The Salmonberry River

Finding a Solution to the
Landslide-Prone Railroad on the Salmonberry River

The Salmonberry River: Healthy fish habitat
Photo credit: David Moskowitz

The Salmonberry River: Collapsed railroad and erosion
Photo credit: Port of Tillamook Bay

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For more information please contact:

Guido Rahr, CEO and President, Wild Salmon Center, 503-222-1804
Chris Robbins, Northwest Program Manager, Wild Salmon Center, 503-222-1804
David Moskowitz, Confluence Consulting LLC, 971-235-8953

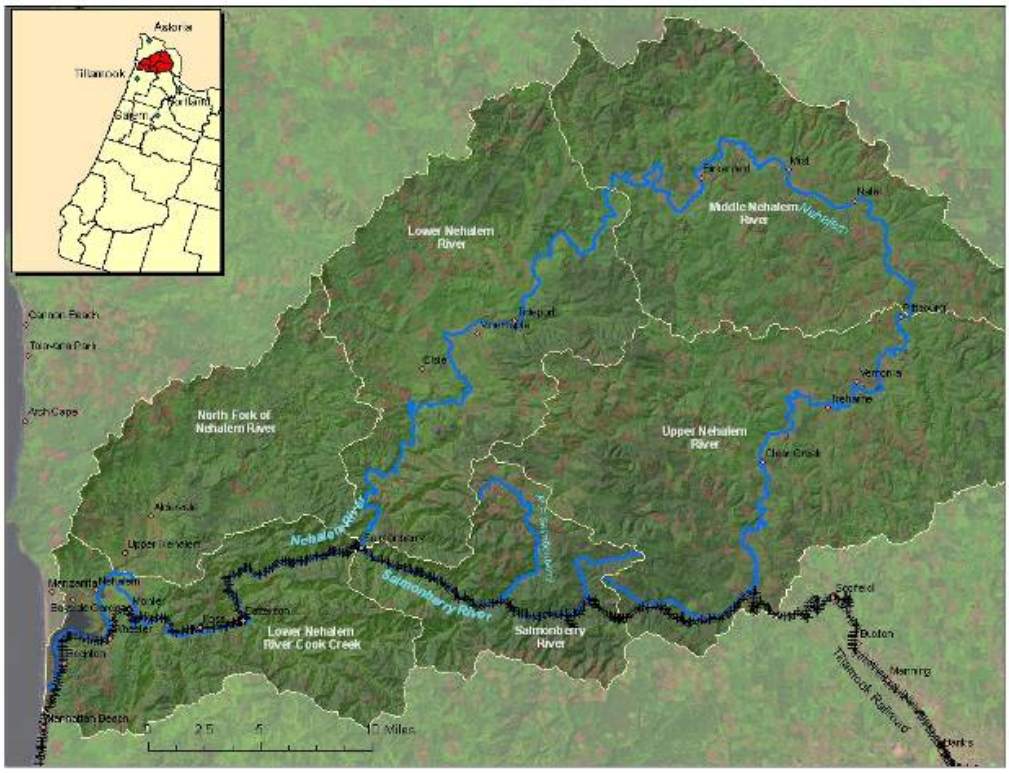
Introduction

Located on Oregon's North Coast, the Nehalem basin and its tributaries are celebrated for having some of the healthiest wild salmon and steelhead runs in the Pacific Northwest. The Nehalem main stem itself is more than 120 miles long. One of its major tributaries, the scenic Salmonberry River, is famous for its clear water and race of large, wild winter steelhead. The Salmonberry and lower reaches of the main stem Nehalem are also used as the corridor for the Port of Tillamook Bay rail line (Map 1). A legacy of industrial forest management in the watershed produces clear-cuts that along with road failures and plugged culverts contribute to erosion and debris flows in a watershed naturally prone to landslides.

Significant repairs have been made to the rail line over the years. In February 1996 and again in December 2007, strong storms triggered landslides and eroded banks that led to the collapse of portions of the railroad and embankment, damaging important spawning and rearing habitat for chinook salmon and winter steelhead in both the Salmonberry and lower Nehalem River. The government spent millions on repairs after the 1996 storm and twice as much may be needed to repair the railroad in 2008.

In our view, the railroad is an ecological and commercial liability. Alternatives should be analyzed that would replace the Coast Range stretch of the rail line with one that is more cost-effective and restores the health and resiliency of the Nehalem and Salmonberry watersheds. Specific recommendations are provided on page 9.

Map 1. The Nehalem Basin and Port of Tillamook Bay Railroad



The Salmonberry River – A Salmon and Steelhead Stronghold

The Nehalem River basin located on Oregon's North Coast produces some of the strongest and most diverse populations of wild anadromous salmon and trout in the Pacific Northwest. Chum, summer and fall chinook, coho, winter steelhead and sea-run cutthroat trout spawn and rear in the Nehalem River and its tributaries. One of Oregon's last remaining wild chum populations inhabits the lower Nehalem. Wild fish originating from the Nehalem support a robust ocean and in-river recreational fishery, which in turn helps the local economy. Uncaught fish nourish the river ecosystem by releasing essential ocean nutrients after they spawn and die.

One of the most famous Nehalem tributaries is the Salmonberry River, which has some of the best winter steelhead habitat and one of the healthiest remaining wild runs of the species in the state. The 42,000-acre Salmonberry watershed is the single largest producer of wild steelhead in the Nehalem and supports a wild population that, at times, may exceed 2,000 fish. The Oregon Department of Fish and Wildlife classifies the watershed as a Core Area for salmon survival and the Oregon Department of Forestry has designated a portion as a Salmon Anchor Habitat.

Steelhead in the Salmonberry spawn later than other steelhead runs on the coast and some exhibit astounding migration skills by navigating waterfalls as high as 12 feet. The large size of Salmonberry steelhead, approaching upwards of 30 pounds, makes them unique to this region. Larger wild fish may be the evolutionary result of the river's formidable physical environment that favors size and strength. Bigger, stronger fish may be more successful clearing waterfalls or excavating redds in fast-moving water than smaller, less powerful fish.

The Salmonberry is managed as an unofficial wild steelhead genetic reserve because the river is not stocked with hatchery fish. The absence of hatchery supplementation minimizes wild/hatchery fish interactions that could be genetically and ecologically undesirable for native fish. The life history traits, adaptations and favorable management practices that help make or maintain a genetically unique race of wild fish underscore the river's importance as a steelhead stronghold and the need for protecting the watershed.

Unstable Railroad Damages Fish Habitat

Several factors threaten fish habitat in the Salmonberry and lower Nehalem. The railroad operated by the Port of Tillamook Bay that runs along 14 miles of the Salmonberry is susceptible to recurring landslides, blowouts and erosion (Map 1). The elevated and hardened embankment used to support the rail line accelerates water velocities and thus increases the river's erosive power. Disposal of slide material over the bank into the river and herbicide spraying of riparian vegetation in the railroad right of way is also an aquatic conservation concern.

During heavy rainfall, sections of the railroad can collapse, releasing silt and mud into the river that can smother incubating fish eggs during certain times of the year. Emergency railroad restoration in the winter and spring has produced large volumes of silt coinciding

with wild steelhead spawning. In-stream habitat and fish surveys following the 1996 February flood and slides found that the quality of fish habitat and number of fish had declined. Juvenile and adult fish surveys conducted in subsequent years showed steelhead had recovered but the limits to which wild fish can withstand repeated disturbance of this magnitude are unknown.

The lack of routine maintenance on the rail line has worked in concert with floods to impact the infrastructure and fish habitat by leaving culverts plugged, spoil piles and leaking oiler boxes. In 1999, failure of a railroad retaining wall combined with portions of the collapsed cliff opposite the wall blocked most fish passage above Kinney Creek for two years. A total of 4.5 miles of steelhead spawning habitat was blocked, counting the main stem Salmonberry (three miles up to a barrier falls) and Wolf Creek (1.5 mi.). Approximately one mile of chinook spawning habitat up to Wolf Creek was also blocked. The artificially elevated railroad embankment creates steep banks above the railroad, increasing the risk of landslides near the tracks.

Continuing slides and loading of rip rap and creosote-treated railroad ties in the Salmonberry could travel to and accumulate in the Nehalem, potentially affecting water quality.

The Port of Tillamook Rail Line – History and Economics in Brief

Completed in 1911, the Port of Tillamook Bay (POTB) railroad connects the city of Tillamook to the greater Portland metropolitan area. For 70 years it was owned and operated by the Southern Pacific Railroad, which sought and received in 1986 federal approval to abandon the railway because diminished traffic levels had made it uneconomical for large railroad operation. POTB acquired full ownership of the line in 1990. The line originates in Tillamook and serves the coastal communities of Garibaldi, Rockaway Beach and Wheeler before winding its way east following the lush forests and clear waters of the Nehalem's lower main stem and Salmonberry for 33 miles. The POTB rail line directly employs 16 people. The railroad partially supports nearly 500 jobs in the forest products industry as forest product companies ship some of their whole logs and milled wood products to connecting lines in Portland. Local dairies use the railroad to import cattle feed, which was 6.5% of the railroad's Tillamook-Garibaldi business in 2006. The railroad's coastal segment from Tillamook to Garibaldi could be retained if the east-west route along the Salmonberry River were removed. On average, in 2006 the railroad generated 60 carloads per week west of the Coast Range summit.

The POTB rail line, in debt since the 1996 storm, has never been profitable. In an attempt to pay their 25 percent matching share of FEMA funding for 1996 repairs, the railroad deeded the Karban rock quarry to Rick Franklin Construction and sold right-of-way rights to a fiber optic cable company. The state paid an additional amount. Without state or federal funding for reconstruction, the future of the rail line is uncertain.

Railroad Troubles Tied to Flood and-Landslide-Prone Terrain, Forestry Practices

Oregon's North Coast is an incredibly dynamic and wet environment. The region was and continues to be shaped by floods, a natural occurrence that climatologists predict will become more frequent and severe in response to the effects of climate change. Rainfall amounts in the Salmonberry watershed are some of the highest in the Coast Range. In the Nehalem River basin alone, six major flood events have occurred in a little more than 100 years.

Storms and the landslides they trigger have severely damaged the rail line several times in the past 15 years, three times quite severely. In 1992, the line experienced flood damage just as an initial effort to upgrade the line due to a one-time federal grant was in process. In 1996, the line was damaged by a storm and 88 separate repair sites required $13 million to repair, with the majority of funding coming from the federal government. In December 2007, another storm obliterated or impaired large sections of the line. Three bridges sustained damage and one tunnel is blocked with mud and debris. Construction and fill material needed to repair the line may cost as much as $30 million.

Portions of the watershed are very steep and characterized as high-risk landslide areas that even under natural conditions trigger scouring debris flows (Map 2). The area immediately upslope of the railroad on the north side of the river's lower five miles, the lower reach of the North Fork and several smaller drainages are at greater risk from landslides. Following the December 2007 storm, surveys of the railroad and riparian vegetation revealed damage to the infrastructure in at least three places believed to have been caused by debris flows originating in landslide hazard areas: tracks (RM 3.7, Image 1); the trestle spanning Clay Creek (RM 5.8, Image 2); and the tracks at the confluence of Bathtub Creek and the main stem Salmonberry (RM 7.1).

Map 2. Landslide potential in the Salmonberry River watershed

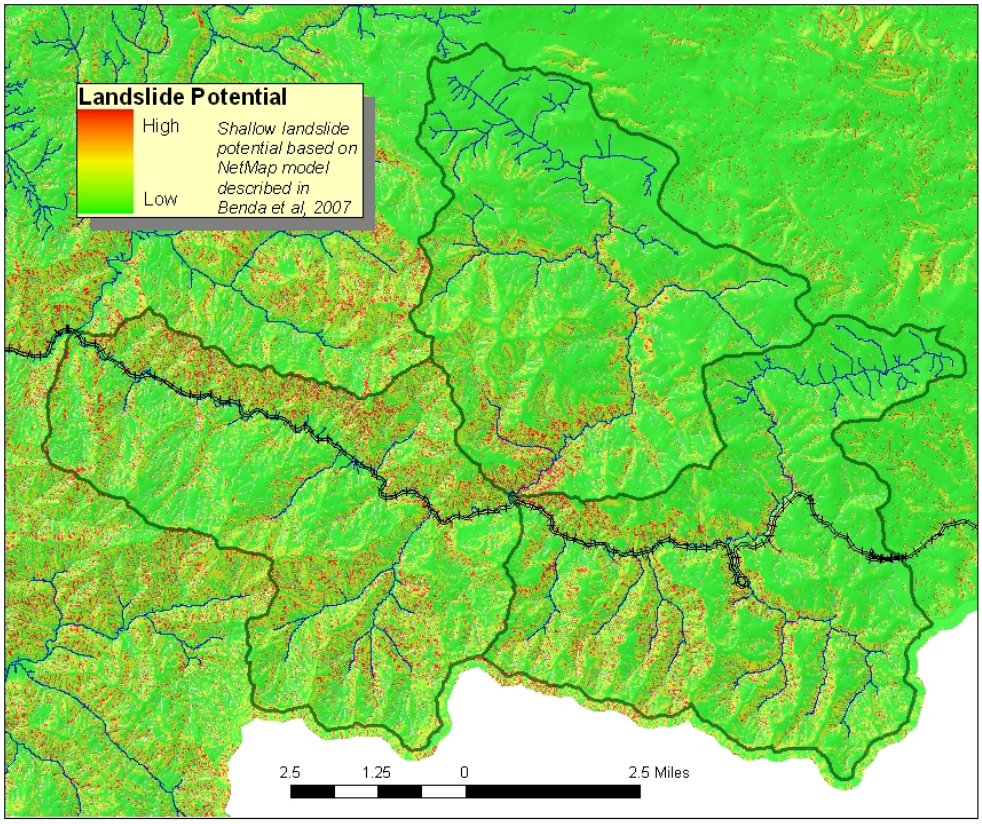


Image 1. Debris flow and railroad damage at unnamed creek (River Mile 3.7)

Photo credit: Ian Fergusson

Image 2. Damage at Clay Creek (River Mile 5.8)

Photo credit: Ian Fergusson

The Salmonberry's topography and terrain pose natural hazards to the railroad. However, a legacy of intensive forestry and the lingering effects of clear-cuts in the watershed have destabilized soils and slopes. Forestry practices have likely contributed to railroad damage and aquatic habitat impacts during heavy rains and floods by increasing the frequency and

intensity of land slides in the Salmonberry drainage. An analysis of timber harvest levels in the watershed using satellite imagery shows that timber harvest has accelerated since the early 1980s (Map 3). Between 1991 and 2007, almost 20 percent of the forest was cut, predominately on private industrial forestlands (Table 1).

Roads and culverts put down to accommodate log trucks and heavy machinery can fail, causing severe erosion and debris flows harmful to fish habitat. In 1996, damage to trestles at Kinney Creek and Bathtub Creek and tunnel 32 across the river from Tunnel Creek was caused by debris avalanches that started up tributaries far from the rail line. While the railroad did not sustain any direct damage at its junction with Wolf Creek in 1996, a slide started in a thinned area (Image 3) above the creek, a steelhead-bearing tributary of the Salmonberry. The resulting debris avalanche obliterated Wolf Creek road (Image 4), and continued on to scour riparian vegetation along the creek downstream for about three miles to the confluence with the Salmonberry River.

Image 3. Origin of Wolf Creek slide near thinned area

Photo credit: Ian Fergusson

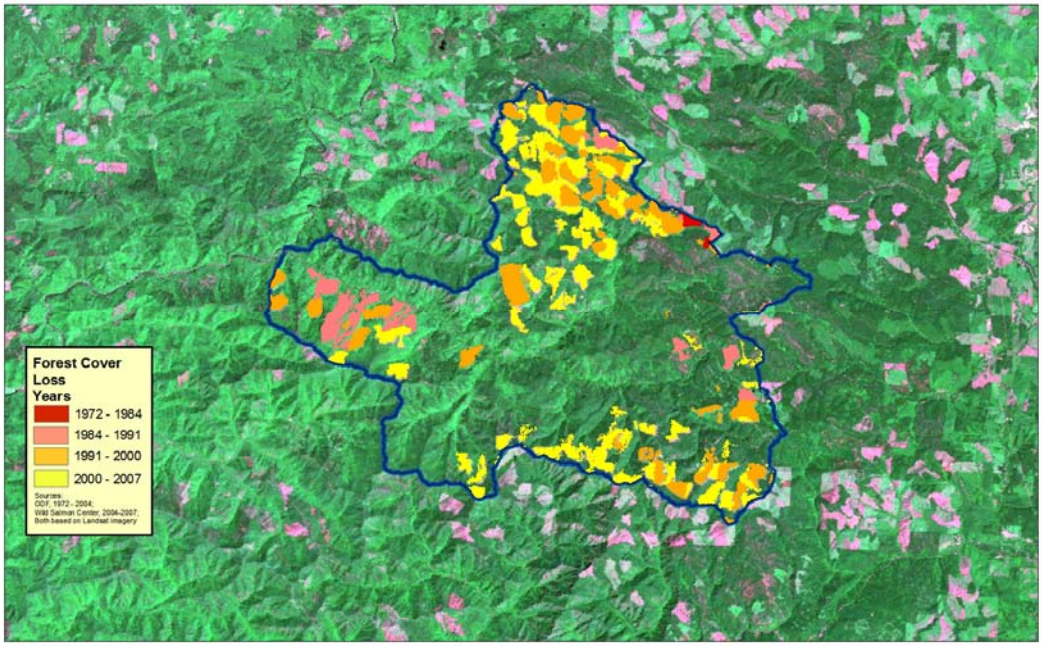
Image 4. Location of Wolf Creek road failure and severe Erosion about a quarter mile from slide origin

Photo credit: Ian Fergusson

Table 1. Forest cover loss in the Salmonberry drainage from 1972 to 2007

Period	Acres lost	% Change
1972-1984	85	0.19%
1984-1991	1,445	3.18%
1991-2000	3,664	8.06%
2000-2007	5,011	11.03%

Map 3. Forest cover loss in the Salmonberry watershed (1972-2007)



Recommendations

The conservation community believes that the reasons to find alternative shipping routes or methods for the POTB rail line are threefold: 1) chronic and repeated episodes of flood-induced collapse of the track and resulting sedimentation threaten irreplaceable steelhead and salmon habitat in the Salmonberry River and lower Nehalem; 2) the susceptibility of the rail line to the effects of clear-cuts and future floods remains problematic, the latter increasing with climate change; and 3) the estimated $30 million cost to rebuild an unprofitable rail line that presents foreseeable location-related structural problems and adverse aquatic impacts is not a responsible use of taxpayer money.

We also realize the importance of the POTB rail line to local jobs and the wood products and dairy industries. Thus, we recommend economically and ecologically sustainable alternatives be found that protect Salmonberry watershed health and local commercial and community interests.

Specifically, we recommend the following:

- The composition of the Governor's committee evaluating shipping alternatives to the Port of Tillamook Bay Railroad should include the full range of experts, including biologists familiar with the Salmonberry River and railroad interactions and impacts on sensitive fish spawning grounds.

- Assess and adopt alternative modes and routes for shipping cargo to and from Tillamook that do not require use of the railroad along the ecologically sensitive Salmonberry.

    - One possibility is a multi-modal system involving a rail-barge-rail shipping system that utilizes existing POTB rail from Tillamook to Garibaldi. Barges would load/unload at Port of Garibaldi and ship cargo to/from Tongue Point near Astoria for transfer to rail to/from Portland metro area. This would appear to be the most innovative, sustainable (smallest carbon footprint) and potentially most economically viable solution.
    - Another option is a truck-to-rail approach. Given the low volume of weekly cargo, truck traffic increases would not be substantial.

- Explore the availability of funding from the Federal Emergency Management Agency that could support or subsidize the following actions.

    - Construct rail spurs and dock construction at Ports of Garibaldi and Astoria
    - Purchase barges for transport from Garibaldi to Astoria.
    - Decommission the rail line from Wheeler to Banks and convert the rail to an accessible "Banks to Beaches" trail for tourists, anglers, hikers and others. Promoting Oregon's longest rail-to-trail conversion as an eco-tourism destination and recreational attraction could benefit a suite of businesses in Tillamook, Clatsop and Washington counties.
    - Purchase or swap private industrial forestland in the Salmonberry for transfer to the Oregon Department of Forestry.
    - Retire old and neglected culverts and logging roads that contribute to erosion and mudslides that threaten the Salmonberry River or its tributaries.

- Designate the Salmonberry River the state's first official wild steelhead and salmon reserve to be managed in perpetuity for native anadromous fish.

Contacts

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