# PUBLIC NOTICE

## 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

**30 Day Notice**

Issue Date: February 27, 20012
Expiration Date: March 28, 2012

Interested parties are hereby notified that the U.S. Army Corps of Engineers, Portland District, has issued a 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 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. Construction work is tentatively planned for the summer and fall of 2012, with in-water work proposed from July 1 to September 15.

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: http://www.nwp.usace.army.mil/.

**State Water Quality Certification:** Pursuant to Section 401 of the Clean Water Act, a The proposed project is consistent with the NWP 33 (*Temporary Construction, Access, and Dewatering*) and is pre-certified, subject to condition, by the Washington State Department of Ecology for the purposes of complying Section 401 State Water Quality Certification.

**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

# 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).**

Draft February 20, 2012

# Table of Contents


1. INTRODUCTION ..... 1
   1.1. Purpose and Need for Action ..... 1
   1.2. Project Area Description ..... 1
   1.3. Authority ..... 2
   1.4. Background/History ..... 3
2. ALTERNATIVES ..... 6
   2.1. Proposed Action ..... 6
      2.1.1. Existing SRS ..... 6
      2.1.2. In-water Work Window ..... 6
      2.1.3. RCC Structure ..... 6
      2.1.4. Rock Excavation ..... 7
      2.1.5. River Management During Construction ..... 7
      2.1.6. Post-Construction Conditions ..... 8
   2.2. No Action Alternative ..... 8
3. AFFECTED ENVIRONMENT ..... 16
   3.1. Physical Environment ..... 16
   3.2. Biological Resources ..... 17
   3.3. Cultural and Historic Resources ..... 17
   3.4. Socio-economic Resources ..... 18
4. ENVIRONMENTAL CONSEQUENCES ..... 19
   4.1. Physical Environment ..... 19
      4.1.1. Proposed Action ..... 19
      4.1.2. No Action Alternative ..... 19
   4.2. Biological Resources ..... 19
      4.2.1. Proposed Action ..... 19
      4.2.2. No Action Alternative ..... 20
   4.3. Cultural and Historic Resources ..... 20
   4.4. Socio-economic Resources ..... 21
      4.4.1. Proposed Action ..... 21
      4.4.2. No Action Alternative ..... 21
   4.5. Cumulative Effects ..... 21
5. COORDINATION ..... 24
6. COMPLIANCE WITH LAWS AND REGULATIONS ..... 25
   6.1. National Environmental Policy Act (NEPA) ..... 25
   6.2. Clean Air Act ..... 25
   6.3. Clean Water Act ..... 25
   6.4. Endangered Species Act ..... 25
   6.5. Magnuson-Stevens Fishery Conservation and Management Act ..... 26
   6.6. Fish and Wildlife Coordination Act ..... 26
   6.7. Migratory Bird Treaty Act ..... 26
   6.8. Natural Historic Preservation Act ..... 26
   6.9. Native American Graves Protection and Repatriation Act ..... 26
   6.10. Environmental Justice ..... 27
   6.11. Floodplain Management ..... 27

6.12. Protection of Wetlands ..... 27
6.13. Federal Leadership in Environmental, Energy and Economic Performance ..... 27
6.14. Prime and Unique Farmlands ..... 28
6.15. Comprehensive Environmental Response, Compensation, and Liability Act and Resource Conservation and Recovery Act ..... 28

7. REFERENCES ..... 29

**LIST OF TABLES AND FIGURES**

Table 1. Population for Cowlitz County and Major Cities ..... 18

Figure 1. Mount St. Helens and Vicinity ..... 2
Figure 2. General Plan of Existing SRS ..... 9
Figure 3. Upstream Elevation of Existing Outlet Works ..... 10
Figure 4. Plan, Profile and Section Views for the RCC Structure ..... 11
Figure 5. Plunge Pool and Low Flow Channel in Rock ..... 12
Figure 6. Staging and Disposal Areas ..... 13
Figure 7. Pool Behind Raised Spillway Prior to Filling with Sediment ..... 14
Figure 8. Example of River Diversion Approach ..... 15

**ABBREVIATIONS AND ACRONYMS**

| | |
|---|---|
| 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 |
| FONSI | Finding of No Significant Impact |
| GBS | grade-building structure(s) |
| LOP | level of protection |
| mcy | million cubic yard(s) |
| MSRS | multiple sediment retention structures |
| NEPA | National Environmental Policy Act |
| NGVD | National Geodetic Vertical Datum |
| NMFS | National Marine Fisheries Service |
| 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 flood risk 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 spillway, allowing more sediment to deposit in the lower Cowlitz River.

## 1.1. Purpose and Need for Action

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. After its 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. The current sediment budget estimates the average annual total sediment load passing the SRS at over 4 million cubic yards (mcy; Corps 2009).

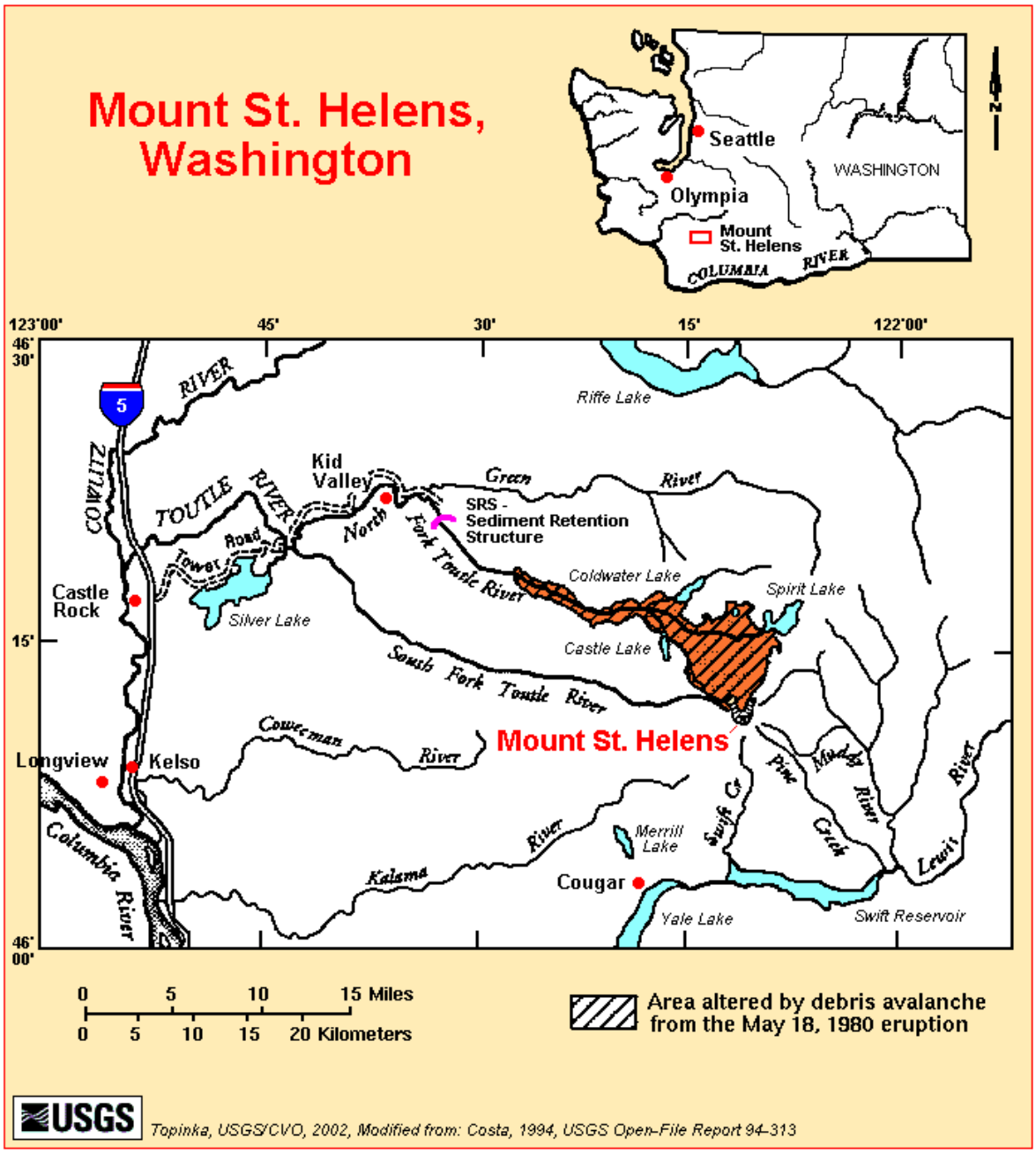
Erosion and sediment movement into the North Fork Toutle River and downstream into the Cowlitz River continues to be significant and unpredictable. Regional rains and flooding since 2003 have mobilized large amounts of sediment from the Mount St. Helens debris avalanche. This trend is a result of increased sedimentation from the Toutle River watershed from sediments being passed through the SRS in greater amounts. Raising the SRS spillway up to 10 feet in the summer of 2012 is necessary in order to reduce the volume of sediment that is depositing in the lower Cowlitz River and increasing flood risks.

## 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.

***Figure 1. Mount St. Helens and Vicinity***




## 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 level of protection (LOP) for 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 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:

> 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.

All previous Corps' National Environmental Policy Act (NEPA) documents associated with Mount St. Helens are incorporated by reference and as decided for the proposed SRS spillway raise project.

## 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 sediment retention structures (MSRS) with dredging.
4. MSRS 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 LOPs on the lower Cowlitz River. The Castle Rock levee upstream of the Arkansas Valley Road Bridge fell below its authorized LOP and was improved in 2009 by installing a cement-bentonite seepage cutoff wall to raise its LOP.

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

## 2.1. Proposed Action

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.

### 2.1.1. Existing SRS

The SRS consists of an embankment dam, concrete outlet works, and spillway. Figure 2 is a general plan showing the location of these features (all figures are located at the end of this section). The proposed action will modify only the spillway; the embankment dam and outlet works will not be modified. Figure 3 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.

### 2.1.2. 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 September 15, 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 (WDFW 2010). Coordination with the Washington State Department of Fish and Wildlife will occur to ensure that this is the most appropriate time for in-water work at this location. No in-water work is proposed to occur outside of this time period.

### 2.1.3. 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 4 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 6 shows disposal and staging areas for the proposed action (disposal area 8 is only for sediment removed).

The RCC berms will be constructed on the downstream slope. The berms, shown in Figure 4, 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.

### 2.1.4. 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 5. 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 6 and cover photo).

### 2.1.5. 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. Two main requirements will be: (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.

### 2.1.6. Post-Construction Conditions

Upon completion of the spillway crest raise, a pool would be created in the sediment plain upstream of the SRS. Figure 7 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.

## 2.2. No Action Alternative

Under the No Action Alternative, the SRS spillway raise project would not be implemented. There would be no ground disturbance or construction activities. All flow would continue to pass over the SRS, and its sediment trapping efficiency would continue to decline. Sediment passing over the SRS will continue to deposit in the lower 20 miles of the Cowlitz River at an increasing rate, which increases the flood risk to Castle Rock, Lexington, Kelso, and Longview, until dredging of the Cowlitz River is necessary to remove sediment and/or 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 LOP for these areas.

***Figure 2. General Plan of Existing SRS***

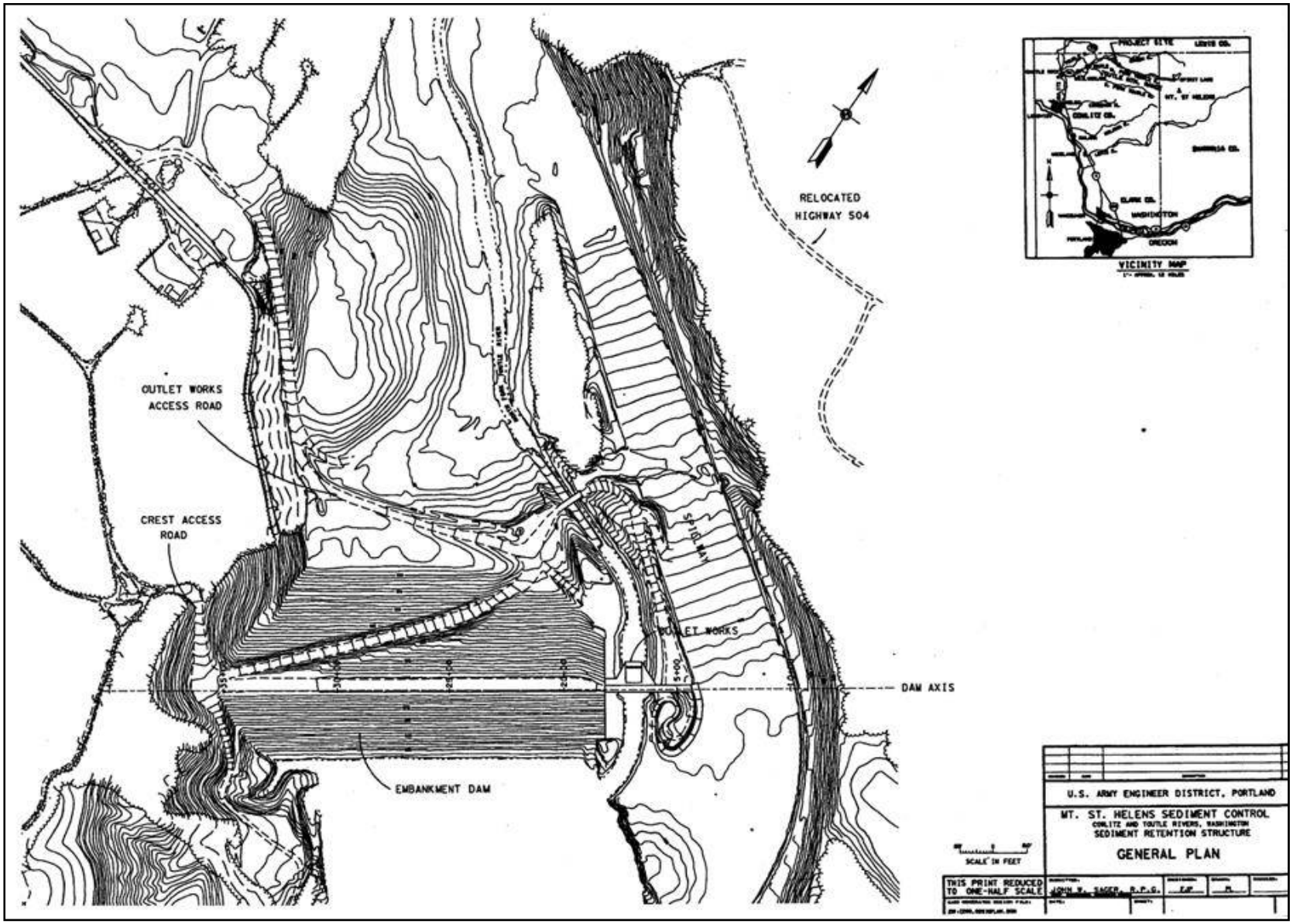


***Figure 3. Upstream Elevation of Existing Outlet Works***

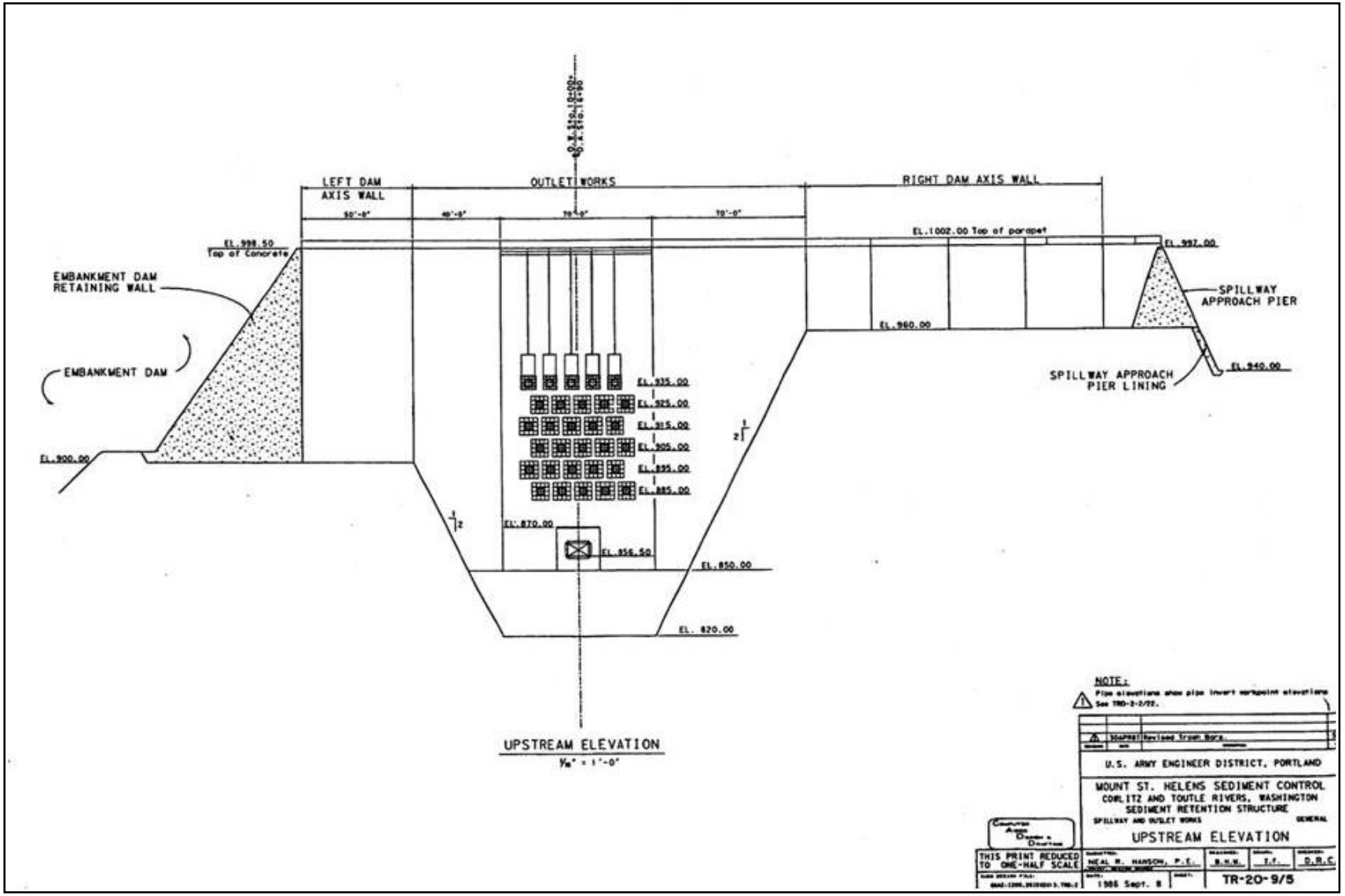


***Figure 4. Plan, Profile and Section Views for the RCC Structure***

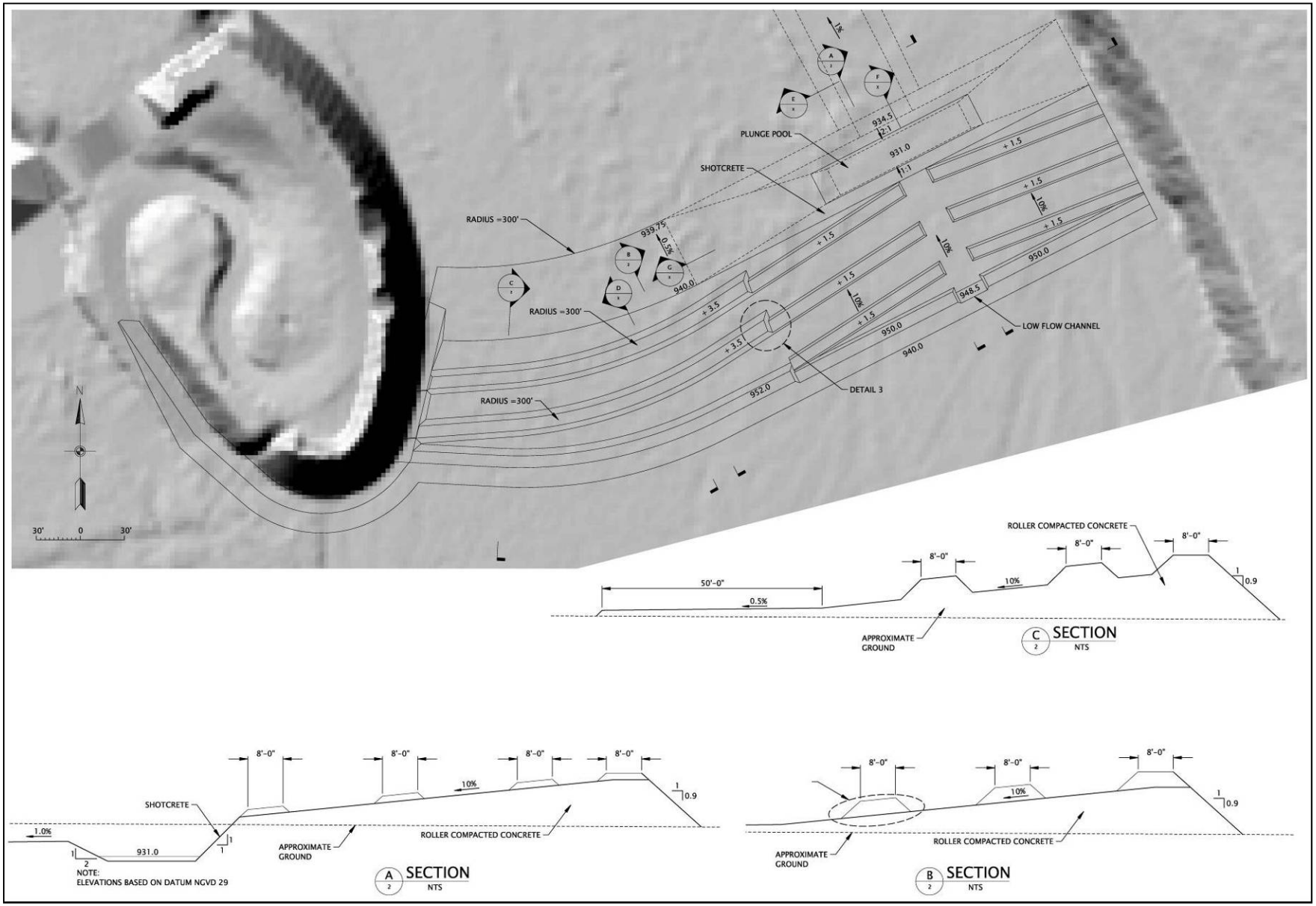


***Figure 5. Plunge Pool and Low Flow Channel in Rock***

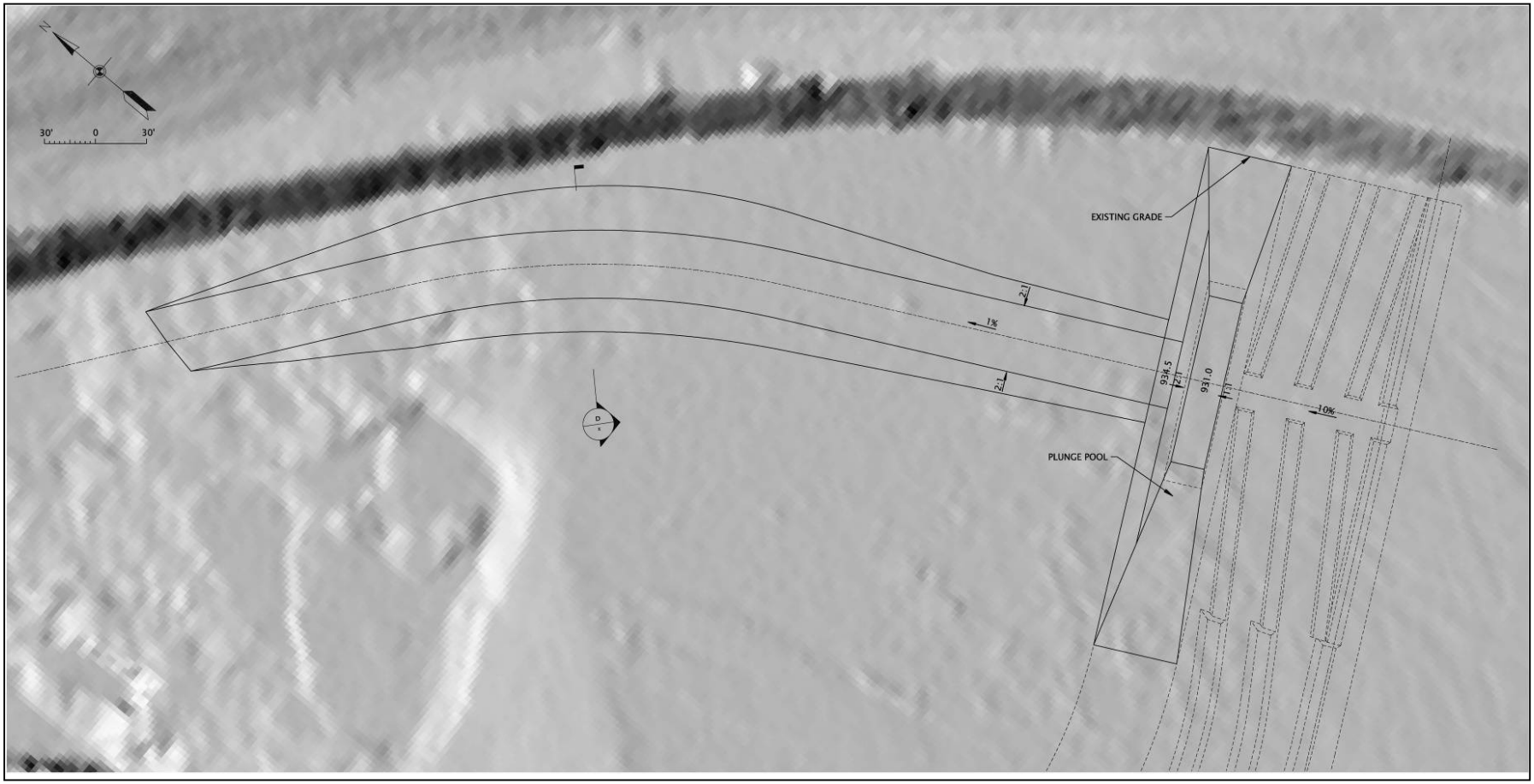
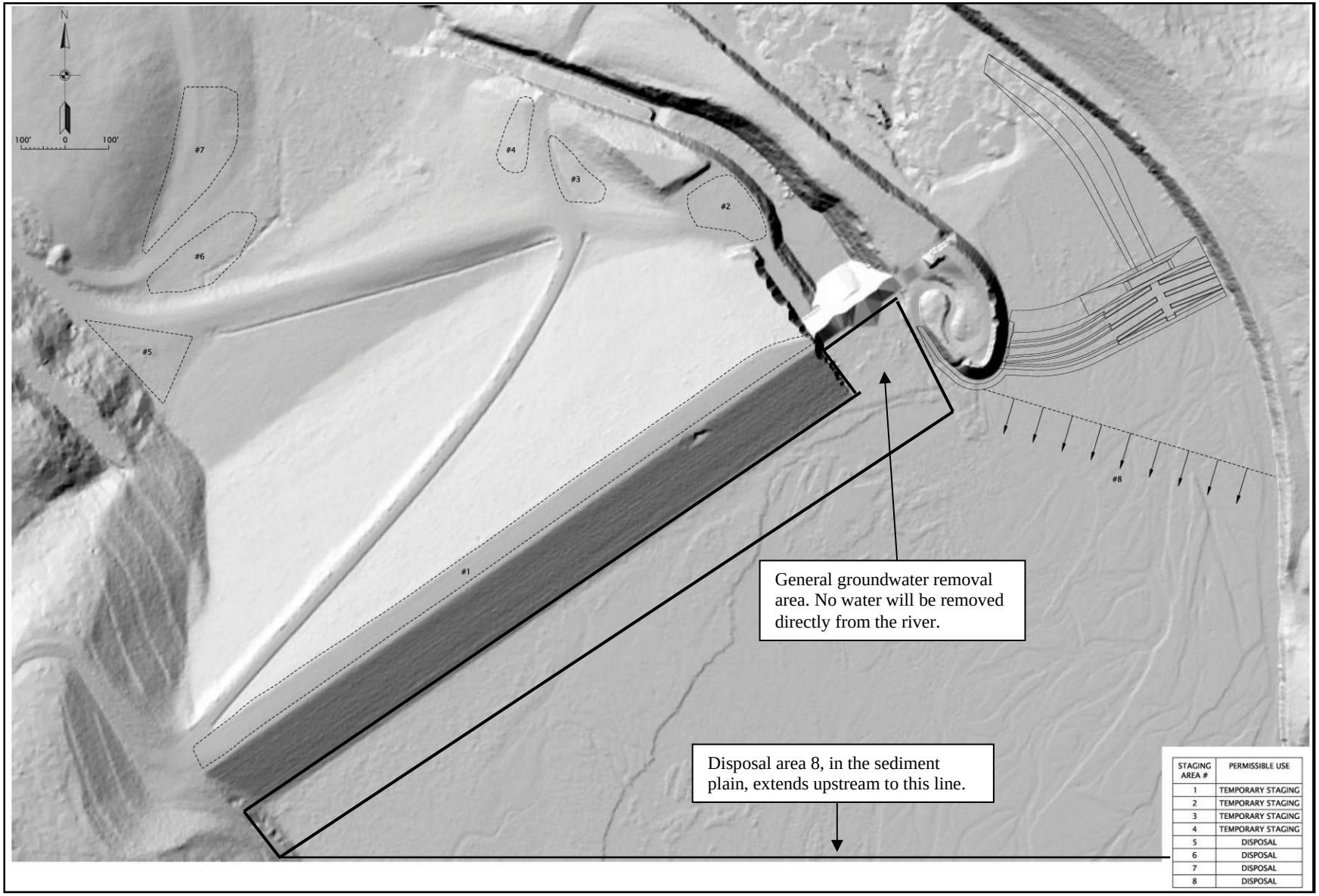


***Figure 6. Staging and Disposal Areas***




| 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 7. Pool Behind Raised Spillway Prior to Filling with Sediment***

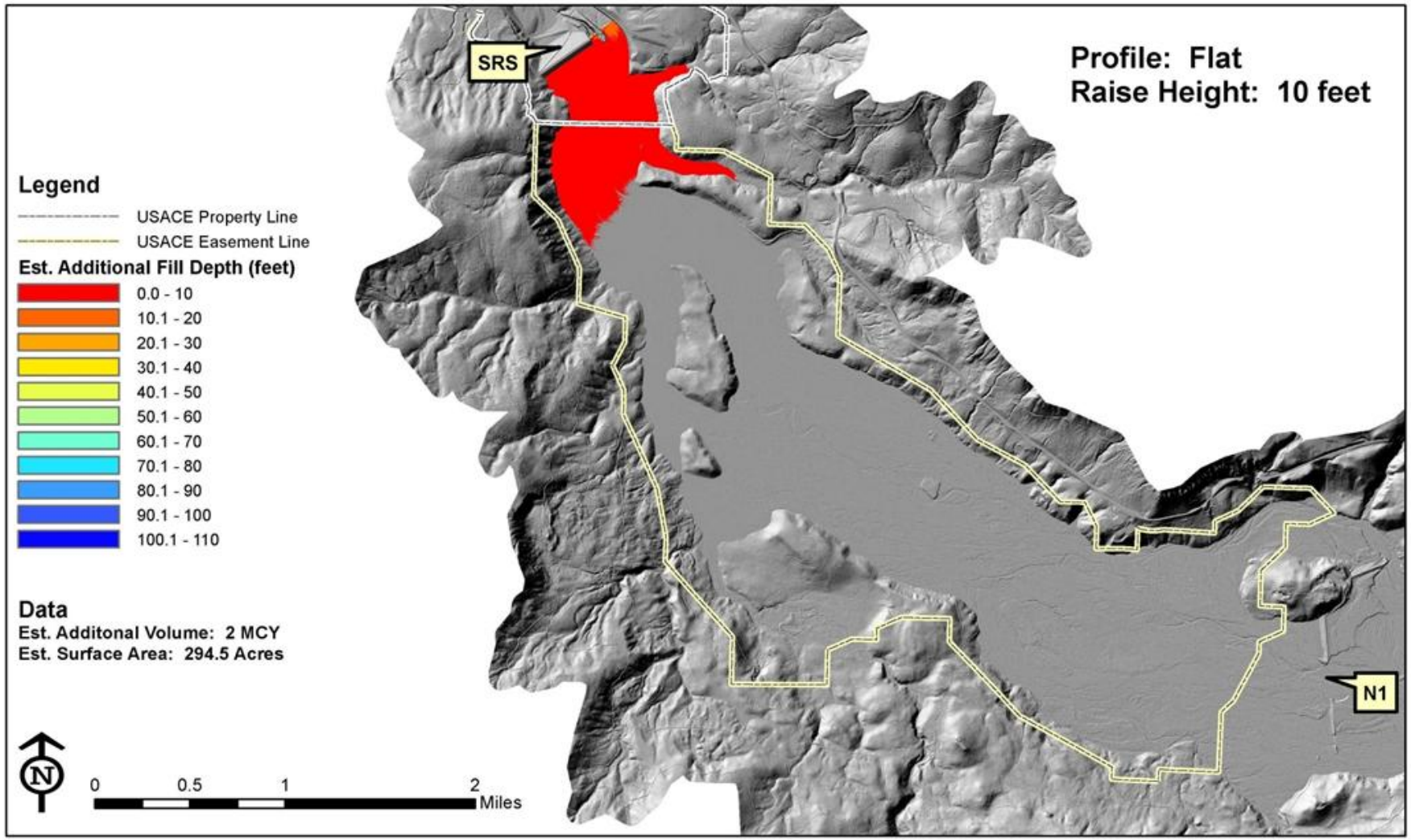
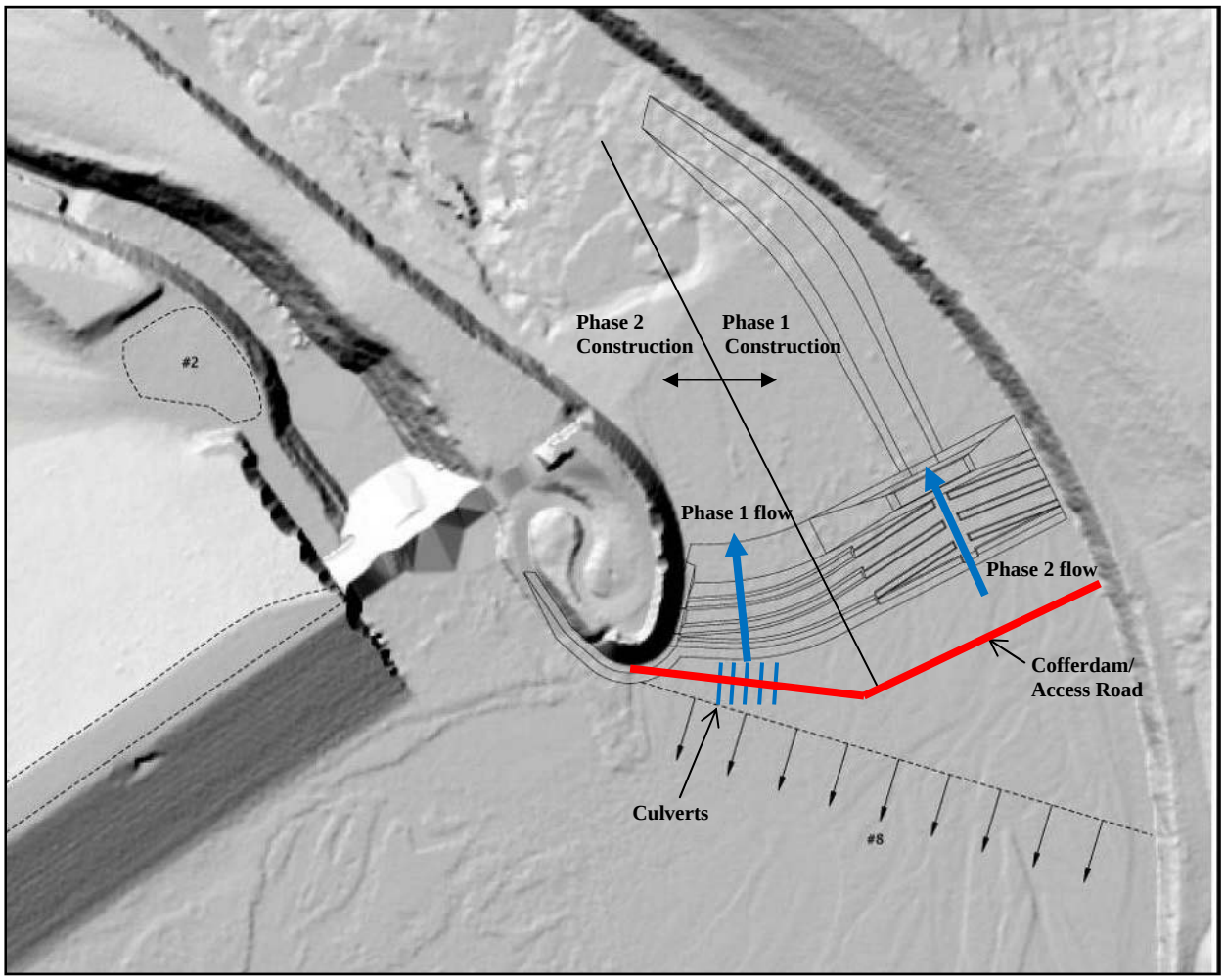


***Figure 8. Example of River Diversion Approach***



# 3. AFFECTED ENVIRONMENT

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 for 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 sediment plain located upstream of the SRS is wide and sparsely vegetated with braided, shifting channels. The valley floor slope and width in the sediment plain, combined with an extraordinarily high incoming sediment load, prevents the formation of a typical cascade stream.

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, although heavy rainfall does occur as intense weather systems move inland. 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.

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.

The North Fork Toutle River carries the bulk of the sediment leaving the Mount St. Helens debris avalanche into the SRS sediment plain. Average annual tonnage of sediment passing the remnant N-1 structure between 2000 and 2007 is estimated to be 8.6 million tons. Average deposition between N-1 and the SRS spillway over the same period is estimated at 2.7 million tons. Composition of the deposition 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 N-1 are retained above the SRS (Corps 2009).

The Corps conducted a water quality monitoring program (1985-1990) on the North Fork Toutle River 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.

The lower Cowlitz River valley has been heavily disturbed by the mudflows resulting from Mount St. Helens eruption and the subsequent recovery work, including channel dredging and levee construction. Most of the low-lying undeveloped areas along the lower Cowlitz have been used as disposal sites for material removed from the channel since the eruption.

## 3.2. Biological Resources

The project area is within the predominantly unvegetated structural boundary of the SRS and the sediment plain immediately upstream of the SRS. The lack of vegetation for forage, nesting, roosting, and security limits use of the construction area by wildlife. The sediment plain immediately upstream of the SRS is an actively aggrading, predominantly unvegetated braided channel network. These channels are deficient in large wood and devoid of riparian vegetation. They lack suitable rearing habitat for juvenile salmonids.

Lower Columbia River steelhead and lower Columbia River coho salmon are the ESA-listed threatened fish species that may occur in the project area. The SRS blocks upstream fish passage. 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 1.3 miles downstream from the SRS. The FCF is operated and maintained by the State of Washington. Adult steelhead trout and coho salmon are collected at the FCF. Fish are collected 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. Fish are then moved into transport tanks on trucks and taken to upstream release locations in tributaries to the North Fork Toutle River. Designated critical habitat for steelhead exists in the project area. Essential fish habitat (EFH) for coho salmon is also found in the project area.

Aquatic habitat in the lower Cowlitz has been severely affected by sediment. Spawning gravels once present are now buried. Adult and juvenile anadromous fish from the upper Cowlitz continue to successfully use the lower Cowlitz as a migratory route. Eulachon, or Pacific smelt, are known to migrate through and spawn in the lower Cowlitz and Toutle rivers.

Wildlife habitat along the lower Cowlitz is limited by commercial and residential development, which occurred prior to the eruption, and by the disposal of millions of cubic yards of dredged material following the eruption. Consequently, wildlife populations on the lower Cowlitz remain low.

## 3.3. Cultural and Historic Resources

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 action footprint. Because the proposed action 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 action and have expressed no concerns about possible impacts to areas of traditional, religious and cultural significance.

## 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.

Census data from 1970 through 2010 are shown in Table 1 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 1. 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 residences. Land ownership includes both private and public.

# 4. ENVIRONMENTAL CONSEQUENCES

## 4.1. Physical Environment

### 4.1.1. Proposed Action

The construction area is on federal land within the predominantly unvegetated structural boundary 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 in the dry. River diversion will occur within the existing spillway. A river diversion berm (temporary cofferdam/road) will be formed by grading sediment for access to construct the RCC berms. 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 fish in the area. Rock removed will be stockpiled for future reuse in disposal areas on mowed grass areas downstream of the SRS. All staging areas and the temporary cofferdam/access road will be restored after construction is completed.

The RCC structure will be built directly on top of the relatively flat bedrock shelf. There is a layer of sediment on this bedrock shelf (about 3 feet, 20,000 cy) that will be removed using dozers or similar equipment. 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 6). In-water work for constructing the river diversion berm, the possible disposal of sediment, and for obtaining groundwater to mix the RCC would result in a temporary increase in turbidity and suspended sediment but will be limited to the active work area. Any turbidity increase would 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. 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.

### 4.1.2. No Action Alternative

For the No Action alternative, there would be no ground disturbance or construction activities. The sediment trapping efficiency of the SRS would continue to decline. All flow 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.

## 4.2. Biological Resources

### 4.2.1. Proposed Action

The SRS is a predominantly unvegetated structure. The sediment plain upstream of the SRS is an actively aggrading, predominantly unvegetated braided channel network. Channel locations change widely and rapidly during winter storm events but tend to stabilize during the drier summer months. The lack of vegetation for forage, nesting, roosting, and security limits the use of these areas by wildlife. Construction activities and noise may cause temporary disturbance to any wildlife in the project vicinity. It is expected that wildlife species would temporarily disperse to adjacent forested areas outside the area during construction.

Two ESA-listed threatened fish species, steelhead and coho salmon, occur in the project area. Protective measures will be implemented to avoid or minimize effects to these listed species and their critical habitat. All work is scheduled to occur during from July 1 - September 15. This is generally the time period when ESA-listed species 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. The adult trap-and-haul program typically would begin after the construction activities have been completed.

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 deficient in large wood and devoid of riparian vegetation. They lack suitable rearing areas for juvenile salmonids. Most of the juvenile salmon rearing is likely restricted to tributary streams that provide cover, forage, and cooler water temperatures. Additionally, the adult release sites for trap-and-haul plantings are restricted to several tributaries outside of the project area.

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. Few, if any, federally-listed fish species would be present in the project 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.

### 4.2.2. No Action Alternative

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. 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 LOP for these areas. These activities may impact the aquatic environment and any aquatic organisms present, including anadromous 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 cultural resources 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 cultural or 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.

## 4.4. Socio-economic Resources

### 4.4.1. Proposed Action

The proposed action would not cause adverse changes in population, economics, or other indicators of social well being. The proposed action 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 proposed action would not alter or have any significant effect on land uses. Recreation in the vicinity of the project would not be affected. 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 proposed action 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. 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.

The SRS on the North Fork Toutle was constructed 5 years after the 1980 eruption 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.

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 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.

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. It is anticipated that near-term work 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.

In conclusion, this cumulative effects analysis 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 each of the resource evaluation categories in this EA, and no cumulatively significant, adverse effects were identified.

# 5. COORDINATION

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.

This draft EA is being issued for a 30-day public review period. The draft EA will be provided to federal and state agencies, tribes, organizations and groups, and interested publics. Public concerns identified in comments will aid in determination of whether or not an Environmental Impact Statement (EIS) is necessary for the proposed action. If it is determined that an EIS is not required, a Finding of No Significant Impact (FONSI) will be signed, concluding the National Environmental Policy Act process.

The draft EA was sent to the following agencies and groups:

U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
National Marine Fisheries Service
U.S. Geological Survey
Washington Department of Ecology
Washington Department of Fish and Wildlife
Washington State Parks and Recreation Commission
Washington Department of Natural Resources
Washington State Historic Preservation Office
Cowlitz County
Cowlitz Indian Tribe
City of Kelso
City of Longview
City of Castle Rock
Port of Longview
Kelso Public Library
Longview Library
Castle Rock Library
Lower Columbia Fish Recovery Board
Lower Columbia River Fish Enhancement Group
Friends of the Cowlitz
Eco Park Resort

# 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 proposed action 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 33 (*Temporary Construction, Access, and Dewatering*) and is pre-certified, subject to condition, by the Washington State Department of Ecology for the purposes of complying Section 401 State Water Quality Certification. All General and Region Conditions associated with NWP 33 will be followed, including pre-construction notification and review.

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 proposed action for species under the jurisdiction of the NMFS. The Corps determined that the proposed action is not likely to adversely affect listed steelhead and coho salmon or their designated critical habitat. Based on the outcome of the Section 7 consultation, the NMFS will issue either a letter of concurrence or a biological opinion (BiOp) that will likely set forth terms and conditions to minimize impacts of the proposed action. 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 proposed action 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. Long-term benefits from project implementation should conserve and improve EFH.

## 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 proposed action 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 proposed action, 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 proposed action 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 proposed action 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 proposed action.

## 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 proposed action 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 proposed action 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 proposed action. 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 proposed action 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. There are no wetland habitats in the project area.

## 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 action 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 action 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

Employment Security Department. 2011. Cowlitz County Profile, located at https://fortress.wa.gov/esd/employmentdata/home. Updated February 2011. State of Washington.

Larson, D.W. 2002. Toutle River SRS, Mount St. Helens, Washington: Limnological and Water Quality Studies 1985-1990, Final Report. Department of Biology, Portland State University, Portland, OR.

LCFRB (Lower Columbia Fish Recovery Board). December 15, 2004. Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan. Volume II – Subbasin Plan, Chapter E – Cowlitz, Coweeman and Toutle. Available at http://www.nwcouncil.org/fw/subbasinplanning/lowerColumbia/plan/.

U.S. Army Corps of Engineers. November 1983. A Comprehensive Plan for Responding to the Long-term Threat Created by Eruption of Mount St. Helens, Washington. Portland District, Portland, OR.

---. December 1984. Mount St. Helens, Washington Feasibility Report and Environmental Impact Statement, Toutle, Cowlitz and Columbia Rivers Vol. 1 and 2. Portland District.

---. October 1985. Mount St. Helens, Washington Decision Document, Toutle, Cowlitz and Columbia Rivers. Portland District.

---. 1987. Mount St. Helens Sediment Control, Cowlitz, and Toutle Rivers, Washington. Design Memorandum No. 10, Sediment Retention Structure Fish Collection Facility. Portland District.

---. September 1997. Cowlitz River Flood Hazard Study, Cowlitz County, Washington. Portland District.

---. April 2002. Mount St. Helens Engineering Reanalysis, Hydrologic, Hydraulics, Sedimentation and Risk Analysis Design Documentation Report. Portland District.

---. August 2006. Mount St. Helens Project, Cowlitz River Levee Projects, Level of Protection and Sedimentation Update. Portland District.

---. 2007. Mount St. Helens Ecosystem Restoration General Reevaluation Study Reconnaissance Report. Portland District.

---. October 2009. Toutle/Cowlitz River Sediment Budget. Portland District.

---. June 2010. Progress Report, Mount St. Helens Long-Term Sediment Management Plan for Flood Risk Reduction. Portland District.

---. February 2010. Mount St. Helens Project, Cowlitz River Levees Safe Water Level Study. Portland District.

---. February 2010. Mount St. Helens Project Cowlitz River Levee Systems, 2009 Level of Flood Protection Update Summary. Portland District.

---. April 2011. Mount St. Helens Future Expected Deposition Scenario (FEDS). Portland District.

# 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 from the Toutle River watershed from sediments being passed through the SRS in greater amounts. Raising the SRS spillway up to 10 feet in the summer of

2012 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 No. 33 (Temporary Construction, Access, and Dewatering). The river diversion method to be used will be based on performance-based requirements. Two main requirements will be: (1) maintenance of a minimum continuous flow in the spillway of 140 cfs, 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 work). The contractor will be required to submit a river diversion plan meeting the performance 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 posting of the draft EA and draft FONSI for a 30-day public and agency review serves as the forum for public input. All public input and requests for information will be considered, and where applicable will be incorporated and identified in the final project design and 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. There are no impacts that are both beneficial and adverse.

(2) Public health and safety: *No adverse impact.* The SRS spillway raise project will have no impact to public health and safety.

(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 known. There is no controversy over the effects of the project.

(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 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.

(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 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 is expected to have no identified impacts on any protected historical or cultural features or 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 determined that the proposed action is not likely to adversely affect listed steelhead and coho salmon or their designated critical habitat. A no effect determination was documented for 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