



Spirit Lake Outflow Safety Improvement Project



Gifford Pinchot National Forest

Purpose of the Project

The purpose of the Project is to provide for the safety of downstream communities by reducing the risk of flooding and mudflows from a failure of the Spirit Lake debris blockage.

Following the 1980 eruption of Mount St. Helens, Spirit Lake’s natural outlet to the Toutle River system was blocked by the landslide and debris flow from the eruption. The Spirit Lake tunnel was constructed under emergency conditions to address the imminent public safety threat posed by rising water levels in Spirit Lake. The tunnel is in an area of volcanic, geologic, hydrologic, and seismic hazards.

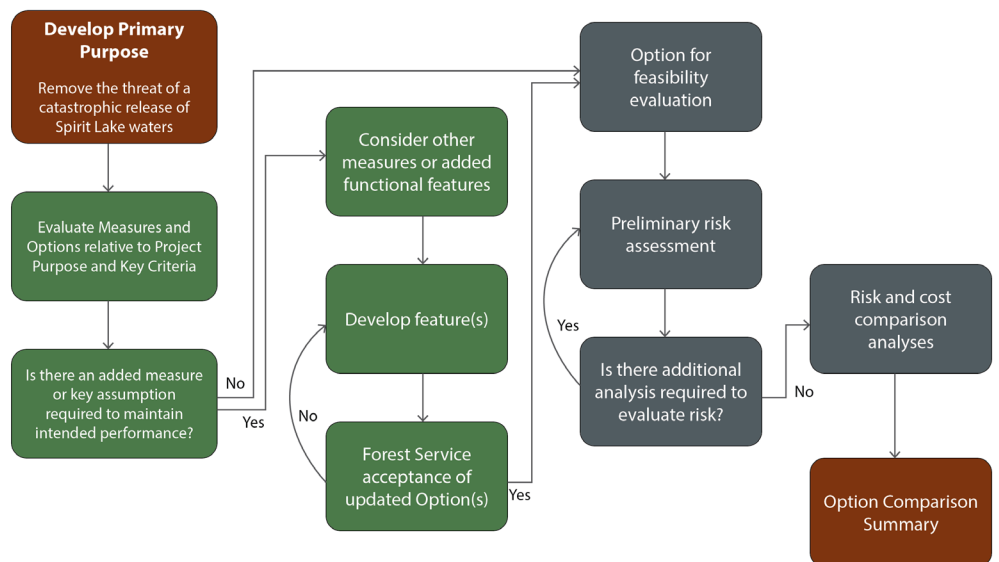
The geological pressures on the tunnel have caused rock heave, compression, cracking and support failures, necessitating periodic repairs. As the tunnel ages, it will require more frequent and longer closures for repair to prevent failure. It is not expected to remain serviceable without significant repair and/or upgrade.

A failure of the tunnel would result in rising lake levels that could exceed the maximum safe operating level, at which point pressure from rising water levels could force the breaching of the natural debris blockage, putting the downstream population of approximately 50,000 people at risk of catastrophic flooding and mudflows.

Primary Needs to Meet the Project Purpose

- Accommodate lake level rise from a flood event without exceeding the maximum safe level
- Improve access reliability to outflow infrastructure.
 - Current access takes 4.5 hours and requires a combination of travel modes including high-clearances passenger vehicles, UTVs, and a boat.
 - Heavy equipment cannot be mobilized to the inlet for repairs.
 - The area is under snow a significant portion of the year. Helicopter access is often not viable or safe due to poor weather conditions.
 - Moving, floating, 40-acre log mat prevents boat access part of the time.
- Create outflow redundancy such that if one method is closed for repair, the lake will remain at safe levels.
- Reduce long-term operation and maintenance burden. The existing tunnel has required repeated significant challenging and costly repairs and is not been resilient long-term.

Figure 1. Process of developing options for the Spirit Lake Outflow Safety Improvement Project.





Current Options Under Consideration



Option	Primary Lake Level Control Measure	Redundant Lake Level Control Measure
A	Construct a large Open Channel Outlet that releases water when Spirit Lake levels are above 3,440 ft elevation	The Existing Outlet Tunnel serves as a redundant back-up outlet
B	Full rehabilitation/repair of Existing Outlet Tunnel and reinforcement through the shear zones	Spirit Lake Storage buffer would be revised based on new evaluation of maximum safe lake level
C	New Pressure Tunnel through Harry's Ridge (parallel to existing tunnel) that would lower the level of Spirit Lake to the west (sets the stage for Engineering with Nature)	The Existing Outlet Tunnel serves as back-up outlet
D	Full rehabilitation/repair of Existing Outlet Tunnel and reinforcement through the shear zones	Install a Buried Conduit Emergency Spillway through the debris blockage that would be large enough to function as a passive emergency spillway (allows development of a pilot outlet channel with fail-safe protection)
E	Convert the Existing Outlet Tunnel into a pressure tunnel	Spirit Lake Storage buffer would be revised based on new evaluation of maximum safe lake level
F	New Outlet Tunnel & Intake through Harry's Ridge (parallel to existing tunnel)	Spirit Lake Storage buffer would be revised based on new evaluation of maximum safe lake level with additional option of using the Existing Outlet Tunnel for intake access and/or emergency outlet capacity
-	The No Action Alternative would mean that no outflow improvement is selected, but repair of the existing tunnel will be unavoidable in the future	

Necessary Elements of All Options

Primary Outlet

- The main outlet. Designed to be reliable, resilient to natural hazards, and long-lasting.

Redundant Capacity

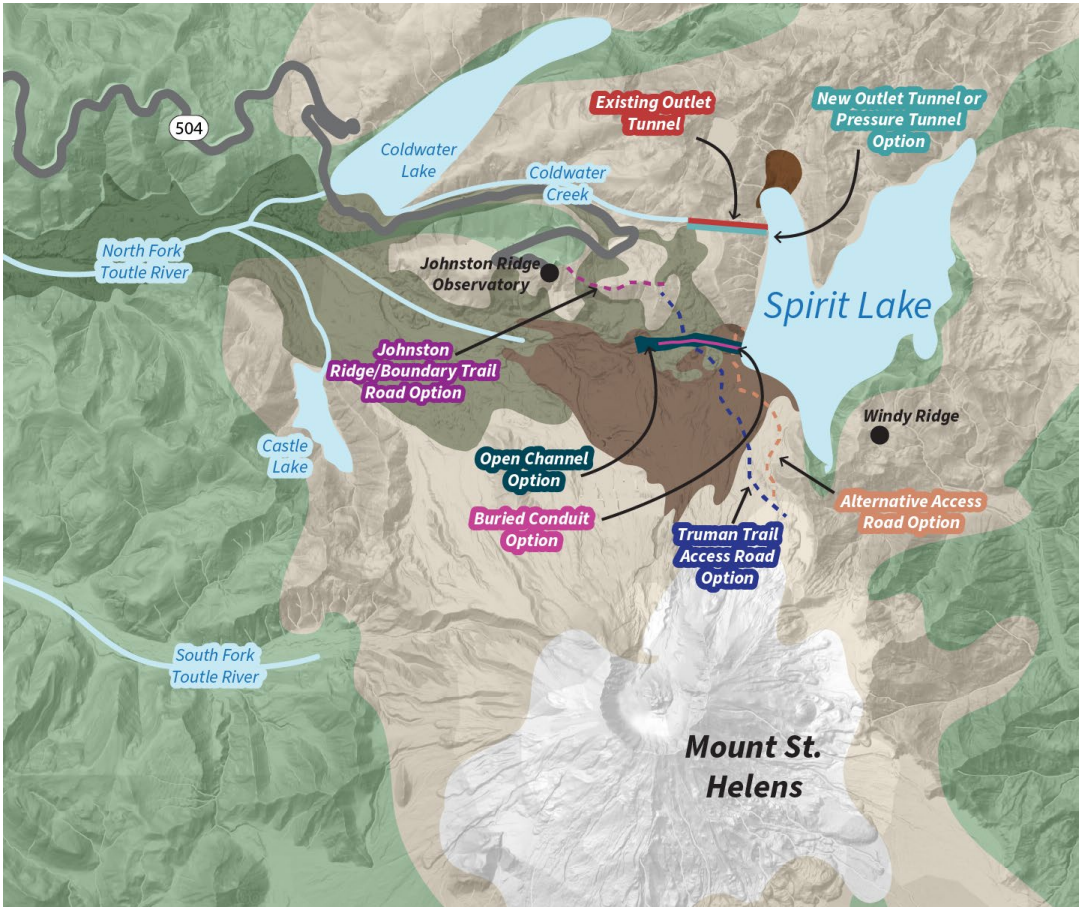
- A secondary option for lake level management. Can be relied upon in an emergency or if the primary outlet is offline.

Reliable Access

- All-season access routes for operations, maintenance, and emergency response.

Support Infrastructure

- Infrastructure needed to support operations and maintenance, and repair efforts in the long term. Examples include staging areas, power supply, instrumentation, monitoring equipment, etc.



Map 1. Locations of potential primary and redundant lake level control measures

Comments concerning the scope of the analysis must be received by November 15, 2024. The draft environmental impact statement is expected May 2025, and the final environmental impact statement is expected October 2025.

Send written scoping comments via U.S. Mail to:
Kelsey Jolley, Spirit Lake NEPA Coordinator
987 McClellan Road
Vancouver, WA 98661.

Comments may also be submitted electronically through the Comment and Analysis Response Application (CARA) at:
<https://cara.fs2c.usda.gov/Public//CommentInput?Project=66482>

An in-person public scoping meeting will be held at the Cowlitz County Event Center located at 1900 7th Avenue, Longview, Washington from 4 to 8 p.m. on Wednesday October 23, 2024.