

Urgent Need to Act: Aging infrastructure and local geological stress have increased the risk of tunnel failure

- The top of the infographic is an artistic watercolor style representation of the Mount Saint Helens landscape with an overlaid graphic drawing of a cross section of Harry's Ridge where the Spirit Lake tunnel can be seen with its intake at Spirit Lake and its outflow leaving the ridge on the opposite side of the ridge. A zoomed in view of the tunnel shows the area prone to damage with indicators of the approximate location of shear zones and faults that damage the tunnel. Two repair events are highlighted:
- 1995/1996: Large sections of shotcrete had pulled away from the tunnel walls and the floor had heaved and cracked. Some supportive ribs had buckled.
- 2015/2016: Significant floor heave from high ground pressure reduced the tunnel diameter from 11 feet to 7 feet, restricting flow capacity. An image is attached showing workers in yellow safety suits repairing the inside of the tunnel.

A summary paragraph is provided that describes the current status and future of the tunnel as follows:

1. **Current Status:** The tunnel was built in an emergency capacity to address the immediate danger of Spirit Lake overflowing after the Mount St. Helens eruption. During the tunnel's lifespan, it has maintained the level of Spirit Lake at a safe elevation. The lake only approaches its maximum safe operating level when the tunnel is closed for repair.
2. **The Tunnel Is No Longer Operating Optimally:** The area around Mount St. Helens, including Harry's Ridge where the tunnel is located, is geologically active, creating evolving subsurface conditions and shifting geologic structure. The tunnel crosses both strong and weak rock along faults and shear zones. The geological pressures in these weak zones have caused rock heave, compression, cracking, and support failures, which have necessitated periodic major repairs.
3. **Increasing Probability of Tunnel Failure:** As the tunnel ages, it will require more frequent and longer closures for repair to prevent failure. A failure 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 release of the natural debris blockage, putting the downstream population of approximately 50,000 people at risk of catastrophic flooding and mudflows. The overall purpose of this project is to find a long-term solution to this issue to ensure the safety of downstream communities."