

Note to readers: In response to public review comments, Sections 3.1 and 3.2 have been entirely revised. Revised or added text in other sections has been underlined.

The physical, biological, and human environments for the Mount St. Helens project were described in detail in the Feasibility Report and Environmental Impact Statement (Corps 1984), in the Comprehensive Plan (Corps 1983), and in the subsequent Decision Document (Corps 1985). These documents contain in-depth analysis of the flooding and sedimentation problems resulting from the eruption of Mount St. Helens including descriptions and evaluations of the physical, biological, cultural, and socio-economic resources of the study area. The following information is provided as an update and summarizes the existing and current conditions in the project area.

3.1. Physical Environment

The project area is located on the North Fork Toutle River and includes the SRS, the spillway, and the sediment plain immediately upstream of the SRS. The project area is where the construction activities will take place including access, staging and disposal areas, stockpile areas for rock, and construction activities associated with the installation of the RCC spillway structure, and the plunge pool and low flow channel excavated in rock.

The Toutle River is a tributary to the Cowlitz River that flows adjacent to the four communities where the Corps is responsible for maintaining authorized flood damage reduction benefits. These communities, from upstream to downstream, are Castle Rock, Lexington, Longview, and Kelso, Washington. The lower Cowlitz subbasin encompasses approximately 440 square miles in portions of Lewis and Cowlitz counties (Corps 2007). The Cowlitz River enters the Columbia River at Columbia River mile 68, about 3.5 miles southeast of Longview, Washington. The Coweeman and Toutle Rivers are the two largest tributaries to the Cowlitz River. Other significant tributaries include Salmon, Lacamas, Olequa, Delameter, and Ostrander creeks.

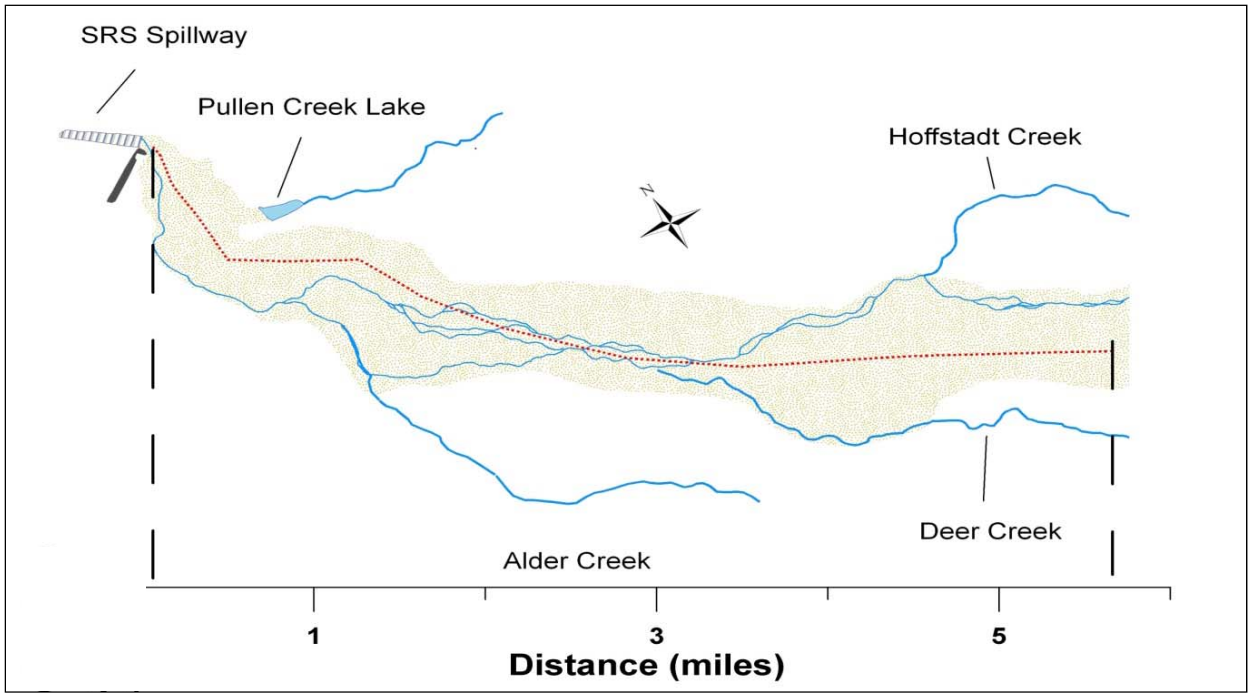
Much of the lower mainstem Cowlitz River has been impacted by channelization features related to industrial, agricultural, and urban development, as well as dredging and levee construction for flood damage reduction after the eruption of Mount St. Helens. Most of the low-lying undeveloped areas along the lower Cowlitz River have been used as disposal sites for material removed from the channel since the eruption. Depending on Toutle River inflow to the Cowlitz River, sand concentrations in the lower Cowlitz range between 300 and 3,000 milligrams per liter (mg/L) during the winter months, increasing from fall to spring. The general pattern of sediment discharge on the Cowlitz River has been that sand concentration and loads increase throughout the winter and begin to decline in spring. Fall and spring flows tend to contain higher amounts of fine sediments (silt-clay fractions) relative to sand (Corps 2007).

The Toutle River subbasin is a historically important drainage area that is the largest tributary of the Cowlitz River, draining an area of over 1,334 square kilometers (Loch and Downing 1990). Of the three main tributaries of the Toutle River, the North Fork Toutle River drains the largest area at over 450 square kilometers. The impact of the Mount St. Helens eruption, referring to the debris avalanche and devastation of area forests, has led to a classification of “impaired” runoff conditions along the majority of the Toutle subbasin waterways (LCFRB 2010). The North Fork Toutle River and some of its tributaries, including Pullen, Alder, Deer, and Hoffstadt creeks, now flow through a sediment plain located upstream of the SRS (Figure 11). The sediment plain ranges from approximately 0.5 to 1.5 miles

in width, is sparsely vegetated with a dominance of early successional species such as willow, and is carved by multiple braided, annually-shifting channels.

Figure 11. Tributaries Upstream of the SRS

Note: Sediment plain is shaded.



The North Fork Toutle River carries the bulk of the sediment leaving the Mount St. Helens debris avalanche into the sediment plain upstream of the SRS. Between 2000 and 2007, an average of 8.6 million tons of sediment from the debris avalanche were estimated to have passed the remnant N-1 structure located approximately 3.5 miles upstream of the SRS. However, only approximately 2.7 million tons of that sediment was estimated to have been deposited between N-1 and the SRS spillway over the same period. The composition of the deposited sediment is 2% fines, 74% sands, 20% gravels and 3% cobbles. Despite the high percentage of sands in the deposited material, only 38% of the sands passing the N-1 structure are retained above the SRS (Corps 2009). The sands that pass over the spillway are carried downstream to the lower Cowlitz River and impact the protection capacity of the levees adjacent to the communities of Castle Rock, Lexington, Longview, and Kelso.

The valley floor slope and width of the sediment plain, combined with an extraordinarily high incoming sediment load, prevents the North Fork Toutle River and its tributaries from developing the formation of a typical cascade stream. Instead, the channels of these waterways are highly unstable and change in response to the sudden increases in flow volume and velocity that occur after rain events (WDFW 2006a). During the November through February rainy season, the Toutle River and its tributaries are flashy, responding rapidly to intense precipitation. Floods on the Toutle River are primarily the result of large rain or rain-on-snow events. Winter floods are generally of short duration (2-5 days) with relatively high peak discharges. About 95% of the annual flood peaks have occurred during the months November through February. As a result, sandbar islands formed within the sediment plain that become vegetated with species such as willow commonly become inundated and relocated or covered with sediment after a large rain event.

The climate of the Toutle River Basin is a predominantly a mid-latitude, West Coast, marine climate. Summers are typically dry and warm while winters are typically cloudy, mild, and wet. Variations in elevation and exposure to prevailing winds result in a wide range of climatic conditions within short distances. There is a predominant westerly flow of moist air from the Pacific during the winter months, and a large portion of the precipitation at high elevations occurs as snow with mostly rain at low elevations. Winter rainfall is usually of light to moderate intensity and continuous over an extended period of time. When heavy rainfall does occur as intense weather systems move inland, the waterways are subject to flash flooding, as described above. During the summer months, the Pacific high-pressure region dominates the area and it is not uncommon for 2 to 4 weeks to pass with little or no precipitation. The climate during spring and fall months is transitional between summer and winter extremes.

Water quality was monitored on the North Fork Toutle River by the Corps from 1985-1990 to determine the effects of the SRS on river temperatures. Monitoring occurred during pre-construction, construction, and post-construction of the SRS. During July through September, daily mean temperatures normally exceed the temperature standard of 16°C (60.8°F) for aquatic life set by the State of Washington for the Green River and for the North and South Forks of the Toutle River. This occurred every year of the monitoring program before and after SRS construction (Larson 2002). Water temperature has not been monitored since this time; however, water temperatures have not likely changed. The Corps will install sensors to continuously monitor water temperature and pool elevation. The sensors will be placed on the new spillway crest where the elevation drops from 952 to 950 feet. The sensors will be connected to the existing weather station on top of the spillway approach pier.

3.2. Biological Resources

The project area is located within the 6,589 acre Mount St. Helens Wildlife Area (MSHWA), which extends from the western boundary of the Mount St. Helens National Volcanic Monument along the North Fork Toutle River to the SRS. The MSHWA nearly doubled in size in 2009 as the result of a land transfer from the Washington Department of Transportation to the WDFW. Since WDFW established the wildlife area in 1990, an emphasis has been placed on elk management because of the area's critical role as winter range for the species. According to WDFW's Washington State Elk Herd Plan, the Mount St. Helens elk herd is one the most important of the state's ten herds because it provides important recreational, aesthetic, and economic benefit to the citizens of Washington (WDFW 2006b). Part of the elk herd plan calls for improving the quantity and quality of elk habitat in the MSHWA, as well as reducing the size of the herd with special hunting permits. Within the action area, elk forage along the sediment plain upstream of the SRS and the adjacent forests, with elk concentrations highest upstream of the original N1 debris dam (approximately 5 miles upstream of the SRS) in what WDFW refers to as the "mudflow elk area 5099." The proposed SRS spillway raise is not expected to affect this highest concentration elk area, which is also the area that WDFW has expended considerable resources to improve forage quantity and quality via plantings.

In addition to elk, Lower Columbia River winter steelhead and coho salmon are the ESA-listed threatened fish species that may occur in the project area. Pacific eulachon (smelt), also an ESA-listed threatened species, are known to migrate through and spawn in the lower Cowlitz and Toutle rivers. Designated critical habitat for steelhead exists in the immediate project area, while essential fish habitat (EFH) for coho salmon is occurs within the project area. Designated critical habitat for eulachon extends from the Columbia River up the Cowlitz to the Cowlitz Salomon Hatchery and up the Toutle from the confluence with the Cowlitz to the Tower Road Bridge (approximately RM 6.7) and approximately 23 river miles downstream from the project.

The SRS blocks volitional upstream fish passage and access to an estimated 50 miles of anadromous fish habitat, and current population sizes of these species are substantially lower than the estimated historic sizes (LCFRB 2010). The lower North Fork Toutle River historically provided considerable spawning habitat, which is now primarily restricted to below the fish collection facility downstream of the SRS and to the South Fork Toutle River. Spawning habitat for winter steelhead is primarily within Alder and Deer creeks and the mainstem of the North Fork Toutle River. The quality of the spawning habitat was greatly diminished as a result of the Mount St. Helens eruption. With the devastation of the surrounding forests, large woody debris was no longer available for recruitment and spawning gravel was smothered with sediment from the debris avalanche. Without large woody debris, the benefits of streambank stabilization, refuge for fish from flood events, and habitat for fish food sources such as benthic invertebrates are lacking. Since the predominant sediment type moving over the SRS spillway is fine sand, with coarser-grained rock material such as gravels settling out of the waterway significantly upstream of the SRS, the gravels that are needed for spawning are unable to get downstream. The result is limited quality fish spawning and rearing habitat in the North Fork Toutle River and its tributaries. However, adult and juvenile anadromous fish from the upper Cowlitz River continue to successfully use the lower Cowlitz River as a migratory route. Eulachon continue to migrate through and spawn in the lower Cowlitz and Toutle rivers.

As mitigation for the SRS, a trap-and-haul fish collection facility (FCF) to facilitate fish passage was funded and constructed by the Corps on the North Fork Toutle River approximately 1.3 miles downstream from the SRS. The purpose of the facility was to collect returning wild adults and transport them above the SRS to important spawning and rearing habitat and to recycle hatchery adults back into the sports fisheries below the SRS (Loch and Downing 1990). The FCF is operated and maintained by the WDFW. Adult steelhead trout and coho salmon are collected at the FCF by diverting a portion of the river above the FCF into a fish ladder. Fish are attracted by this flow into the ladder and move up into a collection pond, then moved into transport tanks on trucks and taken to upstream release locations in tributaries to the North Fork Toutle River. The closest tributary to the SRS with accessible fish habitat is Alder Creek. The proposed up to 10-foot SRS spillway raise is not expected to inundate Alder Creek and impede fish passage (Figure 12). Pullen Creek is not currently accessible for anadromous fish.

Figure 12. Affected Creeks in Predicted Area of Inundation for Proposed 10-foot Spillway Raise

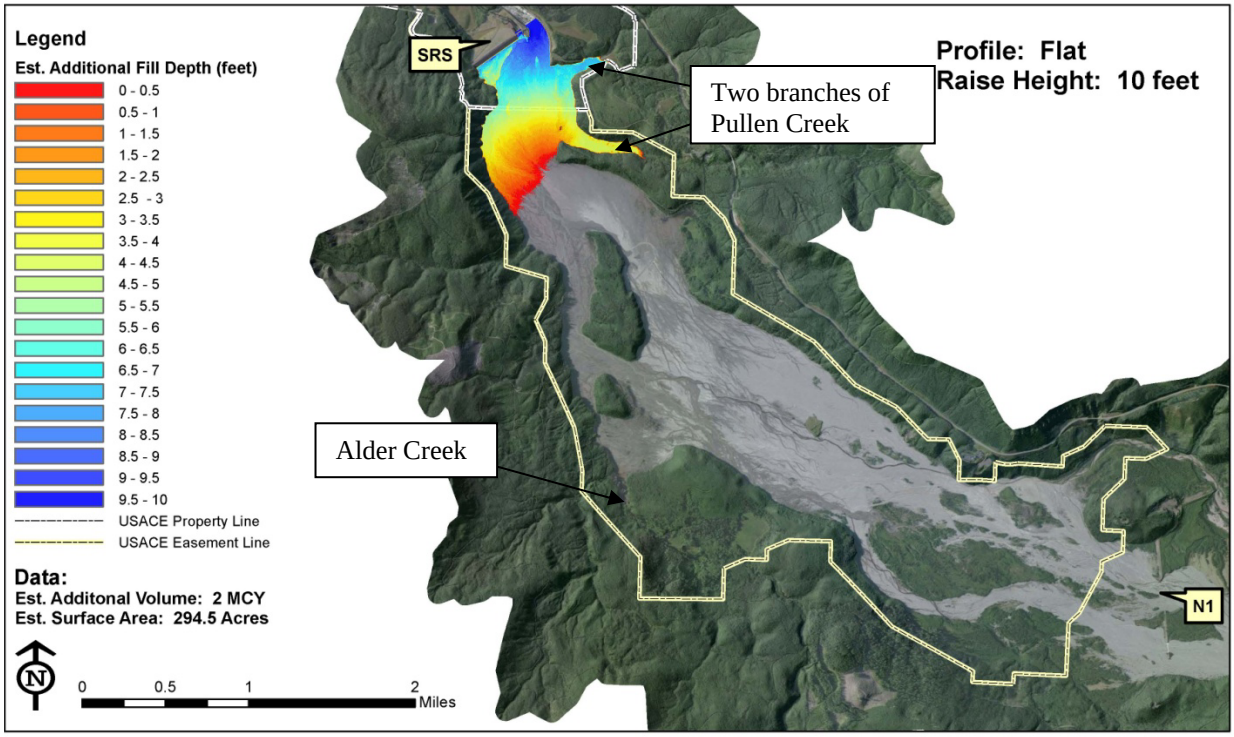


Figure 12 shows the area upstream of the SRS that will be inundated to an elevation 950 feet NGVD29, which is 10 feet above the existing spillway crest elevation of 940 feet. The depth of inundation will range from 10 feet at the SRS spillway crest to zero feet at the upstream boundary. The two branches of Pullen Creek will be further inundated. Existing sediment deposition behind the SRS has already inundated these branches such that the two branches of Pullen Creek have ponded with subsurface outflow into the sediment plain. The aerial image (Figure 13) shows the wetland areas directly affected by the proposed 10-foot SRS spillway raise through inundation by the new pool area that will eventually fill with sediment.

In the project area, wildlife use is diverse beyond elk and salmonids due to the presence of water and forested areas. The WDFW has identified the sediment plain as a waterfowl priority habitat due to the extensive concentrations of waterfowl in the sediment pool upstream of the SRS. Canada geese, ducks, grebes and others species are observed within the ponded areas of the sediment plain. Raptors such as hawks, eagles, and kestrels hunt over the open fields and along the waterways. Mammals such as beaver can usually be found along many of the basin's watercourses, whereas squirrels, black-tailed deer, cougar, bobcat, and black bear can be found in the forested uplands. Reptile and amphibian species within the project area include western toad (federal species of concern), Pacific tree frog, northwestern garter snake, and northern alligator lizard.

Figure 13. Wetland Areas Affected by Proposed 10-foot SRS Spillway Raise

3.3. Cultural and Historic Resources

The Portland District, as part of its Section 106 responsibilities under the National Historic Preservation Act, has considered impacts to cultural resources for the area proposed for impacts. In 1984-1985, the Portland District team completed a field investigation of the area proposed for the SRS and the area upstream of the structure that would hold volcanic sediments. The Washington Department of Archaeology and Historic Preservation (DAHP) reviewed the documentation and concurred with the finding that construction of the SRS and the deposition of sediments behind the structure would have no effect on cultural resources (November 14, 1984; SHPO Log Reference 584-F-COE-P-06). In 2010, DAHP reviewed additional field investigation documentation and concurred with the finding that construction of upstream grade building structures and redirected deposition of sediments would also have no effect on cultural resources (May 11, 2010; Log No: 033010-01-COE-P).

The proposed SRS spillway raise project will occur entirely within areas previously addressed in the above referenced documents. No new areas of disturbance will occur and no additional cultural or historic resources are anticipated within the proposed project footprint. Because the proposed project will occur within the same area that was previously surveyed prior to construction of the SRS, no new cultural or historic resources are expected to occur in the project area. A copy of this determination was provided to the Washington DAHP. Interested Native American tribes have been consulted with on the proposed project and provided a copy of the original draft EA. The Cowlitz Tribe provided comments in response to the original draft EA. The Corps is responding to the Cowlitz Tribe with a letter that includes a copy of the revised EA. Further, the Corps is in the process of government-to-government coordination with the Cowlitz Tribe.

3.4. Socio-economic Resources

The project area is located in Cowlitz County, Washington. Cowlitz County is located in southwestern Washington on the Columbia River, adjacent to the Portland, Oregon metropolitan area. The county has two active ports (Longview and Kalama), a productive wood products industry, two paper mills, a diverse manufacturing base, and good rail and interstate linkages (Employment Security Department 2011). The major industries in the county include manufacturing, retail trade, health care, and local government. Forestry is the dominant land use in the lower Cowlitz subbasin, and commercial forestland makes up over 80% of the subbasin (LCFRB 2004). Much of the private land in the lower river valleys is agricultural and residential (Corps 2007).

Census data from 1970 through 2010 are shown in Table 2 and reflect the population trends for Cowlitz County and its major cities. The population of Kelso and Castle Rock has remained relatively stable from 1970 to 2010, whereas Longview's population has increased. Cowlitz County's population increased by 10.2% from 2000 to 2010 (14.1% for Washington).

Table 2. Population for Cowlitz County and Major Cities

Location	1970	1980	1990	2000	2010	Change 2000 to 2010
Kelso	10,296	11,129	11,767	11,895	11,925	0.3%
Longview	28,373	31,052	31,499	34,660	36,648	5.7%
Castle Rock	1,647	2,162	2,067	2,130	1,982	-0.1%
Cowlitz County	68,616	79,548	82,119	92,948	102,410	10.2%

Source: Census data, Office of Financial Management, State of Washington (http://ofm.wa.gov/pop)

According to the U.S. Census Bureau (http://quickfacts.census.gov), the median household income (2006-2010) in the county was $45,877 ($57,244 for Washington); the percent of persons living below the poverty level (2006-2010) was 16.9% (12.1% for Washington). In December 2011, the unemployment rate in Cowlitz County was 11.3% (8.5% in Washington).

Land use in the project area and upstream of the SRS is primarily for commercial timber production, wildlife habitat, recreation, and a few rural, private residences. While the State of Washington owns the land, the Corps has a permanent easement for all of the land within the project area (see Figure 9 for Corps' property and easement boundaries). The greatest depth of water inundation and sediment accumulation during the first year post-construction is anticipated to be concentrated within the area between the SRS and approximately 1 mile upstream of the SRS. This area is well within the Corps easement boundary and is not anticipated to affect any public or private land outside of the Corps easement boundary.

Tourists come to the area surrounding the project area to visit established viewing and interpretive sites of Mount St. Helens along State Highway 504. Privately-owned businesses provide services to tourists such as lodging, restaurants, and horseback riding.

Weyerhaeuser owns much of the land surrounding the project area. These lands will likely continue to be managed as commercial timber lands into the reasonable foreseeable future.

The 1980 eruption of Mount St. Helens dramatically altered the hydraulic and hydrologic regimes of the Cowlitz and Toutle River Valleys. About 50,000 people and their property are at risk along the lower Cowlitz River if flood damage reduction benefits are not maintained. The construction, operation and maintenance of the SRS, levee improvements, and dredging have maintained flood damage reduction benefits along the lower Cowlitz River to date.

4. ENVIRONMENTAL CONSEQUENCES

Note to readers: In response to public review comments, Sections 4.1 and 4.2 have been entirely revised. Revised or added text in other sections has been underlined.

4.1. Physical Environment

4.1.1. Preferred Alternative

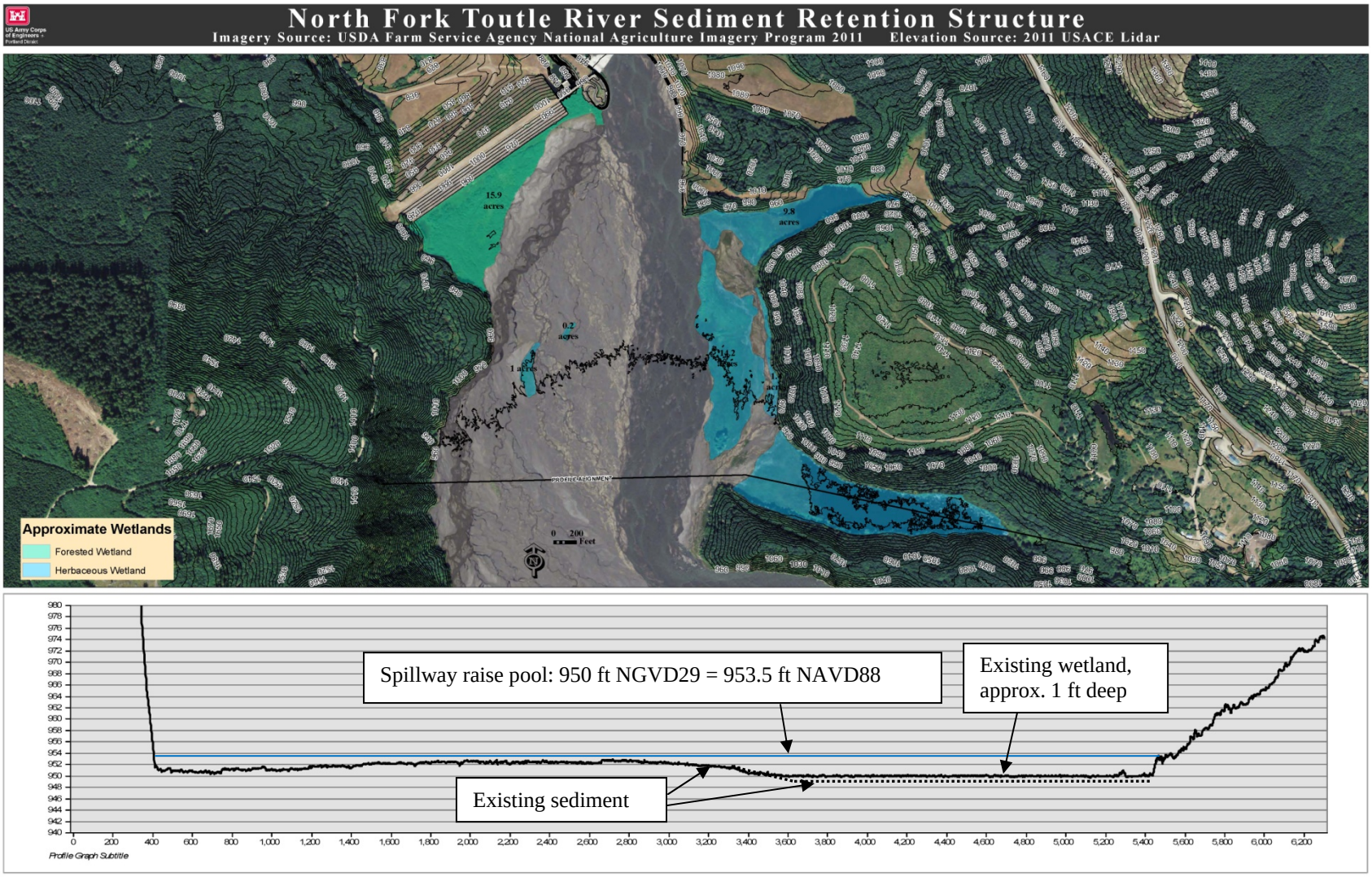
The construction area is on the spillway of the SRS. Construction activities include ground disturbance for staging and constructing the RCC berms and low flow channel/plunge pool. Existing access roads to the SRS structure will be used. Much of the access, staging, and construction activities will occur on the SRS or in upland areas on the downstream side of the SRS. Dozers or similar equipment will remove approximately 3 feet (approximately 20,000 cy) of sediment from the spillway to facilitate river diversion and to expose the bedrock to be excavated in constructing the low flow channel. Removed sediment may be used in the contractor's cofferdam system or placed back in the sediment plain immediately upstream of the SRS (disposal area 8 on Figure 8). Removed sediment will not be placed into existing stream channels. The diversion berm will have a temporary culvert system through it to maintain river flow and construct the RCC structure and low flow channel/plunge pool in the dry. All rock excavation will be done by mechanical means, not blasting, to reduce noise disturbance to wildlife and resident fish in the area. Rock removed will be stockpiled in disposal areas on mowed grass areas downstream of the SRS for future reuse. All staging areas and the temporary cofferdam/access road will be restored with native vegetation after construction is completed.

In-water work for constructing the river diversion berm, the possible disposal of sediment, and obtaining groundwater to mix the RCC will increase turbidity and suspended sediment within the active work area. Turbidity increases will be minor and of limited duration during construction. Soil and erosion control plans will be implemented during construction to minimize potential effects to water quality from stormwater runoff. To aid with long-term water quality monitoring, sensors will be installed on the new spillway crest to continuously monitor water temperature and pool elevation. The sensors will be connected to the existing weather station on top of the spillway approach pier.

A pool of approximately 300 acres is expected to form directly upstream of the SRS and including the branches of Pullen Creek, located less than 1 mile upstream from the SRS (see Figure 12). The pool should begin to form shortly after construction and should reach maximum capacity following the fall/winter rains of the post-construction year. The depth of the new pool will taper from 10 feet deep at the SRS spillway to zero feet at the upstream boundary. Figure 14 shows a cross section of the sediment plain at the location of East Pullen Creek. The current herbaceous wetland at the mouth of Pullen Creek is sparsely vegetated with low species diversity and is inundated to a depth of less than 1 foot. Due to its close proximity to the SRS and its low flow, Pullen Creek ends in the wetland and the outflow from the wetland becomes subterranean. The immediate pool elevation over the wetland, following construction of the spillway raise, is expected to reach approximately 4 feet (see Figure 14). This pool will begin filling with sediment over the first fall/winter, when high flows erode sediment from the debris avalanche, and may be full with sediment to the surface by the spring of 2013. If not full by spring 2013, the pool will most likely fill over the 2013/2014 winter season.

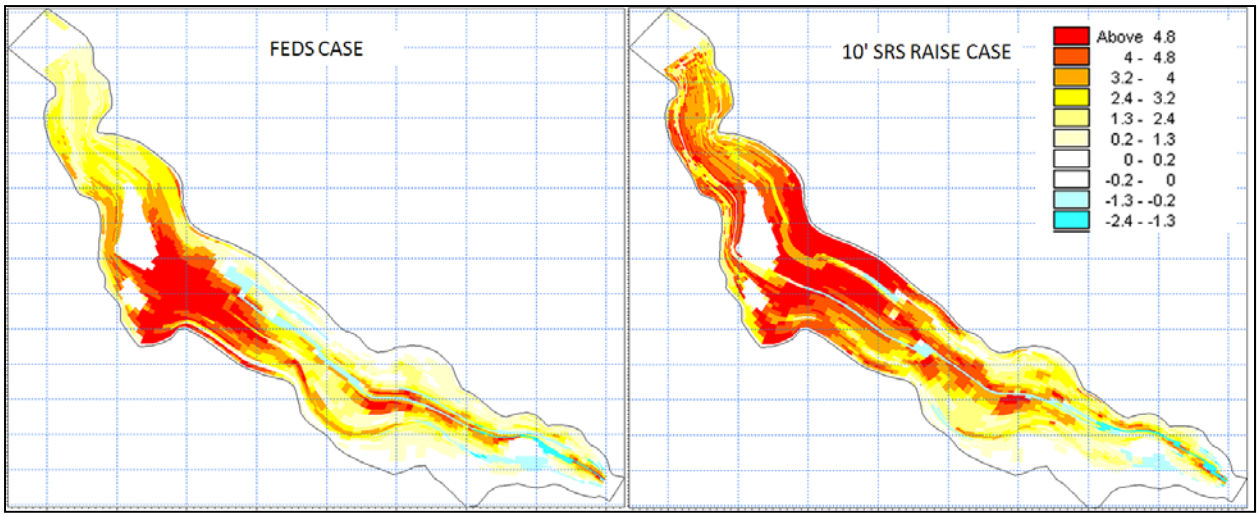
Figure 14. Section Through Sediment Plain at East Pullen Creek

Note: Elevations in NAVD88; 940 feet NGVD29 = 943.5 feet NAVD88



After the initial filling of the 2 mcy pool with sediment, the spillway raise will continue to induce sediment deposition farther upstream, since the spillway raise will reduce the average slope of the sediment plain. With the 10-foot spillway raise, the additional deposition through 2035 is about 44 mcy. After filling of the pool, sediment deposition rates in the first 5 years will be about 1.5 feet per year. The average deposition rate through year 2035 will be about 0.5 feet per year. Figure 15 shows depositional trends in year 2035 for two cases: (1) future expected deposition scenario (FEDS), which is what will occur if no additional action is taken, and (2) the proposed 10-foot SRS spillway raise. As compared to the FEDS case, the 10-foot SRS spillway raise induces an additional 12 mcy of deposition through 2035.

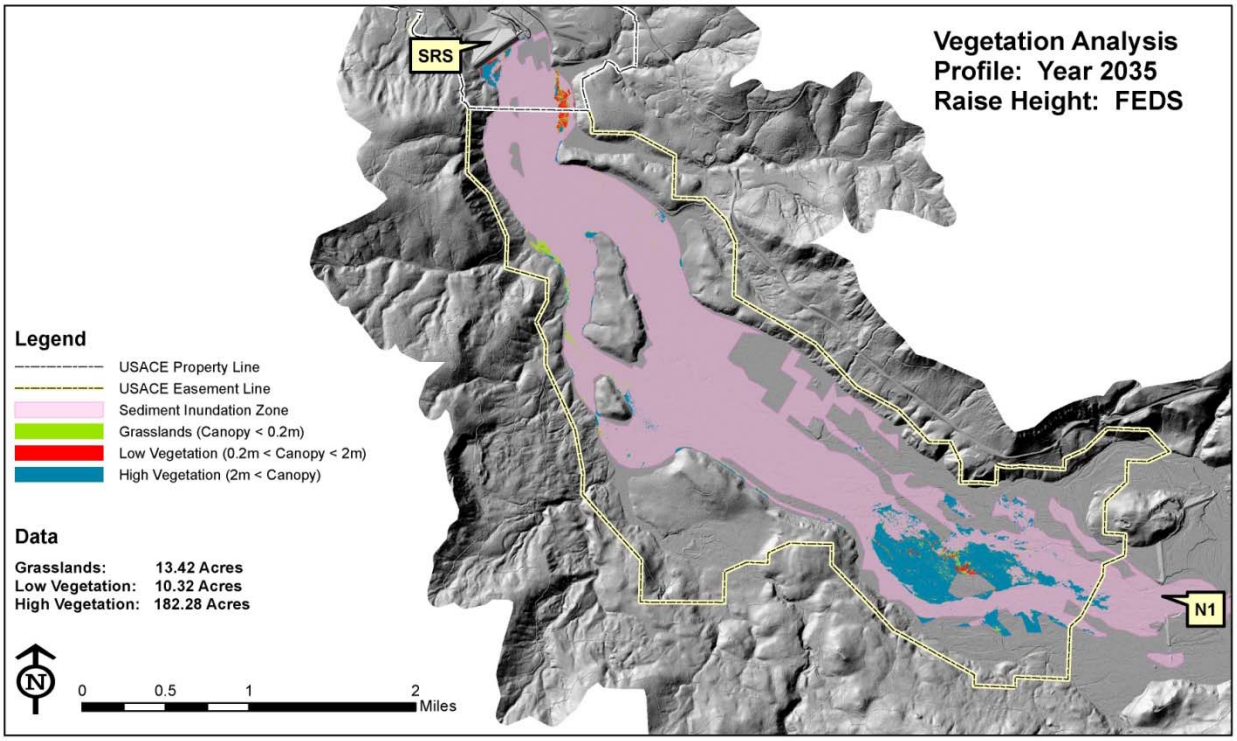
Figure 15. Sediment Transport Modeling Results Showing Deposition Depths (meters) in Year 2035 for FEDS Case and Proposed 10-foot Spillway Raise Case

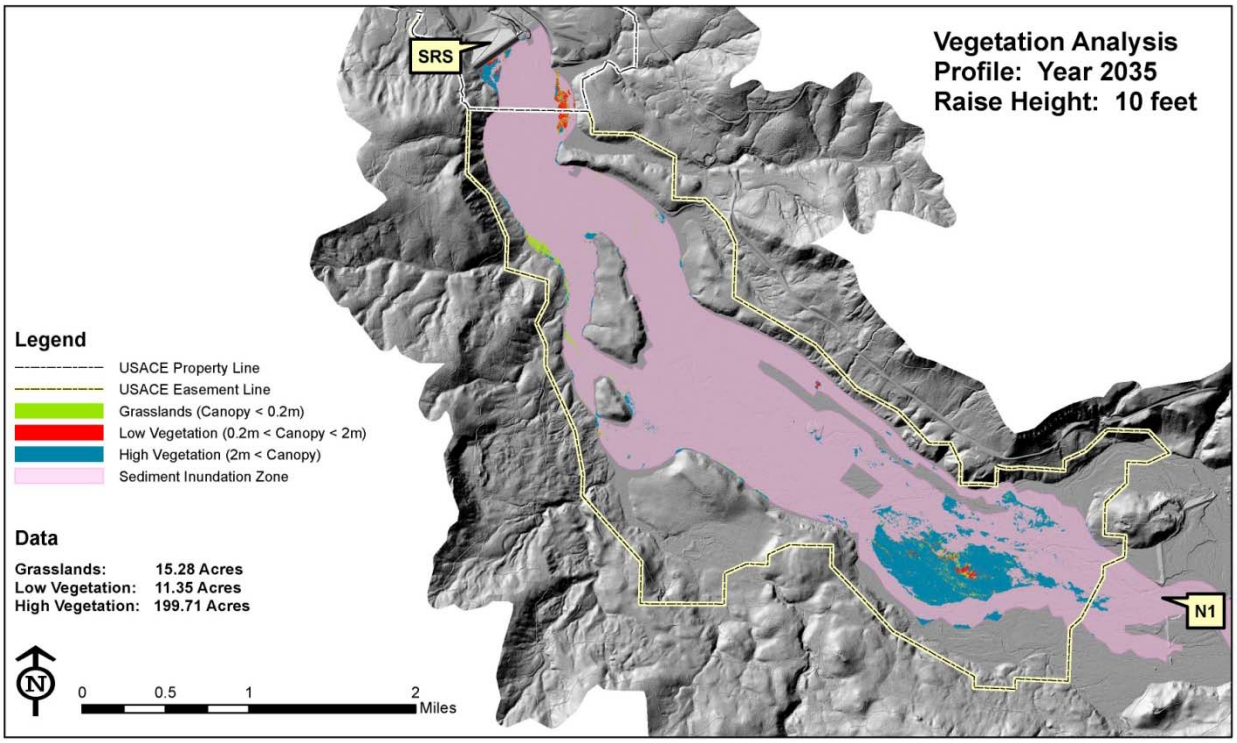


It is important to note that the 2-dimensional sediment transport modeling used to generate the sediment depths in Figure 15 was done to evaluate the general extent and overall volume of deposition; the model does not include the influence of the tributaries. The profiles of sediment elevation versus distance above the SRS along the right and left banks are overestimates of deposition in the areas of the tributaries, because the tributaries will flush out sediment in these areas, and other than the branches of Pullen Creek, will maintain surface connections to the North Fork Toutle River. For example, the watershed, flow, and energy of Alder Creek is much larger than that of Pullen Creek. Alder Creek has the flow and energy to deposit gravels at its mouth. Therefore, it is reasonable that Alder Creek will provide significant sediment flushing and remain connected to the North Fork Toutle River as it has since construction of the SRS.

A second important point is that even if no further action is taken (FEDS case), the sediment transport modeling predicts about 32 mcy of additional deposition through 2035. With the proposed 10-foot SRS spillway raise, the additional deposition through 2035 is about 44 mcy. While the average rate of deposition in the sediment plain has decreased now that the SRS is run-of-river, deposition is still occurring. The sediment plain is not in a steady-state condition. Figure 16 shows the results of a LiDAR analysis in which vegetation of different height ranges were identified. With no action (FEDS case), the areas of grasslands, low vegetation [< 2 meters (6.5 feet)], and high vegetation (> 2 meters) covered with sediment in 2035 are 13, 10, and 182 acres, respectively. With the proposed 10-foot SRS spillway raise, those areas are 15, 11, and 200 acres, respectively. Thus, the 10-foot SRS spillway raise would inundate an additional 2 acres of grasslands, 1 acre of low vegetation, and 18 acres of high vegetation in 2035.

Figure 16. LiDAR Vegetation Analysis for FEDS and 10-foot SRS spillway Raise in 2035





Once the spillway is raised, there will be a reduction in the amount of sediment transported downstream until the pool upstream of the SRS fills with sediment. This reduction in downstream sediment transport may have the added benefit of mobilizing existing sediments in the lower Toutle and Cowlitz Rivers to further assist in maintaining short-term improvements to the levels of flood damage reduction benefits for lower Cowlitz River communities. Thus, there would be an overall reduction in new deposition, and as a result of sediment balance, a likely redistribution of existing sediments within the lower rivers.

4.1.2. No Action Alternative

For the No Action alternative, there would be no ground disturbance or construction activities on the spillway crest and sediment trapping efficiency of the SRS would continue to decline. All flow from the North Fork Toutle River would continue to pass over the SRS and sediment would continue to deposit in the lower 20 miles of the Cowlitz River at an increasing rate. Water quality would be unchanged, with high sediment bedload carried in the winter/spring and decreasing as flows drop in the summer/fall.

The Corps will continue to monitor sediment accumulation in the lower Cowlitz River to determine whether required levels of flood damage reduction benefits are acceptable for the downstream Cowlitz River communities. The Toutle system below the SRS is a transport reach for sand-sized material that passes through the SRS spillway. Additional sources of sediment are introduced in this reach including the inflow from the Green and South Fork rivers, and bank erosion throughout the system. Total additional sediment load from Green and South Fork rivers and other sources for the forecast sequence through 2035 is estimated at 30.9 million tons, which is 15% of the total load entering the Cowlitz from the Toutle. Total sediment load to the Cowlitz River from the Toutle between 2008 and 2035 is estimated to be 203 million tons and is composed of 24% clay/silt, 72% sands, and 4% gravels.

While it is difficult to predict when and where required protection levels will be exceeded, uncontrolled deposition in the lower Cowlitz River will affect upstream communities first. These communities higher in the system will experience a reduction in future flood damage reduction system performance more rapidly than those communities lower in the system due to the cumulative effect of deposition downstream of their levees. Based on the current conditions at Castle Rock and Lexington and estimated downstream sediment deposition rates, these areas will likely require corrective management action in the near term, most likely dredging, to maintain the required levels of flood damage reduction benefits.

In the 1985 Decision Document, dredging was the future anticipated action that would be required to maintain required levels of flood damage reduction benefits during Phase II of the project. Dredging would deepen the Cowlitz River bed to elevations to ensure required levels of flood damage reduction benefits of impacted areas. It is unclear at this point how frequently dredging would occur. It is also unclear where dredged sediments would be placed due to limited upland placement sites in the area of most immediate need. Currently, upland dredged material placement sites are available near the confluence with the Columbia River, but use of these sites will be expensive due to the costs associated with transport and possible rehandling to get material into the sites.

4.2. Biological Resources

4.2.1. Preferred Alternative

The SRS is a predominantly unvegetated structure, and only minimal direct impact from construction or construction staging/stockpiling will occur from raising the SRS spillway. The sediment plain upstream of the SRS is an actively aggrading, sparsely vegetated, braided channel network. The sediment plain changes widely and rapidly during winter storm events but tend to stabilize during the drier summer

months, and allows for temporary establishment of early successional plants (e.g., willows). However, due to the shifting channels these vegetated sand bars are frequently eroded and the vegetation lost during high flows, and then reestablished once flows subside. In other words, there is a constantly shifting mosaic of early successional vegetation that comes and goes depending on the season and associated precipitation levels. Despite the dynamic conditions, many species of wildlife, particularly waterfowl and other migratory birds, are known to use the sediment plain and adjacent upland areas. Construction activities and noise may cause temporary disturbance to any wildlife in the immediate project vicinity. It is expected that wildlife species would temporarily disperse to adjacent areas outside the project area during construction.

Approximately 47.9 acres of herbaceous wetland (although some willow is present within the herbaceous species), mostly in and around the Pullen Creek alcoves, will be temporary impacted when inundated by the new pool created upstream of the SRS (see Figure 12); given the shallow. An additional 15.9 acres of forested wetland, consisting almost exclusively of very young (approximately 5-year old) alder trees will also be inundated along the upstream edge of the SRS. These areas are expected to be inundated by up to 10 feet of water near the SRS, with 3 to 4 feet in the Pullen Creek alcoves. Not all the vegetation is expected to perish as a result of inundation. Most of the plant species present are likely to either survive outright by managing the increased depth (e.g., willow species) or floating on the surface (e.g., cattail species) or recolonize quickly along the margins and within the alcoves once the new sediment settles out (e.g., rushes and sedges). As stated previously, all of these species are early seral species that are adaptable and colonize quickly on disturbed areas. Recolonization will also be expedited as a result of post-construction restoration efforts, particularly the planting of willows stakes salvaged during construction.

As previously stated, material mobilized from the debris avalanche continues to be deposited within the sediment plain. The on-going accumulation of sediment will result in the burial of vegetation currently established on the sediment plain. With no further action, the areas of grasslands, low vegetation [< 2 meters (6.5 feet)], and high vegetation (> 2 meters) covered with sediment are 13, 10, and 182 acres, respectively. With the proposed up to 10-foot SRS spillway raise project, those areas are 15, 11, and 200 acres, respectively. Thus, compared to the FEDS case, the proposed project will inundate an additional 2 acres of grasslands, 1 acre of low vegetation, and 18 acres of high vegetation through 2035 across the entire sediment plain.

Wintering geese and other waterfowl will likely continue using the sediment plain and pool area upstream of the SRS following the spillway raise. A pool commonly forms during winter and spring following heavy precipitation events and it is reasonable that the new pool will not modify the value of this area to wintering waterfowl. Other migratory bird species will likely continue to use the vegetated margins of the sediment plain, even those areas where flooding kills young trees and shrubs as these areas will continue to provide structural habitat. Alder tree snags will provide perches and roosting habitat for some species, including cavity nesting birds such as woodpeckers and purple martin, which currently use existing snags.

The Mount St. Helens elk herd that winters in the area should be only minimally affected by the proposed SRS spillway raise. Only a minor amount of upland vegetation will be affected in the short term, and only in the immediate vicinity of the new pool margins that forms upstream of the SRS. These areas are expected to colonize with the same plant species currently present in the surrounding wetland areas in one or two growing seasons. Any upland vegetated areas disturbed during construction (access, stockpile or staging areas) will be restored to ensure that these areas continue to provide forage for elk and other wildlife. The areas that WDFW actively manages for elk winter use is farther upstream will not be any

more affected by sediment deposition than is already occurring. Therefore, it is expected that any impact to elk will be very minor in extent and localized to the margins of the new pool.

Three ESA-listed threatened fish species occur in the project area. Lower Columbia River coho salmon spawn and rear in Alder and Hoffstadt Creeks upstream of the SRS; Lower Columbia River steelhead trout are known to spawn and rear in Alder, Hoffstadt, and Bear Creeks, and may use the North Fork Toutle to some degree. Eulachon are known to spawn in the lower reaches of the Cowlitz and Toutle rivers; immediately after hatching, eulachon larvae drift downstream in the current en-route to the Columbia River estuary and ultimately the Pacific Ocean. Protective measures will be implemented to avoid or minimize effects to these listed species and their designated critical habitat, as well as to minimize potential impacts to EFH for coho salmon (see Section 6.5). All in-water work is scheduled to occur during from July 1 – October 7. This is generally the time period when coho and steelhead are less likely to occur in the project vicinity. Trap records from WDFW at the FCF below the SRS indicate that the smolt out-migration will have been completed by early June. The adult trap-and-haul program focuses on transporting adult steelhead and coho to several tributary release sites during the fall and winter months and will be unaffected by the proposed SRS spillway raise because the adult trap-and-haul program typically begins after the construction activities have been completed.

No additional sediment accumulation would occur up Alder Creek or any of the other spawning/rearing tributaries upstream of the SRS, and surface connections of tributaries to the North Fork Toutle are expected to continue following the up to 10-foot spillway raise. The Corps used the most recent sediment transport modeling and general hydro-geomorphic principles to determine that Alder Creek (the only creek directly influenced by the proposed spillway raise and subsequent pool development) should maintain surface connection to the North Fork Toutle because of the relatively high energy and discharge from Alder Creek, because the water table within the sediment plain is always within a foot or so of the surface, and because Alder Creek has not been disconnected to date, even following very large depositional events [e.g., winter of 2006/2007 when approximately 7.02 mcy of sediment from the debris avalanche was deposited in the sediment plain (Corps 2010); this is a much larger volume of sediment than is anticipated to result from the proposed SRS spillway raise].

The construction time period corresponds to low flows (summer base flows) and high water temperatures in the braided channel system of the sediment plain. These channels are generally deficient in large wood and devoid of riparian vegetation, except for some early successional species that temporarily establishes on sand bars. Most of the juvenile salmon rearing is likely restricted to tributary streams that provide cover, forage, and cooler water temperatures; rearing habitat in the North Fork Toutle is very limited due to the shifting, braised nature of the channel within the sediment plain, although some rearing may occur downstream of the SRS.

In-water work for constructing the river diversion berm (cofferdam/construction access road) and for obtaining groundwater to mix the RCC would result in slight temporary increases in turbidity and suspended sediment, but will be limited to the active work area. As already stated, few, if any, coho or steelhead would be present in the construction area at this time. It is not expected that this temporary turbidity increase would be of sufficient intensity to cause impacts to aquatic organisms. Sensors installed on the new spillway crest will continuously monitor water temperatures to provide data on conditions for aquatic life. Noise created by construction activities could cause a temporary disturbance or displacement of resident fish species present in the project vicinity, although this is unlikely given the limited habitat in the project area.

<u>The Cowlitz Tribe responded to the initial Public Notice with concerns regarding possible impacts to steelhead and coho salmon habitat. The Tribe requested that the Corps consider opportunities to include</u>

volitional fish passage at the SRS spillway. The proposed project does not preclude the inclusion of fish passage in the future. The Corps is considering opportunities for fish passage as part of the long-term sediment management plan for the North Fork Toutle River and the SRS. The Corps will continue to coordinate with the Cowlitz Tribe, and all other interested Native American tribes, regarding proposed activities within the Toutle Basin.

The Corps is aware that many stakeholders are concerned about long-term volitional fish passage at the SRS. The proposed up to 10-foot spillway raise structure, as well as the existing spillway, are not designed for upstream volitional fish passage. If upstream volitional fish passage is desired in the future, a fishway would need to be carved into the existing spillway, which has a slope of 7%. This would be a new construction project. The proposed 10-foot spillway raise crest is set back from the existing spillway crest by approximately 500 feet so that it can be modified in the future to include an extension of the fishway carved into the existing spillway. The slope of the proposed 10-foot spillway raise is 10%, but since it is set back 500 feet, the slope can be flattened to 2%. Thus, it is possible to extend a future fishway that would be carved into the 7% existing spillway, up to the additional 10-foot structure, which can be modified to a 2% slope.

4.2.2. No Action Alternative

As previously stated, if no further action is taken, sediment transport modeling predicts that about 32 mcy of additional deposition in the SRS sediment plain will occur through 2035. While the average rate of deposition in the sediment plain has decreased now that the SRS is run-of-river, deposition is still occurring. The sediment plain is not in a steady-state condition. Figure 16 shows the results of a LiDAR analysis in which vegetation of different height ranges were identified. With no action (FEDS case), the areas of grasslands, low vegetation [< 2 meters (6.5 feet)], and high vegetation (> 2 meters) covered with sediment are 13, 10, and 182 acres, respectively, through 2035.

For the No Action alternative, there would be no increases to existing noise levels and disturbance to wildlife and fish because no construction would occur at the existing SRS. Use of the area by elk, waterfowl and other wildlife species would continue to occur. Water quality would be unchanged. Continued elevated sediment loads transported below the existing SRS would continue to cause direct impacts to the operation of the fish collection facility (moving sediment out of facility and limiting effectiveness of the facility due to the high sediment load).

Additional accumulation of sediments in the lower 20 miles of the Cowlitz River may result in additional dredging or other measures to maintain required levels of flood damage reduction benefits for these areas. These activities would impact the aquatic environment and any aquatic organisms present, including anadromous fish species listed under the ESA.

4.3. Cultural and Historic Resources

The Section 106 concurrence process for the Mount St. Helens work was completed with the acceptance of the Washington DAHP for the no effect determination for construction of the SRS and subsequent filling of the Toutle River Basin behind the structure. Prior to SRS construction, the area affected by this action was inventoried for cultural resources. No historic properties were documented within the North Fork Toutle floodplain. Therefore, because the SRS spillway raise project will occur within the same area that was previously surveyed prior to construction of the SRS, no new historic resources are expected to occur in the project area. A copy of this determination was provided to Washington DAHP; the Corps has received concurrence with our determination that no historic properties are affected by this proposed project.

The proposed SRS 10-foot spillway raise project will occur entirely within areas previously addressed in the above referenced documents. No new areas of disturbance will occur and no historic resources are anticipated within the proposed project footprint. Because the proposed project will occur within the same area that was previously surveyed prior to construction of the SRS, no new historic resources are expected to occur in the project area. A copy of this determination was provided to the Washington DAHP. Interested Native American tribes have been consulted with on the proposed project.

The 1980 eruption and subsequent construction of the SRS and accumulation of sediment behind it resulted in the destruction and inundation of known cultural sites, historic properties and historic structures. Those properties and cultural features are now encapsulated and likely gone forever. Current existing cultural features, on the other hand, need to be assessed and, if determined to be historically or culturally significant and/or at risk of being impacted by the proposed sediment rise or related activities, need to be protected or mitigated for. To date, no historic properties that are at risk of being affected by the possible sediment rise have been identified within the area of potential effect (APE). To the Corps' present knowledge, no historic properties (either in private or government ownership) are located within the APE. If anyone has any knowledge of any structures that are located within the APE, however, it would be helpful if they could describe where these are located so the Corps can consider and assess whether they may be impacted by proposed sediment rise. The Corps utilized information on file, information reviewed from the Washington DAHP, and information gathered in the field during previous on-the-ground archaeological inspections. The Washington DAHP has reviewed the Corps' original findings and assessment report and has agreed that no historic properties (i.e., archaeological sites, historic structures, orchards, features, etc) are located within the designated APE, and that no historic properties will be impacted (the Corps and Washington DAHP may not have information about private properties and structures contained within; the Corps relies on the public and other agencies to provide information about these locations so they can be considered and assessed if located within the APE). However, the Corps (and all other federal and state agencies) would need permission from the landowners to go onto the property to assess any such structures for potential impacts. However, no private land is expected to be affected by the accumulation of sediment with either the no action alternative or proposed 10-foot SRS spillway raise project.

4.4. Socio-economic Resources

4.4.1. Preferred Alternative

The preferred alternative would not cause adverse changes in population, economics, or other indicators of social well being. The preferred alternative also would not result in a disproportionately high or adverse effect on minority populations or low-income populations. During its construction, the project will generate work in the construction and service industries. Local businesses will likely benefit by providing support services such as supplies, materials, food, and lodging.

The preferred alternative would not alter or have any significant effect on land uses. Access to the SRS would be closed during construction; however, access to the trailhead and overlook trail would remain open. Following construction, all access would be returned to pre-construction levels. Therefore, recreation in the vicinity of the project would only be temporarily affected, and only during the period of construction. After construction, the overall aesthetics of the project area would remain the same. Construction-related traffic may cause a temporary, minor increase to local traffic in the project area and vicinity, which will cease once construction is completed. Consequently, there would be no permanent change to existing roads or traffic patterns.

The preferred alternative is expected to be successful in retaining sediment, which would help reduce sedimentation in the lower Cowlitz River and reduce flood risk damages to the communities of Kelso, Longview, Castle Rock and Lexington and the associated infrastructure.

4.4.2. No Action Alternative

For the No Action alternative, there would be no effect on socioeconomic profiles, land uses, recreation, aesthetics, roads or traffic levels in the project area and vicinity. Public access to the SRS would not be temporarily closed to foot traffic. There would be no income generated in the local area from construction work. Continued sediment accumulation in the lower 20 miles of the Cowlitz River will increase the risk of flood impacts to over 50,000 people in the communities of Kelso, Longview, Castle Rock and Lexington and the associated infrastructure.

4.5. Cumulative Effects

Cumulative effects are defined as, "The impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 *Code of Federal Regulations* Section 1508.7). Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.

Myriad efforts have been undertaken by the Corps and other agencies the since the May 18, 1980 eruption of Mount St. Helens related to erosion and sediment management, flood protection, and fish passage/habitat issues. The debris avalanche resulting from the 1980 eruption deposited approximately 3.8 billion cubic yards of silt, sand, gravels, and trees in the upper 17 miles of the North Fork Toutle River. So much of this coarse sandy material and debris was carried from the Toutle River and into the Cowlitz and Columbia rivers that dredging was required to clear the channel before river shipping could be resumed. Over 74 mcy of material was removed from the Cowlitz in the first year after the eruption to maintain flood capacity. Large-scale removal of volcanic material began at the lower end of the Toutle River and continued down the Cowlitz until the cleared channel could handle expected winter flows without topping dikes and flooding Castle Rock, Longview, and Kelso. Floodplain and wetland habitat along portions of the lower Cowlitz and Toutle rivers was filled with the dredged material. Stream systems have been recovering slowly from the effects of the eruption. However, elevated sediment loads, channel widening, lack of large woody debris, and riparian cover all remain problems today.

After the 1980 eruption, the SRS on the North Fork Toutle was constructed from 1987 to 1989 to prevent the continuation of severe downstream sedimentation of stream channels, which created flood conveyance, transportation, and habitat degradation concerns. Before the SRS was constructed, a temporary structure was built across the North Fork Toutle (N-1) and dredging in sections of the river was initiated as an emergency measure. Once in place, the SRS totally blocked volitional upstream access to as many as 50 miles of habitat for anadromous fish. To mitigate this effect, the Corps funded habitat enhancements (development of off-channel rearing areas) for coho salmon; hatchery supplementation at Green River Hatchery to raise coho, spring Chinook, and fall Chinook; and construction of a FCF below the SRS to trap and haul salmon, steelhead, and coastal cutthroat to tributaries above the SRS.

Erosion and sediment movement into the North Fork Toutle River and downstream into the Cowlitz River continues to be significant and unpredictable. Regional rains and flooding since 2003 have mobilized large amounts of sediment from the Mount St. Helens debris avalanche. This trend is a result of increased sedimentation from the Toutle River watershed from sediments being passed through the SRS in greater amounts. The ability of the SRS to trap sand has decreased since 1998, when the sediment reservoir

behind the dam filled in. All flow now passes through the spillway as designed, carrying sediment downstream. Annual dredging in the lower Cowlitz River for about 5 years is needed to maintain channel dimensions and flood risk management.

Since the SRS has become a run-of-river project (all flow over spillway, now in Phase II), the Corps has implemented sediment management measures as needed to maintain the authorized levels of flood damage reduction benefits. In 2007 and 2008, the Corps dredged the lower 5.7 miles of the Cowlitz River. This dredging was in response to the heavy sedimentation in the river during water year 2007. Dredging occurred in November 2009 using the dredge *Oregon* from RM 0 to 0.6. In 2009, the Castle Rock levee was improved by construction of a seepage cutoff wall in the upper reach of the levee system in order to maintain the authorized level of protection. In 2010, the Corps constructed a pilot project on the sediment plain above the SRS to test the constructability and performance of various grade-building structure concepts. The Corps is evaluating the performance of these structures to determine if they could be used for reliable sediment management in the future. All of the above sediment management measures have been required due to the reduced trapping efficiency of the SRS since it became run-of-river in 1998.

The Corps is investigating long-term sediment management measures to maintain the authorized flood damage reduction benefits for the communities on the lower Cowlitz River through the year 2035. The proposed up to 10-foot spillway raise project described in this EA is an interim measure required to maintain flood risk reduction benefits in the near term. Once a long-term sediment management plan is complete, it is likely additional actions will be required and may include, among a suite of potential alternatives, incremental raises of the SRS spillway up to a total height of 30 feet, grade-building structures in the SRS sediment plain, dredging of the Cowlitz River, and/or raising the entire SRS structure.

Potential long-term measures to maintain the required levels of flood damage reduction benefits for downstream communities may include one or more of the following:

- Increase the height of the SRS spillway.
- Additional grade-building structures in the sediment plain.
- Dredging in the lower Cowlitz River.

All of these measures are speculative at this point. No decision by the Corps has been made as to the most cost-effective means to maintain downstream authorized levels of flood damage reduction benefits. All measures will be thoroughly evaluated with opportunity for public review and comment. Additional environmental review and compliance will be required if the long-term plan deviates from those measures identified in the 1985 Decision Document.

While the Corps is not yet sure what measures will be most cost effective at maintaining long-term downstream levels of flood damage reduction benefits, the Corps is required to assure that these benefits are maintained for downstream communities. The 1985 Decision Document and associated EIS envisioned dredging of the lower Cowlitz as the primary means of maintaining required levels of flood damage reduction benefits once the SRS project entered Phase II with the North Fork Toutle flowing over the SRS spillway.

In addition to long-term sediment management, the Corps is also engaged in evaluating opportunities for long-term habitat restoration of habitat impacted by the construction and operation of the SRS under authority of the Water Resources Development Act 1999 (Public Law 106-53). Radio-tagging and tracking adult coho salmon and steelhead is being undertaken as part of a collaborative effort with the Cowlitz Tribe, U.S. Geological Survey, WDFW, National Marine Fisheries Service (NMFS), Corps,

Weyerhaeuser, and the U.S. Forest Service to determine how and where to pursue long-term salmon recovery in the North Fork Toutle watershed. A 2007 Corps' reconnaissance study identified a federal interest in pursuing potential ecosystem restoration actions that could provide benefits to ESA-listed salmonid species in the Toutle River watershed. The restoration actions considered included:

- Improve SRS falls/spillway.
- Fix existing fish collection facility.
- New trap-and-haul fish collection facility.
- Remove fish collection facility fish/velocity barrier.
- New fish release site above SRS (volitional movements).
- Improve tributary fish release sites.
- Sediment plain structures to direct flows, stabilize channels, and improve channel connectivity.
- Tributary plantings/stabilization.
- Restoring side or off-channel habitats for fish downstream of the SRS.

There is a risk associated with investing in ecosystem restoration measures due to the instability of the Toutle River drainage and continuing sedimentation effects caused by the 1980 eruption. Future work under the WRDA 1999 authority will focus on actions to sustain and improve access to the tributary habitat above the SRS. In the future, the Toutle River system may become stable enough to consider a broader range of ecosystem restoration measures. The current proposed 10' raise of the SRS spillway is authorized only for flood damage reduction benefits.

The EIS associated with the 1985 Decision Document anticipated the long-term effects to maintain the required levels of flood damage reduction benefits; while raising the SRS spillway was not specifically identified, the cumulative effects associated with implementing the spillway raise are consistent with what was described in this document. Therefore, in conclusion, this cumulative effects analysis considered the effects of implementing the preferred alternative in association with past, present, and reasonably foreseeable future Corps' and other parties' actions in and adjacent to the project area and is consistent with the effects indentified in the EIS associated with the 1985 Decision Document. These actions primarily relate to the long-term management of sediment and restoring fish passage and fish and wildlife habitat. The potential cumulative effects associated with the preferred alternative were evaluated with respect to each of the resource evaluation categories in this EA, and no cumulatively significant, adverse effects were identified.

5. COORDINATION

Note to readers: This section has been revised and contains a summary of the comments received on the February draft EA. ***Corps Response****s are provided.*

A public notice was issued on February 27, 2012 indicating that the draft EA (dated February 20, 2012) for raising the SRS spillway up to 10 feet was available for public review through March 28, 2012. During this public review period, the Corps received a total of 19 written letters and emails commenting on the February draft EA. Many of the comments were related to a perceived inadequacy of the February draft EA, particularly in relation to evaluation of existing habitat conditions and potential impacts from the preferred alternative. Thus, the Corps is reevaluating the project need and addressing the issues identified during the public involvement process in this revised EA. The revised EA includes a more robust assessment of existing habitat conditions and the associated environmental consequences of raising the SRS spillway by up to 10 feet. The revised draft EA is being issued for a 15-day public review period.

A summary of the comments received on the February draft EA is provided below, followed by the Corps' response and subsequent changes to the EA, as appropriate.

1. Cowlitz Indian Tribe, email dated March 22, 2012 and letter dated March 21, 2012.

a. There has been no formal consultation with the Cowlitz Tribe on this project. It is important to fully assess all impacts using an EIS for the proposal.

Corps Response: Section 4 of the EA, Environmental Consequences, has been substantively revised to include a more robust assessment of project impacts. With the release of the Draft EA for solicitation of public comments, through its evaluation of impacts and alternatives, and through meeting its other compliance obligations, the Corps has also been complying with its National Environmental Policy Act (NEPA) obligations. At the conclusion of the Final EA, the Corps will make its determination as to whether or not an EIS or a Finding of No Significant Impact (FONSI) will be completed. The purpose of this project is to provide flood risk reduction benefits to downstream communities of the lower Cowlitz consistent with the Decision Document's description of Phase II of the SRS project. The analysis of impacts will take into account the previous evaluations and try to place them into context of the current and future expected conditions (no action) to determine whether the proposed action results in significant impacts to the human environment.

b. The Tribe has worked closely with WDFW and other stakeholders to protect and conserve Toutle River fish resources. The river has extensive restored habitat above the SRS which is now at risk under this proposal.

Corps Response: Sections 3.1, 3.2, 4.1 and 4.2 of the EA have been revised. With the proposed up to 10-foot spillway raise, a pool of about 300 acres is expected to form directly upstream of the SRS and would only include the branches of Pullen Creek, located less than 1 mile upstream of the SRS. The greatest depth of water inundation and sediment accumulation during the first year post-construction is anticipated to be concentrated within the area between the SRS and approximately 1 mile upstream. Modeling shows that no additional sediment accumulation would occur up Deer, Alder, and Hoffstadt creeks, and their surface connections to the NF Toutle would continue.

c. Fish populations in the NF Toutle River are a valuable and irreplaceable cultural resource. All actions with negative effects should be subjected to rigorous scientific review. Steps should be taken to avoid unwanted impact and, if they cannot be avoided, to fully mitigate and overcompensate for negative effects.

Corps Response: The Corps has consulted with the National Marine Fisheries Service, who has determined that the proposed project is not likely to adversely affect endangered salmonids. While the proposed 10' SRS spillway raise does not include volitional fish passage, future opportunities are not precluded and are being considered as part of the long-term plan for the Mount Saint Helens project. Please also see the revised EA Section 4.2.1., final paragraph of that section.

d. Disagree that no significant impacts will result from the proposed action. The Corps' action needs to account for ESA provisions to prevent incidental take of all listed species. The Tribe is working with stakeholders to insure recovery of listed species including smelt.

Corps Response: Sections 3 and 4 of the EA have been substantively revised and include a more robust assessment of existing habitat conditions and associated environmental impacts of raising the SRS spillway by up to 10 feet.

e. The EA does not evaluate or disclose all adverse effects of the proposed action. Adverse effects to ESA-listed fish are not adequately described, particularly spawning habitat in lower reaches of Deer, Alder, and Hoffstadt creeks, and outmigration habitat in the braided channels of the sediment plain.

Corps Response: Sections 3.1, 3.2, 4.1 and 4.2 of the EA have been revised.

f. Given the extreme and variable physical processes in the project area, the proposed action is not routine and is fraught with uncertainty. The Corps says the action will not preclude future efforts to provide fish passage through the spillway, while acknowledging its intent to continue to increase the height of the spillway until it totals 30 feet. The increased height would significantly steepen the spillway, making it unlikely that a fish-navigable fishway can be built in the future.

Corps Response: Section 4.2 of the EA was revised to include a discussion of future volitional fish passage. Section 4.5 states that a potential long-term measure may consider a further increase in the height of the SRS spillway, but is speculative at this time.

g. The EA does not address basic concerns and issues that underlie this proposal – the Corps' responsibility to conserve fisheries resources of the NF Toutle. The FCF barrier dam prevents fish from passing upstream. Radio-tracking studies by the Tribe and partners demonstrated adult steelhead appear capable of ascending the spillway. The spillway has physical conditions to fish passage that can be remedied by altering a few existing features and constructing a low flow fishway channel.

Corps Response: Keeping the sediment from going down to the FCF and Cowlitz River prevents further degradation to downstream fish habitat as well as providing flood risk protection. While the proposed 10' SRS spillway raise does not include volitional fish passage, future opportunities are not precluded and are being considered as part of the long-term plan for the Mount Saint Helens project. See also the Corps' response to Section 5.1.h. below.

h. The Corps already has developed a satisfactory plan to construct a fishway at the SRS. We believe it is appropriate that the Corps build a fishway at the same time the spillway is raised.

Corps Response: The Corps currently has Congressional authority and appropriated funding for activities that specifically address flood risk protection. The Corps would need additional funding from Congress to add volitional fish passage to the proposed 10' SRS spillway raise project.

i. NEPA states that a full EIS is required if the proposed action involves highly uncertain, unique and unknown risks. The EA states that the proposed spillway raise does not preclude volitional upstream fish passage in the future. The Tribe's position is that the proposal must include measures to ensure that salmon and steelhead are able to safely navigate through the spillway and sediment plane during migration. Protection of steelhead and coho should be a fundamental requirement of any action taken to control sediment. Raising the SRS incrementally buys a limited amount of time for flood control and provides a uncertain sense of security to those who rely on it for flood protection.

Corps Response: See response to comments (d) and (g).

j. The possibility that dredging will be continued and/or other sediment and flood control alternatives will be implemented in the future was not considered in the EA. The Corps did not fully evaluate the relative merits of various alternatives, and did not allow public review and comment on the decision to raise the spillway.

Corps Response: Section 2.2 was added to the EA in response to this comment.

k. The Cowlitz Tribe, WDFW and several interest groups have voiced a strong preference for volitional fish passage. The Corps should not forsake its responsibility to assist in the recovery of fish in the NF Toutle, nor should it allow steelhead and coho to go extinct when remedies exist.

Corps Response: See response to comments (g) and (h).

l. The cumulative effects analysis did not analyze the effects of implementing the proposed action in conjunction with other actions that the Corps' and other parties may implement in the near future.

Corps Response: Section 4.5 of the EA has been revised in response to this comment.

m. The proposed action will adversely affect threatened steelhead and coho. The determinations of "not likely to adversely affect" for these species are not based on best available science nor do they consider the full scope and severity of impacts. Corps should suspend Section 7 consultation with NMFS until these deficiencies are addressed. NMFS should issue an incidental take statement only after appropriate measures are put in place to minimize and mitigate adverse impacts to listed species.

Corps Response: The Corps completed Section 7 consultation requirements with the NMFS and has received a Letter of Concurrence the at the proposed spillway raise project will not adversely affect ESA-listed species. No adverse direct, indirect, or cumulative effects were identified. The Corps and NMFS have had follow up conversations to ensure that the consultation remains valid.

n. Executive Order 12898 requires consideration of whether projects would disproportionately impact minority or low-income populations. The Cowlitz Tribe is a minority population, and has gone on record opposing any action that does not include provision for fish passage at the SRS. By not fulfilling this requirement, the Corps' decision will adversely impact the Tribe and ESA-listed populations of steelhead and coho.

Corps Response: The Corps completed ESA section 7 consultations with the NMFS and received a Letter of Concurrence stating that the proposed action was not likely to adversely affect ESA-listed fish in the NF Toutle River. Further, the FCF was built to mitigate for impacts to fish from the installation of the original SRS. Please also see the Corps' response to Sec. 5.1.g. and 5.1.h. above.

o. The Corps has justified the proposed action by reference to the purposes and directions provided by Congress when it authorized the agency to construct and operate the SRS. The presence of extremely vulnerable populations of ESA-listed fish in the NF Toutle watershed, coupled with poor performance of the FCF, provide ample justification for the Corps to take steps to ensure the safe and effective passage of upstream migrating adult salmonids through the spillway.

Corps Response: See response to comments (g) and (h).

2. U.S. Fish and Wildlife Service, email dated March 23, 2012.

a. The public notice notes that the plunge pool and low flow channel are designed to meet fish passage criteria, yet the criteria are not explicitly described or attributed to a regulatory agency.

Corps Response: Passage criteria are for downstream passage only. The current spillway is not designed to meet upstream passage criteria at this time. The National Marine Fisheries Service Northwest Region Anadromous Salmonid Passage Facility Design manual dated February 2008 defines the design flow range for passage projects in Chapter 3, Design Flow Range. Also, Table 11-1 of the NOAA Criteria shows 12" minimum depth in a juvenile bypass pipeline for 500 cfs. We designed it such that the depth was at least 12 inches at 534 cfs (95% exceedance flow) per Section 3.2. Section 7.5.2.7 states low fish passage flow depth shall be 1.0 feet for adult steelhead. Low flow and high flow thresholds for design are the 95% exceedance and 5% exceedance respectively for the previous 25 years worth of daily flow data during the fish passage season.

b. After being conveyed to the crest of the spillway, what types of conditions (impacts) would a fish encounter as it passes down the spillway?

Corps Response: Downstream passage conditions have remained largely unchanged since the Outlet Works were closed and the N.F. Toutle flowed exclusively over the spillway. While not entirely "natural" the spillway is similar to a bedrock cascade channel. This may be an appropriate subject to evaluate as part of future volitional fish passage analysis.

c. Do the braided channels of the sediment plain inhibit fish access to the spillway? Are there any structural approaches to improving downstream access to the spillway that can be installed in anticipation of future conditions within the sediment plain?

Corps Response: Current conditions do not appear to inhibit fish access to the spillway. The new low flow channel has been designed to reduce braiding in the immediate vicinity of the SRS and provide improved passage at the spillway crest.

d. It appears that expanded floodplain on the Cowlitz River has been ruled out as a feasible long-term alternative. If a sizable sediment capture and flood hazard reduction benefit could be realized by using this alternative at a fairly discrete location (i.e., between the Lexington levee and Rocky Point), it seems premature to rule it out from further consideration.

Corps Response: This can be evaluated as part of long-term sediment management, but does not meet the immediate purpose and need to improve flood protection levels in the lower Cowlitz.

3. Washington Department of Fish and Wildlife, letter dated March 28, 2012.

a. The EA does not thoroughly present or evaluate environmental impacts from this proposal. It does not recognize long-term effects, nor does it address short-term impacts that would occur. Because habitat losses are significant, they should be addressed in an EIS that analyzes the full suite of impacts.

Corps Response: Section 4 of the EA, Environmental Consequences, has been substantively revised to include a more robust assessment of project impacts.

b. Give more consideration to other methods to manage sediment. Installing sumps upstream of the SRS could eliminate the need to raise the spillway with minimal habitat alteration. Multiple sump sites and grade-building structures could significantly avoid or lessen many impacts associated with raising the spillway, while contributing to habitat recovery.

Corps Response: Section 2.2 has been added to the EA in response to this comment.

c. Additional loss of fish and wildlife habitat or reduced fish passage efficiency must be addressed with comprehensive mitigation. Given the importance of the habitat above the SRS to wintering elk and threatened salmon, we need to participate in development of a mitigation plan.

Corps Response: The proposed 10' raise of the SRS spillway is expected to result in no change to fish passage efficiency for the waterway channels within the sediment plain upstream of the spillway. The quality and quantity of elk forage is minimal within the area to be inundated post-construction of the 10' raised spillway. The Corps will coordinate with WDFW to implement a post-construction vegetation restoration plan for affected wetlands within the inundation area. No effect to the higher quality and quantity elk forage located upstream of the original N1 debris dams is anticipated from the proposed project. Please also see the Corps' response to Sec. 5. 1. g. above.

d. The EA does not include an analysis of all other alternatives that have been considered. Other alternatives that we are aware of have been dismissed based on cost without consideration of potential ecological benefits.

Corps Response: Section 2.2 has been added to the EA in response to this comment.

e. The EA portrays the impact area as a small flat pool immediately upstream of the SRS. Raising the spillway would delay recovery in the existing SRS impact area (extends for over 4 miles upstream and covers over 3,000 acres) and lead to new impacts in areas that have not been calculated.

Corps Response: Sections 3.2 and 4.1 of the EA have been revised to further describe and assess the impact area upstream of the SRS.

f. The document does not mention the State's Mount St. Helens Wildlife Area.

Corps Response: Section 3.2 of the EA has been revised to describe the Wildlife Area.

g. WDFW recently accepted ownership of most of the sediment retention area and surrounding lands as part of the Wildlife Area. There is the beginning of gradual recovery within the sediment plain as vegetation starts to take hold. The current proposal will stall this recovery for an undetermined period.

Corps Response: Section 4.2 of the EA was revised in response to this comment. The sediment plain tends to stabilize during the drier summer months and allows for temporary establishment of early successional plants. Due to the shifting channels these vegetated sand bars are frequently eroded and the vegetation lost during high flows, and then reestablished once flows subside. There is a constantly shifting mosaic of early successional vegetation that comes and goes depending on the season and associated precipitation levels.

h. The spillway raise will extend the impact of the SRS in terms of both surface area and time. This is a high use area of both summer and winter range for elk. Elk already suffer from poor summer diets and winter stress; additional habitat lost or increased disturbance will exacerbate these problems. Both hunters and non-consumptive recreation will suffer. WDFW is reducing the herd's numbers and this further loss of habitat may necessitate further reductions and loss of recreational opportunity.

Corps Response: Please see the Corps' response to Sec. 5.3.c. above.

i. WDFW is developing a Steelhead Watershed Management Plan for the Toutle Basin and will be proposing that the NF Toutle population be identified as a wild steelhead gene bank, which will eliminate the release of hatchery winter steelhead in the NF Toutle. Because of the existing truck and haul system for upstream SRS passage, all of these fish currently spawn and rear in Alder and Hoffstadt creeks. Impacts to Alder and Hoffstadt Creeks needs further analysis and consideration as it has the potential to preclude recovery of listed fish in this watershed.

Corps Response: Sections 3.1, 3.2, 4.1 and 4.2 of the EA have been revised. With the proposed project, a pool of approximately 300 acres is expected to form directly upstream of the SRS and only would include the branches of Pullen Creek, located less than 1 mile upstream of the SRS. Modeling shows that no additional sediment accumulation would occur up Deer, Alder, and Hoffstadt creeks, and their surface connections to the NF Toutle would continue.

j. The EA should provide an analysis of the fish passage engineering that would be required with initial spillway raise and future raises the Corps is planning. This analysis should include discussion of potential mitigation for future impacts to volitional upstream fish passage.

Corps Response: Section 4.2 was revised to include a discussion of future volitional fish passage. Section 4.5 states that a potential long-term measure may consider a further increase in the height of the SRS spillway, but is speculative at this time.

k. The disturbed nature of the soil on the sediment plain presents a prime opportunity for noxious weeds to establish and flourish. Raising the spillway will enlarge the footprint of weed prone areas and lengthen the period of time when areas will remain unvegetated due to ongoing disturbance. The proposal should include a long-term strategy and funding for control and revegetation efforts to offset the impacts of the spillway raise.

Corps Response: Most of the sediment plain is subject to frequent disturbance of from the shifting channels of the N.F. Toutle and tributaries. These areas will not likely be subject to prolonged vegetative establishment (as described in Section 3 of the revised EA). The up to 10-foot spillway raise does not increase the footprint beyond that envisioned in the 1985 Decision Document. Finally, sediment accumulation is occurring on the sediment plain and will continue for decades to come, maintaining the conditions that exist currently. The impacts of the up to 10-foot spillway raise are consistent with that anticipated at the time of the 1985 Decision Document.

l. Purpose and Need for Action: WDFW does not take issue with the need for flood protection along the lower Cowlitz. The spillway raise option would cause permanent impacts when other interim measures are available during long-term sediment plan development. Rather than supporting a short-term solution with permanent impacts, WDFW would prefer to avoid permanent impacts until the long-term plan is complete.

Corps Response: The Corps is required to assure flood damage reduction benefits to the communities on the lower Cowlitz River, through 2035. Sections 1.1, 3.1, and 4.1 have been updated to better reflect the purpose and need, affected environment, and environmental consequences associated with the spillway raise. The Corps will continue to work with WDFW on long-term sediment management in the Toutle/Cowlitz Rivers.

m. Project Area Description: The EA generally portrays the sediment retention area as a wasteland. Plant communities within its boundaries have begun to recover naturally. At least two wetlands with high quality plant communities exist within the limits of the flat pool that would result from the spillway raise. Other areas with developing plant communities exist further upstream in areas where additional sediments would accumulate because of the raised spillway.

Corps Response: Sections 4.1 and 4.2 of the EA have been revised in response to this comment.

n. Proposed Action: The proposed action indicates that there will be a low flow channel/plunge pool excavated in rock to maintain and improve downstream fish passage. This is contrary to the statements made in the public notice and without supporting documentation regarding impacts to fish from high velocities, turbulence, fish abrasion and disorientation. It is also stated that the proposed action will not preclude future potential for volitional fish passage, however as modifications are made to existing structure, design options for volitional fish passage may become more limited.

Corps Response: The Corps has consulted with the National Marine Fisheries Service, who has determined that the proposed project is not likely to adversely affect endangered salmonids. While the proposed 10' SRS spillway raise does not include volitional fish passage, future opportunities are not precluded and are being considered as part of the long-term plan for the Mount Saint Helens project. Please also see the revised EA Section 4.2.1., final paragraph of that section.

o. Post-Construction Conditions: The description only seems to address the 294.5-acre flat pool that would immediately result from the spillway raise. The existing SRS continues to accumulate sediments deposition gradually builds a slope upstream. We assume that since this slope will now start from a higher point that an equal slope will begin to develop again at a higher elevation for several miles upstream. Documents from the 1980s depicted sediment slope limits on the landscape. These limits need to be revised and presented as the actual impact area of this project.

Corps Response: Sections 3.2 and 4.1 of the EA have been revised to further describe and assess the impact area upstream of the SRS.

p. We have seen depictions in recent meetings with the Corps that show long-term deposition as a result of this proposal extending well upstream of the N-l structure. Long-term sediment deposition may cause impacts outside of Corps existing easements. This long-term impact may cause the river channel upstream to become unstable leading to upstream erosion or avulsion, which could result in serious habitat and recreational impacts. Impacts could include elimination of connectivity with tributaries and NF Toutle for both juvenile and adult fish. Additional forest, wetlands and other

habitat adjacent to the sediment slope limits will be lost or impacted as a result. The EA is deficient in that it does not mention or evaluate these effects of the project.

Corps Response: Sections 3.1, 3.2, 3.4, 4.1 and 4.2 of the EA have been revised. The greatest depth of water inundation and sediment accumulation during the first year post-construction is anticipated to be concentrated within the area between the SRS and approximately 1 mile upstream of the SRS. This area is well within the Corps easement boundary and is not anticipated to affect any public or private land outside of the Corps easement boundary. Modeling shows that no additional sediment accumulation would occur up Deer, Alder, and Hoffstadt creeks, and their surface connections to the NF Toutle would continue.

q. Biological Resources: This section does not describe areas that eventually would be impacted by the proposed project. Such areas lie between the existing sediment slope limits and the new slope limits resulting from the elevated spillway. These areas include conifer and hardwood forest, old fields, tributary riparian habitat and wetlands plus tributary fish rearing and spawning habitat.

Corps Response: See response to comment (p).

r. Cultural and Historic Resources: Because the project will affect lands owned by WDFW, we believe that it is important to point out that some features associated with old homesteads and residences may warrant revisiting. These features may include orchards, old fields, dumps etc, found on the north side of the retention area and near Alder Creek.

Corps Response: Section 4.3 has been revised to further describe and assess the impact area upstream of the SRS.

s. Socio-economic Resources: Sediment retention areas and surrounding lands lie within a State Wildlife Area. Since WDFW recently acquired this site, we expect recreation to increase over time. Increased sediment retention has the potential to impact this projected recreational use and this impact should be evaluated in the EA.

Corps Response: Section 4.4 of the EA has been revised. Access to the SRS would be closed during construction but access to the trailhead and overlook trail would remain open. Following construction, all access would be open. Thus, recreation in the vicinity of the project would only be temporarily affected only during the period of construction. The greatest depth of water inundation and sediment accumulation during the first year post-construction is anticipated to be concentrated within the area between the SRS and approximately 1 mile upstream of the SRS. This area is well within the Corps easement boundary and is not anticipated to affect any public or private land outside of the Corps easement boundary.

t. Proposed Action: If this project is constructed, excavated rock should be placed in an area that is currently unvegetated to avoid, albeit small, losses of critical winter range forage habitat for ungulates and other species. We recommend using sediments removed to facilitate construction to create areas where habitat can recover more quickly.

Corps Response: All stockpile areas will be revegetated following construction to restore forage for elk and other wildlife species.

u. Biological Resources: Additional permanent losses of terrestrial and in-stream habitats will result and the EA does not quantify or describe these effects. WDFW requests more thorough evaluation of

the acreage or stream miles affected beyond the impacts of the existing SRS: (1) stream length affected by long-term sediment deposition and potential backwatering of stream channels; (2) surface area of wetlands that will be either flooded or have sediment accumulate; (3) surface area of terrestrial habitats that sediment deposition will impact; (4) total surface area within existing sediment plain footprint where long-term accretion of sediments will set back recovery of vegetation; and (5) amount by which surface area of the sediment plain will increase, which may eliminate salmon and steelhead access to and habitat in important tributaries.

Corps Response: See response to comment (p).

v. The impacts described above (v) will result in significant losses of ESA listed fish resources, negatively impact one of Washington's most critical elk wintering areas, and significantly alter habitat for numerous species of migratory birds and resident wildlife. Because these losses are significant, they should be addressed in the form of an EIS or by implementing other alternatives to manage sediment that may actually help to improve habitat within the project area.

Corps Response: Section 4 of the EA has been substantively revised to include a more robust assessment of project impacts.

w. Socio-economic Resources: Raising the spillway will increase the impact of sediment deposition in terms of both surface area and the time required for vegetative recovery. These impacts to the landscape will also impact fish and wildlife based recreation and social and economic benefits associated with this recreation. Without the project, we would expect this type of recreation to increase and benefit local communities. If the project is implemented, these social and economic benefits will be impacted, or at a minimum be delayed.

Corps Response: See response to comment (s).

x. Cumulative Effects: The proposed project will set back vegetative recovery and efforts to boost it for an undetermined period over an area perhaps exceeding 3,000 acres. This section of the EA does not recognize the benefits these efforts might have or that the spillway raise would impact them. The EA states, "It is anticipated that near-term work will focus on actions to sustain and improve access to the tributary habitat above the SRS." WDFW believes that the action of increasing the elevation of the sediment plain will have an opposite effect. The EA should include actions that would result in improved access to tributary habitat to support the statement in the EA. As modifications are made to existing structure, design options for volitional fish passage will become more limited. Future incremental raises of the spillway will need to be staged and constructed so as not to cause additional cumulative impacts. Any additional impacts from future raises would require additional mitigation.

Corps Response: Section 3 of the EA has been substantively revised to include a discussion of WDFW's efforts to increase the quantity and quality of elk forage upstream of the SRS. Please also see the Corps' response to Sec. 5. 1. g. above.

y. Clean Air Act: Sediment deposition will cause further tree die-off, which will release sequestered carbon back into the atmosphere, thereby potentially contributing to climate change.

Corps Response: The existing approximately 16 acre immature forested wetland that is abutting the SRS is expected to become inundated post-construction of the 10' raised spillway. The Corps will coordinate with WDFW to implement a post-construction vegetation restoration plan for

affected wetlands within the inundation area, which will include planting of species such as alder and willow.

z. Clean Water Act: Increased water temperatures and turbidity problems are expected in areas where sediment deposition causes additional stream backwatering and subsequent vegetation die-off due to persistent flooding.

Corps Response: Section 4.2 of the EA has been revised in response to this comment.

aa. Magnuson-Stevens Fishery Conservation and Management Act: The EA states, *"Long-term benefits from project implementation should conserve and improve EFH."* WDFW does not agree with this statement. Losses off fish habitat upstream of the SRS will occur over time as a result of raising the spillway. Downstream impacts are also conceivable, caused by a longer-term reduction in spawning gravel recruitment and fine sediment transport during low flow periods.

Corps Response: The sentence has been removed from the EA.

bb. Fish and Wildlife Coordination Act: While WDFW has been in contact with the Corps for some time regarding the SRS, we do not believe that the Corps has given adequate consideration to the concerns we have expressed.

Corps Response: The State of Washington is the non-federal sponsor for the project. As such, the Corps will continue to work with the State, through the appropriate departments to ensure that agency concerns are addressed and met. Much of the EA has been revised to address many of the concerns identified by the WDFW.

cc. Migratory Bird Treaty Act: Significant numbers of waterfowl use the developing marsh area of the existing sediment pool. WDFW designates the sediment pool as a waterfowl concentration area in our Priority Habitats and Species maps. Changes to water levels and sedimentation patterns could impact waterfowl use of the sediment pool. Additional losses of forest habitat and wetlands further upstream will also impact migratory birds.

Corps Response: Section 4 of the EA has been substantively revised in response to this and similar comments.

dd. Floodplain Management: The EA references three alternatives, but does not list other alternatives we know staff considered such as sumps and grade building structures. Use of options such as these would significantly avoid or lessen many of the impacts described above and have the potential to contribute to and accelerate recovery of habitat. Filling the floodplain via increased sediment deposition upstream of the SRS would cover an area of over 3,000 acres. Filling the floodplain would directly impact existing habitat and create an increased risk of flood damage further upstream. Increased flooding upstream would impact important habitats by flattening the river's slope and making it more prone to shift or avulse. Figures presented to WDFW during meetings suggest that the long-term deposition may occur outside of the Corps existing easements and could potentially affect privately owned lands along Hoffstadt Creek.

Corps Response: This project will not result in any additional impacts to areas outside of the sediment plain boundary as identified in the 1985 EIS and Decision Document. Changes have been made to Sections 3 and 4 of the draft EA to better describe current conditions and environmental consequences of the action.

ee. Protection of Wetlands: Vegetated wetlands have formed immediately upstream of the SRS spillway and occur along the current upstream base of the SRS. These areas cover at least 50 acres that is within the pool area illustrated in Figure 7. Raising the spillway would cause the level of sediment to rise above elevations that would be reached with the existing spillway crest. A rising level of sediment would impact these and other wetlands up to 5 miles upstream of the SRS structure.

Corps Response: Sections 3.2, 4.1 and 4.2 of the EA have been revised to reflect possible impacts to wetlands from the proposed project.

ff. Draft FONSI: The EA does not list all important considerations of the proposed project and their environmental impacts and fails to adequately address the long-term effects that would result.

Corps Response: Section 4 of the EA, Environmental Consequences, has been substantively revised to include a more robust assessment of project impacts.

4. Lower Columbia Fish Recovery Board, letter dated March 27, 2012.

a. The physical and biological resources potentially affected in the Toutle and Cowlitz rivers are not adequately discussed and considered. The EA does not adequately assess the potential impacts of the preferred alternative on the physical environment and ESA-listed salmon, steelhead, and eulachon.

Corps Response: Sections 3 and 4 of the EA have been substantively revised to include a more robust assessment of project impacts.

b. The EA considers only one option for near-term sediment control despite that the Corps is actively considering a number of sediment management approaches. The relationship between the proposed action and others being considered in the long-term sediment management plan is not explained.

Corps Response: Section 2.2 has been added to the EA in response to this and similar comments.

c. The EA fails to adequately describe the severity and urgency of flood risks associated with sediment deposition or establish why the preferred alternative is the best option for addressing those risks. The Corps has not explained an immediate, compelling need for the proposed action to be implemented in 2012. The EA does not acknowledge that the spillway raise project is a temporary solution.

Corps Response: Section 1.1, Purpose and Need for Action, has been revised in response to this and similar comments.

d. Section 3.2 does not acknowledge that eulachon are ESA-listed as threatened and that the lower Cowlitz and Toutle rivers are designated critical habitat.

Corps Response: Section 3.2 of the EA has been revised.

e. Vegetation is beginning to take hold in the sediment plain and could eventually stabilize and concentrate flows, easing fish passage concerns and allowing unfettered access to tributary habitats. Raising the sediment plain elevation would reset the vegetative succession process and delay establishment of functional in-stream and riparian habitat.

Corps Response: Section 4.2 of the EA was revised in response to this and similar comments. With or without the proposed project, there is a constantly shifting mosaic of early successional vegetation on the sediment plain that will come and go depending on the season and associated precipitation levels.

f. The impacts to federally designated critical and essential fish habitat have been omitted.

Corps Response: Section 4.2 has been revised.

g. The extent and severity of potential impacts to fish passage, increased water temperatures, flooding and death of riparian forests, further isolation of tributary habitat, inundation of wetland habitats, and re-setting of vegetation re-colonization and succession on the sediment plain not adequately addressed.

Corps Response: Sections 4.1 and 4.2 have been revised in response to this comment.

h. The impacts to reduced connectivity and channel instability not discussed.

Corps Response: Sections 4.1 and 4.2 have been revised in response to this comment.

i. Cumulative effects section does not describe or consider impacts of the preferred alternative in relation to past or future sediment management measures. Since the impacts are not discussed, the conclusion is unsupported.

Corps Response: Section 4.5 of the EA has been revised.

j. The cumulative effects section notes that the Corps is involved in a long-term sediment management investigation that includes SRS spillway raises as an alternative. LCFRB staff questions the process of pulling an alternative from another planning process for implementation under a separate EA without considering other alternatives. Given the short-term benefit (but permanent impacts) of the proposed spillway raise and nearing completion of the draft sediment management plan, the EA should make a compelling case that increased flood protection is immediately necessary and that the spillway raise is the only feasible alternative to meet flood protection needs.

Corps Response: The Corps has revised the Purpose and Need Section (Section 1.1) to better reflect the pressing need for completion of this project.

k. A more thorough vetting of possible alternatives and a comprehensive evaluation of the environmental impacts is needed. To this end, the Corps should consider completing a full EIS rather than an EA for this action.

Corps Response: Section 2.2 has been added to the EA. Section 4 of the EA, Environmental Consequences, has been substantively revised to include a more robust assessment of project impacts.

5. Toutle Valley Community Association, letter dated March 19, 2012.

a. The Corps bares a retroactive obligation for past projects and should provide mitigation funding to compensate for the loss caused by the sediment dam and the proposed project to raise the spillway.

Corps Response: The Corps does recognize that the eruption of Mount St. Helens and the construction of the SRS has dramatically altered the basin conditions. Many of the impacts were

considered and assessed in the mid-1980s EIS and associated Decision Documents. The original work and any future work the Corps completes is under a cooperative agreement with the State of Washington; and under that agreement the State is responsible for all real estate easement and access requirements. This proposed action results in sedimentation within the current sediment deposition zone..

b. The sediment dam blocks access to the Wildlife Area and state DNR land by flooding old SR 504 and county roads. The public has no legal access to the Wildlife Area (7,000 acres) and the Toutle DNR Forest (35,000 acres). The Corps should provide funding for alternate routes to the Wildlife Area and the DNR Forest for the public.

Corps Response: The State of Washington, as the non-Federal sponsor for the MSH Project, and land owner of the wildlife area, is the appropriate entity to resolve public access issues. Also, see response to comment 5(a) above.

c. The Corps should ensure protection of existing cultural features, such as existing homes buried by the eruption, to compensate for sites buried under the sediment plain.

Corps Response: Please see revised section 4.3 in the revised draft EA.

d. The Corps should help purchase and protect shorelines along the Toutle/Green River system for public access and recreation to compensate for a loss of the upper Toutle. These shoreline areas could also serve as reserve places for dredge spoils, if needed.

Corps Response: Under the existing Cooperative Agreement, the State is responsible for all real estate easement and access requirements. This proposed action results in sedimentation within the current sediment deposition zone, therefore cultural resources such as buried homes within the sediment deposition zone will remain buried, with or without this action. Also, Section 4.3 has been revised to address this and similar comments.

e. Traditional migration routes for salmon, steelhead, and trout were blocked. It's time to re-establish them.

Corps Response: Providing volitional upstream fish passage is an action beyond the scope of what is proposed. Congress has appropriated the funds to reduce flood risks to the lower Cowlitz River communities. However, this action does not preclude reestablishment of volitional upstream fish passage at some point in the future.

f. The EA is inadequate in its discussions of environmental consequences. The EA outlines the impacts of the spillway raise, but only looks at construction and the footprint of the actual spillway, completely ignoring the effects of the new impoundment area. Stockpile areas #3-7 and surrounding open hillside provide elk winter range. After construction, the stockpile areas should be smoothed out and planted with forage.

Corps Response: Section 4 of the EA, Environmental Consequences, has been substantively revised to include a more robust assessment of project impacts. All stockpile areas will be revegetated following construction to restore forage for elk and other wildlife species.

g. The EA does not recognize the significant impact on habitat the new impoundment will have on migratory birds. In winter, the braided river and sediment plain area are used by hundreds of geese

and ducks. The ponds created by the backed up waterways are prime habitat for waterfowl and other birds. Eagles nest and winter in the area. The WDFW has this concentration of waterfowl on their Priority Habitat and Species maps, along with the eagle sites. At least one colony of purple martin, a state species of concern, lives in the dead trees killed by the sediment. A survey should be undertaken to see if more colonies exist in the future impoundment area.

Corps Response: Section 4 of the EA has been revised in response to this and similar comments.

h. The EA needs a detailed map or aerial photo that shows the extent of the area to be flooded before and after the project. The vegetated area and wetlands to be flooded should be calculated separately. Only then can the real impact on habitat be delineated and mitigated.

Corps Response: The requested information has been added to Sections 4.1 and 4.2 of the EA in response to this and similar comments.

i. Wildlife viewing, hiking, and waterfowl hunting will be disrupted as the new impoundment floods these prime wildlife areas. Need to develop a plan for public access and recreation for the entire SRS property, but especially during construction. Should acquire/develop public access to landlocked wildlife area, using eminent domain if needed.

Corps Response: Section 4.4 of the EA has been revised. Access to the SRS would be closed during construction but access to the trailhead and overlook trail would remain open. Following construction, all access would be open. Thus, recreation in the vicinity of the project would only be temporarily affected only during the period of construction. The greatest depth of water inundation and sediment accumulation during the first year post-construction is anticipated to be concentrated within the area between the SRS and approximately 1 mile upstream of the SRS. This area is well within the Corps easement boundary and is not anticipated to affect any public or private land outside of the Corps easement boundary.

j. A goal of the spillway project should be to make the spillway itself navigable by fish. Fish routes through the braided portion of the sediment plain need to be established. Loss of fishery and fishing access should be compensated by providing additional access in the Toutle/Green River system.

Corps Response: Section 3.1., fourth paragraph, of the revised EA has been substantively revised to include a more robust discussion of the condition of waterways within the Toutle subbasin.
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k. Mitigate for all sediment management impacts (dredging, SRS, etc) by protecting remaining undeveloped shorelines within the Toutle and Cowlitz system and develop plan to offset losses to recreation and fish and wildlife habitat.

Corps Response: See response to comment 5(d) above.

6. Lower Columbia Regional Fisheries Enhancement Group, letter dated March 27, 2012.

a. The EA is not sufficiently comprehensive to determine project impacts on ESA-listed fish or elk that use the area above the SRS. Volitional fish passage is required for continued existence of anadromous fish, and a stable floodplain is necessary to provide elk wintering habitat.

Corps Response: Section 4 of the EA, Environmental Consequences, has been substantively revised to include a more robust assessment of project impacts. Sections 3.2 and 4.2 of the EA

have been revised to better reflect fishery and elk resources in the project area and anticipated project impacts to these resources.

b. Increasing the elevation of the SRS may result in loss of critical tributary access for ESA-listed species and loss of elk refuge habitat due to increased deposition of sediments.

Corps Response: Section 4.1 of the EA has been revised to reflect results of sediment modeling of the proposed project showing that tributaries upstream of the SRS (other than branches of Pullen Creek) will maintain surface connections with the NF Toutle River. Section 4.2 was revised to specifically reflect anticipated impacts to the elk herd.

c. Complete an EIS for the proposed project that identifies alternatives incorporating flood control with volitional fish passage, reducing input of sediment from eroding stream banks and protection of critical elk wintering habitat.

Corps Response: Section 4.2 has been revised and also specifically discusses why the proposed project does not preclude volitional fish passage in the future.

7. Lower Columbia Fish Enhancement Group, Ed McMillan email dated March 7, 2012.

a. This action will not trap fine sediment and even large portions of coarse sediment because its weight is extremely light.

Corps Response: The purpose of the project is to trap medium- to course-grained sediment. Smaller-grained sediments typically do not drop out of suspension in the lower Cowlitz River; therefore they do not generally contribute to bed aggradation and associated increase in flood risk.

b. The flood plain above the dam is very unstable and will continue to provide sediment downstream unless stabilized. Allowing this instability to continue while raising the dam is not the answer. The upper watershed is slowly stabilizing naturally and the Corps could take restoration actions that would accelerate this process.

Corps Response: The sediment plain is continuing to accumulate sediment from the debris avalanche and will continue to for decades to come. It does not appear that the sediment plain is stabilizing at this point, however, the Corps is evaluating the response to the grade building structures recently constructed in the sediment plain to assist in long term planning efforts.

c. Raising the dam and trapping more sediment damages existing upstream salmon habitat and further creates a blockage to migratory salmonids. This action is in violation of ESA laws.

Corps Response: Sections 3.1, 3.2, 4.1 and 4.2 of the EA have been revised. With the proposed spillway raise, the greatest depth of water inundation and sediment accumulation during the first year post-construction is anticipated to be concentrated within the area between the SRS and approximately 1 mile upstream. Modeling shows that no additional sediment accumulation would occur up Deer, Alder, and Hoffstadt creeks, and their surface connections to the NF Toutle would continue.

d. Continuing with this plan wastes money because it cause negative impacts that cannot be reversed. There does not exist mitigation that can offset the negative impact of this proposal.

Corps Response: Please see revised Section 1.1. All impacts are within the footprint of the existing sediment plain; no greater impacts than envisioned in the 1984 EIS are expected to occur.

e. It is better to spend funding stabilizing the Lahar, improving fish passage and periodically dredging the lower river system in areas where commerce is being limited by sediment deposition.

Corps Response: The purpose of the project is to maintain reductions in flood risk for the lower Cowlitz River communities. Please see revised Section 2 (Alternatives) for more discussion.

8. Willapa Hills Audubon Society, letter dated March 27, 2012.

a. Request mitigation for lands inundated behind the proposed 10-foot raise, which will create a new impoundment area. The EA only considers the immediate construction area and footprint of the spillway. It does not consider the areas that will be newly flooded.

Corps Response: Sections 3 and 4 of the EA have been substantively revised to include a more robust assessment of project impacts.

b. The EA claims the area behind the SRS has no habitat value. In fact, the braided channels are used by hundreds of wintering waterfowl and the edges of the impound area are high quality habitats. At least one colony of purple martin, a state species of concern, lives in the dead trees killed by the sediment. In winter, the river and sediment plain are used by hundreds of geese and ducks. The ponds created by the backed up waterways are prime habitat for waterfowl and other birds. Eagles nest and winter in the area. The WDFW has this concentration of waterfowl on their Priority Habitat and Species maps, along with the eagle sites.

Corps Response: Section 4 of the EA has been revised in response to this and similar comments.

c. The EA states that the overall aesthetics will remain the same. As the impoundment grows and backs up into new lands, the aesthetics will change. The area directly behind the sediment dam has developed into prime waterfowl habitat. It is a spectacular place to view wildlife, and is a good duck hunting area. The planned inundation will affect recreational use of these areas.

Corps Response: Section 4.4 of the EA has been revised. Access to the SRS would be closed during construction but access to the trailhead and overlook trail would remain open. Following construction, all access would be open. Thus, recreation in the vicinity of the project would only be temporarily affected only during the period of construction. The greatest depth of water inundation and sediment accumulation during the first year post-construction is anticipated to be concentrated within the area between the SRS and approximately 1 mile upstream of the SRS. This area is well within the Corps easement boundary and is not anticipated to affect any public or private land outside of the Corps easement boundary.

d. The area that will flooded by the 10-foot raise has small tarns and wetland mixed in with the returning hardwoods. Despite the fact that the EA contends that “there are no wetland habitats in the project area,” in fact there are two ponds within the area that will be newly impounded.

Corps Response: Sections 4.2 and 6.12 have been revised in response to this and similar comments.

e. It is recommended that a survey be undertaken to see if more purple martin colonies exist in the future impoundment area as this is a state species of concern. There is also a need for survey data on migratory wildfowl whose habitat will be directly affected by the new impoundment.

Corps Response: Habitat for purple martins and waterfowl are not expected to seriously impacted (See revised Section 4.2).

f. It is recommended that the EA needs a detailed map or aerial photo that shows the extent of the area to be flooded before and after the project. The vegetated area and wetlands to be flooded should be calculated. Only then can the real impact on habitat be delineated and mitigated.

Corps Response: The requested information has been added to Sections 4.1 and 4.2 of the EA in response to this and similar comments.

9. Individual 1, email dated March 1, 2012.

a. Where would I find the information about streams that might be further inundated?

Corps Response: Section 4.1 of the EA has been revised to reflect results of sediment modeling of the proposed project showing that tributaries upstream of the SRS (other than branches of Pullen Creek) will not be inundated with sediment and water, and will maintain surface connections with the NF Toutle River.

10. Individual 2, email dated March 2, 2012

a. Commenter is generally upset about the existence of the SRS. Without dredging, the dam will be raised another 10 feet every few years and keep flooding and ruining wildlife habitat and recreation areas. Prefer that the Corps, “just dredge a channel and dredge the rest of the river like the Cowlitz was done years ago.”

Corps Response: Sections 1.1, 3.1 and 4.1 have been substantively revised to address this and similar comments. The Corps is also working on a long-term sediment management plan.

11. Individual 3, email dated March 13, 2012.

a. While I understand the convenience of segregating and separating "management" from "restoration work," I believe this decision has the effect of separating and segregating this inclusive work in time and space. Further it subordinates fish restoration work and delays it unacceptably. If responsible parties would agree that volitional passage is a primary objective (in addition to storing additional sediment), and that reestablishing riparian and tributary river connections is an additional objective to allow adult salmonids to reach spawning grounds, then both "components" could be integrated and accomplished together. I believe the SRS spillway modifications, adult salmon holding pool, and levee or dike extensions along each side of the sediment plain would result in significant benefits to fish and wildlife. Relatively stable and productive elk and deer habitat would be maintained and adult and juvenile upstream and downstream would be possible, maybe even improved greatly.

Corps Response: While we do not disagree with the overall sentiment in this comment, the current work is authorized and funds have been appropriated by Congress for addressing flood risks. We have taken great care in proposing an action for near-term sediment management that does not negatively impact salmon and steelhead and does not preclude future restoration actions. Congress would need to provide the necessary funding for volitional fish passage.

b. The Corps has decided that only sediment management work can be funded and conducted this summer based on 1982 SRS "emergency" funding. I believe that the Corps has the authority and the congressional authorization to accomplish ecosystem restoration work both to comply with the Clean Water Act and to fulfill more subjective or fluid responsibilities of Public Trust Doctrine etc. Would you please provide an explicit statement of the authorization for this current incremental project.

Corps Response: Section 1.3 of the EA discusses the authority for the proposed project. Also see response to comment (a).

c. I believe that to forge ahead with only the incremental 10 foot spillway raise without full integration of ecosystem restoration actions will result in unintended adverse environmental consequences and increased expense to retrofit or modify the raised spillway in the future toward accomplishment of objectives to improve river connections and improved salmon/steelhead migration (i.e., remove the barriers).

Corps Response: Section 1.3 of the EA discusses the authority for the proposed project. Also see response to comment (a).

d. In the late summer 2011 the Corps completed placement of "geotubes" and tree-trunk with root-wad sediment catching and deflecting structures on the sediment plain upstream of the SRS. Just that action had significant effects on the surroundings and the nearby resident and transient flora and fauna. It seems that an EIS is that now under "emergency funding" and original "emergency" authorization that only sediment management work can be done and that the creation of a "temporary" lake that will rapidly fill with sediment will have no significant impact to anything. This is an untenable position, or at best a polite fiction.

Corps Response: Section 1.1 of the revised draft EA discusses the purpose and need of the project and section 1.3 of the EA discusses the authority for the proposed project. Section 3 and 4 have also been revised to better describe the affected area and potential environmental consequences.

e. The full range of chemical, physical, biological and environmental-organism-population impacts of this project should be disclosed. For example, the flooding of well established shorelines and tributary valleys will significantly reduce the area vegetation that is grazed and used for food, shelter and basic habitat for deer and elk. This anticipated dislocation will result in increased mortality by the combination of winter starvation, hoof rot and mange, etc.

Corps Response: Section 4 of the EA has been revised to address this and similar comments.

f. The Corps has a responsibility to evaluate the full range of impacts of the larger SRS project dating from the early 1980s, as well as the incremental and cumulative impacts of each iteration or "mini" project.

Corps Response: The 1984 EIS anticipated a broad range of impacts and the current proposed spillway raise dos not expand the overall project footprint nor result in additional impacts beyond those expected and described in that document. Section 4 of the EA, Environmental Consequences, has been revised to include a more robust assessment of spillway raise project impacts.

12. Individual 4, letter dated March 23, 2012.

a. Do a complete assessment of project impacts to the watershed.

Corps Response: Section 4 of the EA, Environmental Consequences, has been substantively revised to include a more robust assessment of project impacts.

b. Concerned about project impacts to ESA-listed fish (coho, steelhead, Chinook and smelt).

Corps Response: Sections 3.2 and 4.2 of the EA have been revised to better reflect fishery resources in the project area and project impacts to ESA-listed fish species.

c. Keeping the tributaries to the NF Toutle connected to the river, where the majority of the spawning habitat for salmon and steelhead is available, is critical.

Corps Response: Section 4.1 of the EA has been revised to reflect results of sediment modeling of the proposed project showing that tributaries upstream of the SRS (other than branches of Pullen Creek) will maintain surface connections with the NF Toutle River.

d. The EA is not comprehensive enough; should do an EIS that identifies an alternative incorporating flood control with volitional fish passage.

Corps Response: Section 2.2 was added to the EA. Section 4.2 has been revised to specifically discuss why the proposed project does not preclude volitional fish passage in the future.

13. Individual 5, letter dated March 27, 2012.

a. Do a complete assessment of project impacts to the watershed.

Corps Response: Section 4 of the EA, Environmental Consequences, has been revised to include a more robust assessment of project impacts.

b. Concerned about project impacts to ESA-listed fish (coho, steelhead, Chinook and smelt).

Corps Response: Sections 3.2 and 4.2 of the EA have been revised to better reflect fishery resources in the project area and project impacts to ESA-listed fish species.

c. Keeping the tributaries to the NF Toutle connected to the river, where the majority of the spawning habitat for salmon and steelhead is available, is critical.

Corps Response: Section 4.1 of the EA has been revised to reflect results of sediment modeling of the proposed project showing that tributaries upstream of the SRS (other than branches of Pullen Creek) will maintain surface connections with the NF Toutle River.

d. The EA is not comprehensive enough; should do an EIS that identifies an alternative incorporating flood control with volitional fish passage.

Corps Response: Section 2.2 was added to the EA. Section 4.2 has been revised to specifically discuss why the proposed project does not preclude volitional fish passage in the future.

14. Individual 6, letter dated March 27, 2012.

a. The NF Toutle River always was turbid during and after high water events or snow melt-off. The magic of this river was the tributaries and the ability of fish to migrate into and out of these tributaries, including Hoffstadt, Alder and Deer creeks that now discharge into the sediment plain upstream of the

SRS. There is a need to work on making the existing spillway navigable for anadromous fish and to ensure connectivity for these fish with creeks like Hoffstadt, Alder and Deer.

Corps Response: Sections 3.1, 3.2, 3.4, 4.1 and 4.2 of the EA have been revised. The greatest depth of water inundation and sediment accumulation during the first year post-construction is anticipated to be concentrated within the area between the SRS and approximately 1 mile upstream of the SRS. This area is well within the Corps easement boundary. Modeling shows that no additional sediment accumulation would occur up Deer, Alder, and Hoffstadt creeks, and their surface connections to the NF Toutle would continue. Section 4.2 also was revised to specifically discuss why the proposed project does not preclude volitional fish passage in the future.

b. Mt. St. Helens will discharge large amounts of sediment for many years, even as it had before 1980. The proposed higher spillway will result in only a few years of sediment collection and have huge impacts on rebuilding potential wild fish populations. We should be working with the existing spillway and sediment plain to fix damage already done to wild fish migration.

Corps Response: Keeping the sediment from going down to the FCF and Cowlitz River prevents further degradation to downstream fish habitat as well as providing flood risk protection. While the proposed 10' SRS spillway raise does not include volitional fish passage, future opportunities are not precluded and are being considered as part of the long-term plan for the Mount Saint Helens project. See also the Corps' response to Section 5.1.h. below.

15. Individual 7, letter dated March 28, 2012.

a. Due to the complexity of the issue, an EIS is warranted for this project. The EA provides little to no consideration regarding the impacts to ESA-listed fish species. Providing a long term solution for the flooding downstream is important. An ElS should be completed for the proposed project that thoroughly addresses and mitigates for impacts to ESA-listed species.

Corps Response: Section 4 of the EA, Environmental Consequences, has been revised to include a more robust assessment of project impacts

16. Individual 8, email dated March 27, 2012.

a. The Corps should improve public access to the area affected by the SRS (e.g. build trails, picnic areas, Toutle River access).

Corps Response: The State of Washington, as the non-Federal sponsor for the MSH Project, and land owner of the wildlife area, is the appropriate entity to resolve public access issues. Also, see response to comment 5(b) above.

17. Individual 9, letter dated March 27, 2012.

a. An EIS should be completed to evaluate impacts at a watershed scale through and include alternatives for volitional fish passage (eliminate the current trucking of fish).

Corps Response: Section 4 of the EA, Environmental Consequences, has been substantively revised to include a more robust assessment of project impacts. Section 4.2 was revised to specifically discuss why the proposed project does not preclude volitional fish passage in the future.

b. Concerned that the 10-foot spillway raise will lead to additional efforts to raise the spillway up to 30 feet and will eliminate opportunities for other alternatives in long-term planning.

Corps Response: The proposed project will modify the spillway up to 10 feet, not 30 feet. The Corps is in the process of evaluating a range of potential long-term measures for sediment management. Once the evaluation is completed, the environmental impacts of these potential long-term measures will be analyzed and vetted with the public through the NEPA process.

c. Concerned that the impoundment of sediment in the North Fork Toutle Valley is in conflict with the intentions of Congress when they created the Mount St. Helens Volcanic National Monument to protect, preserve and study the natural recovery of the area for future generations.

Corps Response: The sediment infill caused by the proposed project is within the sediment deposition boundary of the original SRS, which was identified and documented in the Corps 1984 EIS. The SRS/proposed project are not located in the Mount St. Helens Volcanic National Monument area.

d. Concerned about how this could affect my property, will it create back up of water and or sediment on my property or water run off streams. How will it affect our horse and hiking trails on WDFW land that we have current contracts to use and maintain.

Corps Response: Through the 1984 EIS process, the sediment deposition boundary upstream of the SRS was determined. An easement for the purposes of sediment infill in this zone was established at that time, and it was recognized to be needed through 2035. Sediment infill in this reach above the SRS will continue to occur with or without the proposed spillway raise project.

18. Individual 10, letter dated March 13, 2012.

a. Raising a dam by 10 vertical feet is a very significant project that clearly requires a thorough review, analysis of alternatives and public scrutiny. This can only be achieved by vetting this project though a peer reviewed and public scrutinized EIS. What we have is a drastically scaled down EA followed by an even more unacceptable FONSI. If this were a private project, the Corps would require the applicant to spend hundreds of thousands of dollars, spend several years in a complex permitting process and require mitigation for ALL impacts to the physical and biological environment.

Corps Response: Section 4 of the EA, Environmental Consequences, has been substantively revised to include a more robust assessment of project impacts.

b. An updated project purpose and need backed up with current sediment budget data (completed by an independent third party not influenced by the Corps) that clearly shows that the diked communities of Castle Rock, Lexington, Kelso and Longview are in immediate threat of flooding by the increased amount of silt in the Cowlitz River.

Corps Response: Section 1.1, Purpose and Need for Action, has been revised to address this and other similar comments.

c. The project clearly requires an Individual Permit under Section 404 of the CWA due to the large amount of wetland acreage that will be permanently impacted by raising the spillway 10 feet. This will result in the deposition of sediment in excess of 3 miles east (upstream) of the SRS. A comprehensive wetland delineation and stream mapping effort including, at a minimum, 3 miles upstream of the SRS. Once the extent of jurisdictional waters (wetlands and streams) have been identified, mapped, rated, and typed a complete alternatives analysis must be conducted. As part of

the Section 404 process an updated cultural resource survey, biological evaluation, alternatives analysis, and mitigation plan must be written, reviewed, and submitted for public comment.

Corps Response: Sections 3.2, 4.1 and 4.2 of the EA have been revised to reflect possible impacts to wetlands from the proposed project. The sediment infill caused by the proposed spillway raise is within the sediment deposition boundary of the original SRS, which was identified and documented in the Corps 1984 EIS. An easement for the purposes of sediment infill in this zone was established at that time, and it was recognized to be needed through 2035. Sediment infill in this reach above the SRS will continue to occur with or without the proposed spillway raise project. With the project, the greatest depth of water inundation and sediment accumulation during the first year post-construction is anticipated to be concentrated within the area between the SRS and approximately 1 mile upstream of the SRS.

d. Upstream and downstream fish passage must be improved as long as there is a feasible method to allow fish passage. Given that a functioning spillway is present, it is absolutely feasible and required to make this structure passable to upstream and downstream migrating fish. Making the spillway fish passable is the very first and legally required project BEFORE the SRS structure can be raised.

Corps Response: Section 4.2 was revised to include a discussion of future volitional fish passage. The proposed spillway raise up to 10 feet does not preclude future efforts to provide fish passage through the SRS spillway. The proposed spillway raise has been specifically designed to enhance downstream fish passage and provide for future upstream fish passage if found desirable in the future. There is no increase height to the overall slope of the existing SRS spillway. The Corps is aware of the interest in potentially having volitional fish passage at the SRS, and the design of the proposed spillway raise reflects that.

e. The off-site source of aggregate for the RCC must be identified, a mining permit verified, impacts to traffic analyzed and mitigation measures implemented as needed.

Corps Response: The Corps does not specify where contractors obtain aggregate. However, commercial providers are subject to applicable Federal, State, and local laws and permit requirements. It is anticipated that no more than 50 trucks per day during construction of the RCC structure will be necessary. The current volume of traffic in this area is low, so no serious disruption to local traffic patterns are expected.

f. Does the Corps have a valid water right to utilize groundwater from the NF Toutle aquifer for water for the RCC? If not, a water right must be obtained from Washington Department of Ecology.

Corps Response: The SRS authorization allows us as a matter of federal law to withdraw the water we need to construct the project, without state water rights. It's called federal reserved rights.

g. Issue #6 - Section 2.1.5, second sentence states that the Corps will not specify the river diversion method to be used by the contractor, but will provide performance based requirements. The diversion method must be stated, reviewed, provided for public comment and become a condition of the permit. Leaving this up to the contractor is not prudent project management.

Corps Response: The Corps will require our contractor to meet the general and regional requirements of NWP 31 and 33 and any requirements from the Department of Ecology pursuant to the water quality certification.

h. Figure 7 shows only a limited area flooded from 0-10 feet. A thorough land survey must be completed to identify the lateral and upper extents of expected sediment deposition such that an honest evaluation of impacted areas can be made. Impacted areas will include jurisdictional wetlands, streams and forested upland habitats. Impacts to these critical areas must be quantified and mitigated under local, state and federal regulations.

Corps Response: Sections 3 (Affected Environment) and 4 (Environmental Consequences), including Figures 12, 13, and 14 have been updated in the revised draft EA.

i. Section 3, paragraph 1 states that physical, biological and human environment were identified in past documents from 1984, 1983 and 1985. Using documents that are more than 25 years old to base the affected environment discussion is unacceptable. A comprehensive EIS is required for a project that raises an existing dam by 10 feet resulting in permanent impacts to wetlands, streams, ESA species, etc. Anything less than a peer reviewed EIS, public comment, and mitigation for impacts clearly does not follow the legal intent of NEPA.

Corps Response: An EA is the appropriate means to determine whether an EIS is necessary, however, the proposed action does not result in additional environmental impacts beyond those identified in the 1984 EIS. Further, Sections 3 (Affected Environment) and Section 4 (Environmental Consequences) have been substantively revised to provide a more robust analysis of proposed project.

j. Section 3.1 states that the sediment plain located upstream of the SRS is wide and sparsely vegetated with braided , shifting channels. This statement is not true and downplays the true functions and values of the habitat located upstream of the SRS. Many areas of the sediment plain are indeed sparsely vegetated but a simple walk in the area clearly leads to the conclusion that a large portion of the area is vegetated with grass, shrub and trees species. This is tremendous habitat that needs to be protected or mitigated if unavoidable impacts are encountered.

Corps Response: The EA has been revised to more accurately reflect the vegetation resources on the sediment plain.

k. Section 3.2 is a misrepresentation of the biological resources the area upstream of the SRS provides. By raising the SRS by 10 feet, sediment will be deposited for more than 3 miles upstream of the SRS filling jurisdictional wetlands, filling Type N, F, and S streams, and destroying functional upland habitat for many native species. The FCF located 1.3 miles downstream of the SRS has been a failure and underfunded. The FCF cannot be considered mitigation for past impacts to aquatic life and certainly cannot be used as mitigation for raising the SRS by 10 feet. Nor can the FCF be mitigation for impacts to jurisdictional wetlands. This project must go through a comprehensive EIS process to sort out true impacts to the human and natural environment while mitigating for unavoidable impacts.

Corps Response: Sections 3 (Affected Environment) and 4 (Environmental Consequences) have been updated in the revised draft EA. The WDFW is responsible for the operation and maintenance of the FCF.

l. Section 3.3: By flooding at least 3 miles upstream of the SRS including all of the side streams there will certainly be potential impacts to cultural and historic resources. Once the Corps has done a proper job identifying the extent of impacts, a new cultural resources survey must be completed on the areas left out of the EA. Based on my experience having been born and raised in the Toutle Valley, there

are many more cultural sites than the Corps would like to believe and this project will no doubt bury some of those sites in sediment.

Corps Response: Effects from the spillway raise will occur entirely within the footprint identified in the 1984 EIS. Further, section 4.3 has been revised to address this issue.

m. Section 4.5 Cumulative Effects: Basically, the conclusion of this section is that there have been cumulative effects but don't worry we (Corps) will mitigate for those impacts at a later date and at a level that has not yet been determined. It is simply not legal under a NEPA process to defer mitigation to a future undetermined date and a level not yet determined. Kicking mitigation down the road is not acceptable and is illegal.

Corps Response: The Corps mitigated effects of the SRS with such actions as constructing the FCF and providing funds for restoration and research. The effects of the spillway raise fall entirely within the footprint identified in the 1984 EIS. Further, section 1.1 (Purpose and Need) and Section 1.3 (Authority) and Section 6 (Cumulative Effects) discuss how this projects is related to the original SRS Decision Documents.

n. The last sentence of Section 4.5 states, "The potential cumulative effects associated with the proposed action were evaluated with respect to each of the resource evaluation categories in this EA, and no cumulatively significant, adverse effects were identified." First of all, the EA does not address major impacts to ESA listed fish, jurisdictional wetlands, waters of the state or upland habitats, to name a few. Based on the damage done to these resources from past SRS activities the Corps cannot possibly think we believe there are no significant, adverse cumulative effects. Nothing less than a comprehensive EIS is required for the large amount of impact this project brings.

Corps Response: The effects of the spillway raise fall entirely within the footprint identified in the 1984 EIS. Further, section 1.1 (Purpose and Need) and Section 1.3 (Authority) and Section 6 (Cumulative Effects) discuss how this projects is related to the original SRS Decision Documents. Finally, the Corps completed section 7 consultation and received a letter of concurrence that the proposed spillway raise project would not adversely affect ESA-listed species under their jurisdiction.

o. Section 6.1 states, "This Environmental Assessment satisfies the Requirements of the National Environmental Policy Act of 1969." This project clearly has a significant impact on the natural human environment and therefore cannot be analyzed under an EA/FONSI process. Rather, a comprehensive EIS is legally required for a project of this magnitude.

Corps Response: An EA is the appropriate means to determine whether an EIS is necessary, however, the proposed action does not result in additional environmental impacts beyond those identified in the 1984 EIS. Further, Sections 3 (Affected Environment) and Section 4 (Environmental Consequences) have been substantively revised to provide a more robust analysis of proposed project.

p. Section 6.3: The Corps states that an NWP 33 will satisfy the requirements of the Clean Water Act. This statement is laughable given the large amount of jurisdictional wetland and waters of the state that will be permanently impacted by the deposition of sediment in excess of 3 miles upstream of the SRS. The Corps is required to apply for and Individual Permit under Section 401/404 of the Clean Water Act. This will require mitigation sequencing to avoid, minimize and mitigate for expected

impacts to waters of the U.S., and alternatives analysis plan, a mitigation plan, a biological assessment, and a cultural resources survey.

Corps Response: The proposed project is consistent with the NWP 31 (*Maintenance of Existing Flood Control Facilities*) and NWP 33 (*Temporary Construction, Access, and Dewatering*). For use of NWP 31, the maintenance baseline for the MSH SRS is provided in the "Mount St. Helens, Washington Feasibility Report & Environmental Impact Statement," dated December 1984. The maintenance baseline was approved by the Secretary of the Army, acting through the Chief of Engineers on August 15, 1985.

q. Section 6.4: A biological assessment was prepared for species under the jurisdiction of NMFS. Since the EA did not represent the true extent of impacts, the biological assessment was likely lacking as well. Formal consultation is required based on a truthful representation of the extent of the proposed project and a complete summary of anticipated impacts to ESA listed species.

Corps Response: The Corps completed section 7 consultation with the NMFS and received a Letter of Concurrence that the proposed action was not likely to adversely affect ESA-listed species under their jurisdiction.

r. All projects within waters of the State of Washington legally are required to obtain a Hydraulic Project Approval. The EA omits referencing this requirement. Once the true extent of the proposed project are identified, an Hydraulic Project Approval must be applied for. Mitigation for impacts to state waters is required and cannot be postponed to a later date as has been commonplace since construction of the SRS.

Corps Response: The Corps is not legally required to obtain a Hydraulic Project Approval. However, it is the practice of the Corps to coordinate with the landowner (in this case WDFW) and WDOE to identify appropriate conditions and incorporate into the proposed project.

s. The EA does not include any reference to local environmental permit requirements. The SRS and the anticipated impact are some 3 miles upstream of the SRS are not under ownership of any federal agency and therefore ALL local and state environmental protection regulations apply to ALL proposed projects in the area. The Corps does not own any of the land upstream or downstream of the SRS, the lands are owned by Weyerhaeuser, WDFW and WDNR. The Corps does not get a pass on state and local regulations. Impacts to critical areas are regulated under Cowlitz County Code 19.15. Once the true extent of impacts are known and mitigation measures applied the project must be vetted under current Cowlitz County Critical Areas regulations. The project is within a mapped shoreline and must reviewed under current Cowlitz County shoreline regulations. I assume a Substantial Development permit will be required. Lastly, a fill and grade permit from Cowlitz County must be obtained.

Corps Response: The Corps owns and/or has an easement to store sediment on all lands associated with this project, including upstream of the SRS. The non-Federal sponsor of this project is the State of Washington. Any required local/state permits are provided by the non-Federal sponsor.

t. It is hard to fathom the lack of information presented in the EA. The Corps has been given a free pass on all proposed projects in and around the SRS since the early 1980s. Mitigation has been woefully lacking and in most cases non-existent. Impacts to wetlands, streams, aquatic resources, recreation and listed ESA species has been and continue to be unacceptable. I have never seen a project that proposes to raise a dam by 10 vertical feet, further impact ESA listed species, impact

wetlands, impact streams, and propose NO mitigation approved without truthfully analyzing the project under an EIS implemented under state and federal SEPA/NEPA process. An EIS is required. Updated data is required. Mitigation is required. And lastly, full transparency is required so the taxpaying public has a chance to fully vet this project and decide if the impacts are acceptable.

Corps Response: Substantial revisions to the draft EA have been made in response to this and similar comments, however, the impacts are within the range of those initially identified in the 1984 EIS.

19. Letter from Blue Heron Inn, dated March 28, 2012.

a. Do a complete assessment of project impacts to the watershed.

Corps Response: Section 4 of the EA, Environmental Consequences, has been substantively revised to include a more robust assessment of project impacts.

b. Concerned about project impacts to ESA-listed fish (coho, steelhead, Chinook and smelt).

Corps Response: Sections 3.2 and 4.2 of the EA have been revised to better reflect fishery resources in the project area and project impacts to ESA-listed fish species.

c. Keeping the tributaries to the NF Toutle connected to the river, where the majority of the spawning habitat for salmon and steelhead is available, is critical.

Corps Response: Section 4.1 of the EA has been revised to reflect results of sediment modeling of the proposed project showing that tributaries upstream of the SRS (other than branches of Pullen Creek) will maintain surface connections with the NF Toutle River.

d. The EA is not comprehensive enough; should do an EIS that identifies an alternative incorporating flood control with volitional fish passage.

Corps Response: Section 4.2 has been revised to specifically discuss why the proposed project does not preclude volitional fish passage in the future.

6. COMPLIANCE WITH LAWS AND REGULATIONS

6.1. National Environmental Policy Act (NEPA)

This Environmental Assessment satisfies the requirements of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.).

6.2. Clean Air Act

The Clean air Act of 1970, as amended, established a comprehensive program for improving and maintaining air quality throughout the United States. Its goals are achieved through permitting of stationary sources, restricting the emission of toxic substances from stationary and mobile sources, and establishing National Ambient Air Quality Standards. Title IV of the Act includes provisions for complying with noise pollution standards. There would be a small, localized reduction in air quality during construction due to emissions from construction equipment, and also localized increases in noise levels. These impacts would be minor and temporary in nature and would cease once construction is completed.

6.3. Clean Water Act

Section 401 of the Clean Water Act of 1977, as amended, requires certification from the state or interstate water control agencies that a proposed water resources project is in compliance with established effluent limitations and water quality standards. The preferred alternative will be in compliance with the Clean Water Act via public review of the draft EA and with the issuance of a Section 401 Water Quality Certification from the Washington Department of Ecology.

The proposed project is consistent with the NWP 31 (*Maintenance of Existing Flood Control Facilities*) and NWP 33 (*Temporary Construction, Access, and Dewatering*). For use of NWP 31, the maintenance baseline for the MSH SRS is provided in the "Mount St. Helens, Washington Feasibility Report & Environmental Impact Statement," dated December 1984. The maintenance baseline was approved by the Secretary of the Army, acting through the Chief of Engineers on August 15, 1985.

The Washington State Department of Ecology (WDOE) anticipates issuing their State Water Quality Certification for the 2012 NWPs in the month of June, 2012. For the 2007 NWPs, WDOE pre-certified NWP 31 where waterways did not have a TMDL for temperature and wholly certified NWP 33 with conditions, by the for the purposes of complying Section 401 State Water Quality Certification. There is no TMDL for temperature for the North Fork Toutle River, the main stem Toutle River, nor the Cowlitz River. These waterways are also not on the State's 303 d list (Category 5). This is likely due to the natural nature of the water quality conditions in these waterways (Category 7). The Corps anticipates the same pre-certification decision by the WDOE for the 2012 NWP 31 and 33. If NWP 31 and/or 33 are denied water quality certification, the Corps shall obtain an individual water quality certification. All General and Region Conditions associated with NWP 31 and NWP 33 will be followed, including pre-construction notification, review, and revegetation.

The Corps will obtain a National Pollution Discharge Elimination System (NPDES) Permit from the Environmental Protection Agency prior to beginning construction.

6.4. Endangered Species Act

In accordance with Section 7(a)(2) of the Endangered Species Act of 1973, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed or proposed threatened or endangered species. A Biological Assessment was prepared for the preferred alternative for species under the jurisdiction of the NMFS. The Corps determined that the preferred alternative is not likely to adversely affect listed steelhead and coho salmon or their designated critical habitat. The Corps completed Section 7 consultation requirements with the NMFS and has received a Letter of Concurrence, dated March 21, 2012, that the at the proposed spillway raise project will not adversely affect ESA-listed species under their jurisdiction. A no effect determination was documented for species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS).

6.5. Magnuson-Stevens Fishery Conservation and Management Act

The Sustainable Fisheries Act of 1996 amended the Magnuson-Stevens Act establishing requirements for essential fish habitat (EFH) for commercially important fish. Essential fish habitat is defined by the Act as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The project area for the preferred alternative is designated as EFH for Chinook and coho salmon. An assessment for EFH was prepared and provided to the NMFS for review and consultation. There would be temporary, limited, short-term modifications to EFH during construction. With construction timing and techniques, best management practices and a Stormwater Pollution Prevention Plan for construction activities, and excavation planned primarily in the dry, potential impacts to EFH will be minimized.

6.6. Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act of 1934 states that federal agencies involved in water resource development are to consult with the USFWS and state agency administering wildlife resources concerning proposed actions or plans. The preferred alternative is being coordinated with the USFWS and WDFW in accordance with this Act.

6.7. Migratory Bird Treaty Act

The Migratory Bird Treaty Act requires that migratory birds not be harmed or harassed. Under this Act, "migratory birds" essentially includes all birds native to the U.S. and the Act pertains to any time of the year, not just during migration. For the preferred alternative, construction site preparation will not remove possible habitat for migratory birds. Construction-related noise could displace birds by causing flushing, altering flight patterns, or causing other behavioral changes; however, effects are not expected to rise to the level of harm or harassment.

6.8. Natural Historic Preservation Act

Section 106 of the National Historic Preservation Act requires that federally assisted or federally permitted projects account for the potential effects on sites, districts, buildings, structures, or objects that are included in or eligible for inclusion in the National Register of Historic Places. The preferred alternative is being coordinated with the Washington DAHP. Results of cultural resources surveys done to date support a determination of no effect on historic properties.

6.9. Native American Graves Protection and Repatriation Act

This Act provides for the protection of Native American and Native Hawaiian cultural items, established ownership and control of cultural items, human remains, and associated funerary objects to Native Americans. It also establishes requirements for the treatment of Native American human remains and sacred or cultural objects found on federal land, and provides for the protection, inventory, and repatriation of cultural items, human remains, and funerary objects. There are no recorded historic properties within the immediate project area and the probability of locating human remains in the project area is low. However, if human remains are discovered during construction, the Corps and/or the Contractor will be responsible for following all requirements of this Act.

6.10. Environmental Justice

Executive Order 12898 requires federal agencies to consider and minimize potential impacts on subsistence, low-income, or minority communities. The goal is to ensure that no person or group of people shoulder a disproportionate share of any negative environmental impacts resulting from programs. The preferred alternative will not cause changes in population, economics, or other indicators of social well being. It will not result in a disproportionately high or adverse effect on minority or low-income populations. There are no environmental justice implications from the preferred alternative.

6.11. Floodplain Management

Executive Order 11988 requires federal agencies to consider how their actions may encourage future development in floodplains, and to minimize such development. The preferred alternative does occur in and affect the base flood plain upstream of the SRS as defined by ER 1165-2-26. Due to the nature and purpose of the existing SRS, there is no practicable alternative to the location of the preferred alternative that reduces overall impacts to the base flood plain in the Cowlitz basin. Three other feasible sediment management scenarios have been investigated including the no action alternative. The no action alternative does not meet the objective of the authorization to provide flood protection to communities along the lower 20 miles of the Cowlitz River. The other two alternatives, a significant raise of the SRS and dredging in the lower Cowlitz, have a larger impact to the base flood plain than the preferred alternative. The raised SRS would create a larger pool and deeper sediment deposition upstream of the SRS. Dredging in the lower Cowlitz exclusively would likely result in portions of the existing floodplain along the reach being filled with dredge disposal.

Raising the existing spillway at the current location of the SRS would not induce development in the base flood plain upstream of the SRS as the pool and sedimentation impacts would occur within Corps owned property or the existing flow and sediment deposition easement area established for the SRS project in the 1980s.

A Probable Maximum Failure Mode analysis has indicated that the preferred alternative in and of itself does not appreciably increase the risk to human safety. The purpose of the project is to manage sediment such that flood protection for the four communities named in the authorization is maintained above the authorized level. In the absence of this project, the flood risk for the downstream communities is increased within the planning horizon.

The base flood plain upstream of the SRS affected by the proposed project is currently a sparsely vegetated, highly braided depositional plain. The nature of the base flood plain post project will not be significantly different than the current condition. Features of the proposed project, specifically the weir

crest shape, are intended to improve upstream conditions in the future by promoting a more stable depositional flood terrace.

6.12. Protection of Wetlands

Executive Order 11990 requires federal agencies to minimize the destruction, loss or degradation of wetlands. All impacts to wetlands will be indirect and temporary in nature. Within the post-construction inundation area, approximately 16 acres of immature, forest wetlands and approximately 48 acres of herbaceous wetlands presently exist (NOTE: herbaceous wetlands include willow). The inundated area containing wetlands is expected to become full with sediment to the surface within 1 year post-construction. Once full to the surface with sediment, the area will return to approximately pre-construction contours and growth medium of plants. The Corps will coordinate with the WDFW to create and implement a post-construction vegetation restoration plan that will include planting an appropriate density of native species that were present within the effected forest and herbaceous wetlands.

6.13. Federal Leadership in Environmental, Energy and Economic Performance

Executive Order 13514 requires federal agencies to increase energy efficiency; measure, report, conserve and reduce their greenhouse gas emissions from direct and indirect activities; conserve and protect water resources through efficiency, reuse, and stormwater management; eliminate waste, recycle, and prevent pollution; leverage agency acquisitions to foster markets for sustainable technologies and environmentally preferable materials, products, and services; design, construct, maintain, and operate high performance sustainable buildings in sustainable locations; strengthen the vitality and livability of the communities in which federal facilities are located; and inform federal employees about and involve them in the achievement of these goals. The proposed project activities are in compliance with this Executive Order because no development will occur and all actions will be conducted in a manner as to prevent pollution and chemical spills. All rock removed will be stockpiled on-site for reuse. The project will not result in changes in pre-project hydrology from additional impervious surfaces or changes in stormwater drainage and/or runoff patterns at the project.

6.14. Prime and Unique Farmlands

There are no prime and unique farmlands in the project area.

6.15. Comprehensive Environmental Response, Compensation, and Liability Act and Resource Conservation and Recovery Act

The location of the proposed project is not within the boundaries of a site designated by the U.S. Environmental Protection Agency or State of Washington for a response action under Comprehensive and Environmental Response, Compensation and Liability Act, nor is it a part of a National Priority List site.

7. REFERENCES

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DRAFT FINDING OF NO SIGNIFICANT IMPACT
Sediment Retention Structure (SRS) Spillway Raise Project
Mount St. Helens Sediment Management for Flood Risk Reduction

Based upon the Environmental Assessment (EA) prepared for this project, I find that the proposed action would not significantly affect the quality of the human environment and that an Environmental Impact Statement is not required. This Finding of No Significant Impact (FONSI) is based on the Sediment Retention Structure (SRS) Spillway Raise Project EA, which has been independently evaluated by the U.S. Army Corps of Engineers, Portland District (Corps).

Any human action has the potential for minor to moderate or even severe impacts and consequences. This EA and FONSI have listed all of the important considerations of the proposed project and their environmental impacts. These impacts, both individually and cumulatively, are *NOT SIGNIFICANT* as "significant" has been defined by NEPA law, regulations, and case law.

Introduction

The May 18, 1980 catastrophic eruption of Mount St. Helens dramatically altered the hydraulic and hydrologic regimes of the Cowlitz and Toutle River valleys. Ash fall and lateral blast from the eruption produced immediate and long-term effects on the hydrology of the Toutle watershed by changing its land cover and runoff characteristics. The excessive amount of sediment produced by the eruption and its aftermath was deposited downstream in the lower Toutle, Cowlitz, and Columbia rivers. The rapid influx of sediment reduced the channel capacities of the rivers affected. This left the communities of Castle Rock, Lexington, Kelso, and Longview with the potential for major flooding even with normal runoff.

As part of the effort to maintain flood risk reduction benefits to the communities along the lower Cowlitz River, the Corps is proposing to raise the spillway of the existing sediment retention structure (SRS) by up to 10 feet to increase its sediment storage capacity. The SRS is a single-purpose structure that consists of an earth and rock fill embankment dam, an outlet works, and an ungated spillway excavated in rock. The SRS was constructed from 1987 to 1989 at river mile 13.2 on the North Fork Toutle River for the single purpose of trapping sediment eroding from the debris avalanche on Mount St. Helens. Sediment from the debris avalanche is transported through the North Fork Toutle River, mainstem Toutle River, and into the lower 20 miles of the Cowlitz River. As sediment accumulated behind the SRS, the rows of outlet works pipes were buried and closed. Since 1998, all flow passes over the spillway, which allows more sediment to deposit in the lower Cowlitz River.

The Proposed Action

The purpose of the proposed action is to increase the sediment storage capacity of the SRS. This action is needed to increase the efficiency of sediment deposition above the SRS and decrease the volume of sediment available for deposition in the lower Cowlitz River. After construction, the existing SRS provided a sediment trapping efficiency of approximately 92%. All flow now passes over the spillway and the trapping efficiency of the SRS has been reduced to approximately 31% and is dropping. Erosion and sediment movement into the North Fork Toutle River and downstream into the Cowlitz River continues to be significant and unpredictable. Regional rains and flooding since 2003 have mobilized large amounts of sediment from the Mount St. Helens debris avalanche. This trend is a result of increased sedimentation of the Toutle Subbasin from sediments being passed through the SRS in greater amounts. Raising the SRS spillway up to 10 feet in the summer of 2012

or 2013 is necessary in order to reduce the volume of sediment that is depositing in the lower Cowlitz River and increasing flood risks.

The features of the proposed action include a roller-compacted concrete (RCC) structure up to 10 feet in height and founded on rock, and low flow channel/plunge pool excavated in rock from the new RCC structure to the existing spillway crest to maintain and improve downstream fish passage conditions. This action does not preclude the potential for volitional upstream fish passage in the future. The entire project will be constructed on Corps' property.

RCC Structure. The RCC structure will be constructed up to 10 feet in height. The downstream end of the RCC structure will be located approximately 300 feet upstream of the existing spillway crest elevation. The average width of the structure is approximately 500 feet and the length is approximately 100 feet. The structure will be built directly on top of a relatively flat basalt bedrock shelf. There is currently a thin amount of sediment (about 3 feet, 20,000 cubic yards) that will be removed prior to construction. Removed sediment may be used in the contractor's cofferdam system or disposed of in disposal area in the sediment plain immediately upstream of the SRS. The RCC berms will be constructed on the downstream slope. The berms will be 1.5 feet high in the vicinity of the low flow channel. The low flow channel is designed to maintain a minimum 1 foot of water depth at a minimum flow rate of 140 cubic feet per second. The total volume of RCC to be used is approximately 15,000 cubic yards. The RCC will likely be mixed in a batch plant set up on top of the dam. Aggregate for the RCC will come from an off-site commercial location and needed water will come from groundwater. Placement rates for past RCC projects of similar size generally ranged from 2,000 to 3,000 cy per day. At these rates, the proposed RCC structure could be built in about 2 weeks.

Rock Excavation. Rock excavation will occur from the downstream toe of the RCC structure to the existing crest of the spillway to maintain and improve downstream fish passage conditions. Rock will be excavated by mechanical methods (no blasting). A short (50 feet), wide (300 feet) plunge pool will be excavated immediately downstream of the RCC structure in line with the low flow channel. A low flow channel about 400 feet long will be excavated in the rock from the plunge pool to the existing crest of the spillway. The purpose of the low flow channel is to safely and swiftly convey fish across about 400 feet of level terrain and prevent stranding that would otherwise occur. The channel will be approximately 40 feet wide at the bottom and at least 5.5 feet deep with 2:1 side slopes. The approximate volume of rock excavation is 9,000 cubic yards. Excavated rock will be stockpiled for future use in disposal sites located on grassy upland areas downstream of the dam.

River Management During Construction. River diversion will occur within the spillway. The temporary water diversion will be implemented under the criteria for Nationwide Permit (NWP) 33 (*Temporary Construction, Access, and Dewatering*). All General and Region Conditions associated with NWP 33 will be followed such as the maintaining aquatic life movement, removal of temporary fills, and implementing a post-construction vegetation restoration plan. In order to maintain aquatic life movement, we will require: (1) maintenance of a minimum continuous flow in the spillway of 140 cfs (to provide continuous flow in the river), and (2) maintenance of a minimum flow depth of 1 foot from the upstream extent of the contractor's operations to the existing spillway crest (for potential downstream fish passage occurring during the in-water work window). The contractor will be required to submit a river diversion plan meeting the performance-based requirements.

The following approach is provided to demonstrate that river diversion may be accomplished meeting performance-based requirements. A combination cofferdam/construction access road may be built from the existing access road coming down the spillway approach pier to the right wall of the spillway, upstream of the new RCC structure footprint. The cofferdam/road would have a

temporary culvert system through it on the left side to pass the river flow. With the river diverted down the left side of the RCC structure footprint, the right half of the RCC structure, including the low flow channel, would be constructed in the dry. The cofferdam/road upstream of the finished right half of the RCC structure would be removed. Flow through the culvert system would then be reduced, building a pool, until flow is both through the culvert system on the left and through the low flow channel of the RCC structure on the right, maintaining the minimum continuous flow in the spillway. Once there is flow over the low flow channel, the culvert system would be closed entirely so that the left half of the RCC structure could be constructed in the dry. Throughout this process, temporary features, such as sandbags, may be required in the upstream/downstream direction to contain flow from the cofferdam/road to the existing spillway crest, maintaining the minimum flow depth of 1 foot. Several approaches may be used for cofferdam/road construction including, for example, sediment berms or Hesco Baskets filled with sediment.

Post-construction Conditions. Upon completion of the spillway raise, a pool would be created in the sediment plain upstream of the SRS. Over time, sediment will deposit in the pool and it will fill to the spillway crest height. Total volume of the flat water pool will be approximately 2 million cubic yards. Over time, the reservoir will fill with sediment with the North Fork Toutle flowing through it. The time period for this to occur is estimated at 1 to 5 years. Flows over the new spillway will be concentrated through the 250-foot wide main channel of the new RCC structure. Modeling predicts that a 10-foot spillway raise would increase total trapping of sediment above the SRS by about 15 million tons.

Public Input

Mount St. Helens coordination meetings were held in August and December 2011, at which the SRS spillway raise project was discussed. State, federal and local agencies and members of the public attended these meetings. The February 2012 draft EA and draft FONSI were published for a 30-day public and agency review on February 27, 2012 to receive public input. All public input and requests for information were considered. The Corps response to all received comments is provided in the revised May 2012 draft EA.

Final Determination

The Corps is required to make every effort to fulfill all statutory authorized project purposes and directions provided by the Congress in the project authorization documents. Under authority of Public Law 84-99, the Corps immediately responded to the Mount St. Helens disaster with dredging of the rivers and emergency levee improvements. Congress authorized interim protection measures in 1983 (Public Law 98-63) for the Corps to maintain at least 100-year protection along the Cowlitz River until an overall solution was in place. Long-term sediment control facilities were constructed under Supplemental Appropriations Act of August 15, 1985 (Public Law 99-88). The Corps was authorized to construct and operate a SRS near the confluence of the Toutle and Green rivers. The Corps was directed by Congress to maintain an authorized level of protection (LOP) for four communities along the Cowlitz River (Castle Rock, Lexington, Kelso, and Longview) that is not less than described in the 1985 Decision Document. The Water Resources Development Act of 2000 authorized the Corps to maintain these LOPs through the end of the Mount St. Helens project planning period, which is 2035. In addition, the Committee on Transportation and Infrastructure of the United States House of Representatives adopted the following Resolution on September 24, 2008 that authorized the Corps to investigate modifications to flood damage reduction for the Coweeman River and levee.

The Corps recognizes that in fulfilling the authorizations, the Corps needs to assess the whether the impacts of a project rise to the level of “significantly affecting the human environment” (40 CFR 1508.27). Following is the checklist from (1) to (10):

(1) Impacts that may be both beneficial and adverse. Beneficial impacts include a reduction in downstream sediment transport and maintenance of required levels of protection for communities located along the lower Cowlitz River. Reduction in downstream sediment transport may temporarily improve conditions at the Fish Collection Facility (FCF) that result from excessive sediment deposition at the facility. Adverse effects are largely temporary and are a result of short term inundation and subsequent deposition of sediment on wetland habitats. The impacts are considered temporary because the impacted areas are expected to recover quickly following infill and recolonize with same or similar vegetation within one to two years following the project.

(2) Public health and safety: The SRS spillway raise project will have no direct impact to public health and safety, however, raising the spillway will reduce sediment transport and deposition in the lower Cowlitz River and will assist in maintaining the authorized level of flood risk reduction benefits to the communities of Castle Rock, Lexington, Kelso, and Longview, Washington.

(3) Unique characteristics of geographical area (such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas): The SRS is located at river mile 13.2 on the North Fork Toutle River, 30.5 miles above the mouth of the Toutle River in Washington State. The sediment plain above the SRS is characterized by highly braided and mobile stream network with shallow flow. Through the course of the winter season, surface water can be seen covering a large portion of the sediment plain. During the low flow summer months, channel mobility reduces and the reduction in flow results in less surface water. The sediment plain is finest in composition and flattest in slope immediately upstream of the SRS. There are no unique natural features in the project area that stand out compared to the surrounding environment.

(4) Are effects on quality of human environment highly controversial: The effects of the activities are well understood. The purpose of the project is to maintain flood risk reduction benefits to lower Cowlitz communities and is within the authority of the Corps. There is disagreement on the scope of the action, however, with many of the comments received during the public comment period requesting actions that do not meet the purpose and need for the project and are outside the scope of this analysis. The spillway raise project does not limit or preclude potential environmental enhancement measures or future sediment management actions.

(5) Are the risks highly uncertain or unique or unknown: There are no uncertain or unique risks associated with the operations of this project. None of the features are expected to provide unique or uncertain risks beyond those addressed in the project design documents and environmental documentation for this project.

(6) Future Precedents: Currently, the Corps is investigating long-term sediment management measures to maintain the authorized LOPs for the communities on the lower Cowlitz River through the year 2035. The proposed up to 10-foot spillway raise project described in this revised EA is an interim measure required to maintain flood risk reduction benefits in the near term. Once a long-term sediment management plan is complete, it is likely additional actions will be required and may include, among a suite of potential alternatives, incremental raises of the SRS spillway up to a total height of 30 feet, grade-building structures in the SRS sediment plain, dredging of the Cowlitz River, and/or raising the entire SRS structure.

The spillway raise project does not limit or preclude potential fish and wildlife habitat enhancement measures or future sediment management actions.

(7) Cumulative Impacts: The cumulative effects analysis in this EA considered the effects of implementing the proposed action in association with past, present, and reasonably foreseeable future Corps' and other parties' actions in and adjacent to the project area. These actions primarily relate to the long-term management of sediment and restoring fish passage and fish and wildlife habitat. The potential cumulative effects associated with the proposed action were evaluated with respect to the 1984 Environmental Impact Statement and to each of the resource evaluation categories in this EA and no cumulatively significant, adverse effects were identified.

(8) National Register of Historic Places and other historical and culturally significant places: The SRS spillway raise project will have no effect on any historic properties.

(9) Endangered Species Act (ESA): A Biological Assessment was prepared for the proposed action for species under the jurisdiction of the National Marine Fisheries Service (NMFS). The Corps of Engineers completed section 7 consultation with the NMFS and received a Letter of Concurrence that the proposed Spillway Raise Project is not likely to adversely effect ESA-listed species under their jurisdiction. The Corps determined that there will be no effect to ESA-listed species under the jurisdiction of the U.S. Fish and Wildlife Service

(10) Other Legal Requirements for the protection of the environment: There is no anticipated violations of any other federal, state, or local law imposed for the protection of the environment.

The Corps is required to make every effort to fulfill all statutory authorized project purposes following the balance of purposes and other directions provided by the Congress in the authorization documents. The Corps is also required to take into account other legal mandates such as the Endangered Species Act and the Clean Water Act. As noted in the EA, the proposed action is not likely to adversely affect ESA-listed steelhead and coho salmon or their designated critical habitat. Impacts to water quality are expected to be minor and of limited duration during construction.

Date: _____ Signed:_____

John W. Eisenhauer, P.E.
Colonel, Corps of Engineers
District Commander