The Threat Below Mount St. Helens

Forty years after the mountain's eruption, officials struggle to balance research and risk.

By Eric Wagner
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The Pumice Plain in southwest Washington's Mount St. Helens National Volcanic Monument is one of the most closely studied patches of land in the world. Named for the type of volcanic rock that dominates it, it formed during the mountain's 1980 eruption. Since then, ecologists have scrutinized it, surveying birds, mammals and plants, and in general cataloging the return of life to this unique and fragile landscape.

Now, the depth of that attention is threatened, but not due to the stirrings of the most active volcano in the Pacific Northwest. The problem is a large lake two miles north of the mountain: Spirit Lake. Or, more specifically, the Spirit Lake tunnel, an artificial outlet built out of necessity and completed in 1985.

After nearly four decades, the tunnel is in need of an upgrade. At issue is the road the Forest Service plans to build across the Pumice Plain despite the scientific plots dotting the plain's expanse. In this, Spirit Lake and its tunnel have become the de facto headwaters of a struggle over how best to manage research and risk on a mountain famous for its destructive capabilities.

The entanglement of the land, the lake and the tunnel began 40 years ago, when Mount St. Helens erupted on May 18, 1980. At 8:32 a.m., a strong earthquake caused the mountain's summit and north flank to collapse in one of the largest landslides in recorded history. Some of the debris slammed into Spirit Lake, but most of it rumbled 14 miles down the North Fork Toutle River Valley. Huge mudflows rushed down the Toutle and Cowlitz rivers, destroying hundreds of bridges, homes and buildings.

The eruption killed 57 people and caused millions of dollars in damages. Mount St. Helens shed more than 1,300 feet of elevation, hundreds of square miles of forest were buried or flattened, and Spirit Lake was left a steaming black broth full of logs, dead animals, pumice and ash. Its surface area nearly doubled to about 2,200 acres, and its sole outlet, to the North Fork Toutle River, was buried under up to 600 feet of debris.

Having no outlet, and with rain and snowmelt still flowing in, Spirit Lake began to rise. The situation was dangerous: If the basin filled, the lake could overtop the debris field and radically destabilize it, unleashing another devastating mudflow that would send millions of tons of sediment toward the towns of Toutle, Castle Rock and Longview, Washington.

To forestall this, the U.S. Army Corps of Engineers built a 1.6-mile-long tunnel through a ridge, allowing water to flow out to the river. That held the lake's surface steady, but the ridge itself remained in constant — if slow — motion: Twelve faults and sheer zones have squeezed and buckled the tunnel, causing engineers to close it several times for repairs. During one closure in the winter of 2016, Spirit Lake rose more than 30 feet. "It was definitely a wake-up call," said Chris Strebig, a project director with the U.S. Forest Service, the agency that oversees the monument. What if something — perhaps another earthquake — severely damaged the tunnel? Federal managers are facing a situation that Rebecca Hoffman, the monument's manager, characterizes as an urgent, although not immediate, crisis — a potential catastrophe. "This is the struggle we're in the middle of," she said. "I don't want to get to the point where we wait for an emergency."

The Forest Service decided to open a second outlet as a safeguard. To gauge a likely route's feasibility, the agency needs to drill into the debris blockage and study its composition. Its plan for doing so, however, has unsettled another group deeply interested in the region: scientists.

After the 1980 eruption, some of the first people to visit the blast area were researchers. For a group of ecologists from the Forest Service and universities across the Pacific Northwest, the eruption was a huge, unplanned experiment, a chance to test some of their discipline's oldest theories about how life responds to what can seem like total devastation.

The scientists set up hundreds of studies. It was in large part at their urging that the federal government created the monument in 1982, setting it aside as a place for "geologic forces and ecological succession to continue substantially unimpeded." Many plots from 1980 are still studied today, and the work has had a broad reach. One group's findings have helped shape regional forest management by uncovering the role "biological legacies" — organisms that survived the blast — played in the development of the post-eruption community. Another group described how plants returned to the denuded space of the Pumice Plain willy-nilly, rather than in the orderly fashion theory previously presumed.

The sediment retention structure and upstream sediment plain on the North Fork Toutle River, flowing out of Spirit Lake. Photo Credit: U.S. Army Corps of Engineers

"Mount St. Helens has taught us so much about how plants and animals respond to large disturbances," said Charlie Crisafulli, a Forest Service ecologist who came to the blast area in the summer of 1980 and never left. "It has let us ask questions that we can't ask anywhere else in the world. That's what makes this such a valuable landscape."

Now, however, ecologists are worried. In 2018, the Forest Service proposed constructing a 3-mile road across the Pumice Plain to move drilling rigs to test sites. Scientists and conservationists objected so strongly that the agency withdrew the proposal. Then, a few months later, in December 2019, it released a new one. This time, in addition to tacking on some tunnel mainte-

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