Tenmile Creek IMW Oregon – Accomplishment Report

Tenmile Creek Intensively Monitored Watershed Overview

Focal Species: winter steelhead, coho salmon, coastal cutthroat trout

Limiting Factors: Habitat complexity

Restoration Strategy: The Tenmile Creek IMW focused on evaluating the effect of the placement of large wood in the instream channel. Other restoration actions in the Tenmile Creek watershed have included road removal and stabilization, modification of riparian vegetation, and replacement of culverts to improve fish passage.

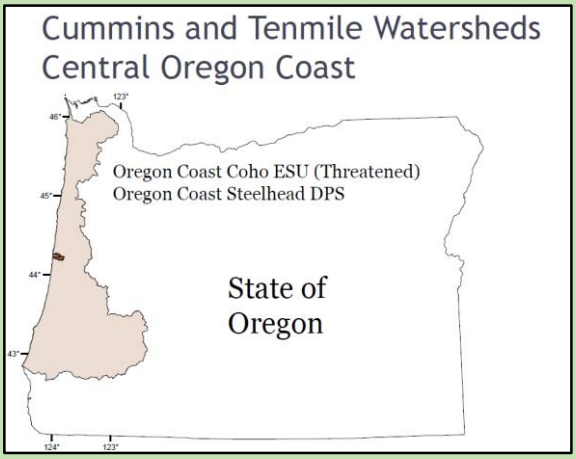
Experimental Design

Objective: Determine the whole-watershed fish and habitat response to large wood addition

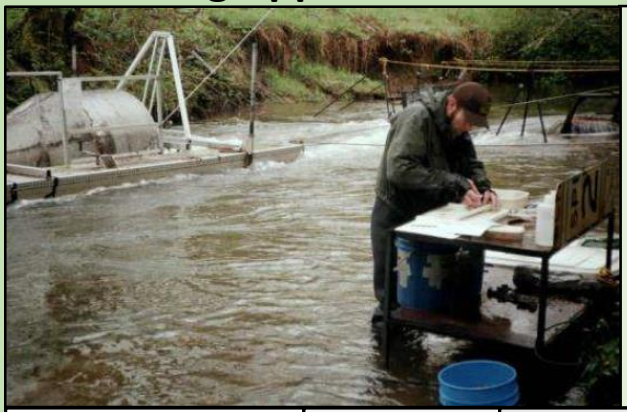
Design: Before-After-Control Impact (BACI) design

Treatment Watershed: Tenmile Creek (61 km^2)
- Direct Ocean Tributary

Control Watershed: Cummins Creek (25 km^2)
- Direct Ocean Tributary; Designated Wilderness Area



Monitoring Approach



Habitat: summer and winter habitat surveys
- Unit Type and Surface Area
- Substrate Classification
- Counts of Key Pieces of Wood

Fish: summer parr surveys
- Calibrated pool snorkel counts
- Electrofishing in non-pool habitats
- Spring downstream migrant trapping

Pre-Treatment Baseline 1991 - 1996	Wood Addition 1996	Post Treatment 1997-2001	Outmigrant Trapping 2002-2012	Tenmile Only Trapping 2013-Present (2017)

Restoration Approach

In 1996, 241 large conifer trees were placed in the upper portion of the Tenmile Creek watershed (approximately 11 stream km) as well as some large wood additions following a large winter storm in 1996 prior to wood placement.

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Habitat Responses

Wood addition led to increases in large wood, pool habitat, and pool quality in the treatment stream.

Localized gravel deposition was observed at wood jams, but no reach level changes were detected.

Fish Population Responses

Abundance: Age 0+ Steelhead increased in the control watershed but did not change in the treatment watershed; Steelhead smolts increased in both watersheds. Coho Age 0+ and smolt abundance did not change in either watershed.

Survival (0+ to Smolt): Freshwater survival increased for both coho and steelhead in the treatment watershed.

Successes and Challenges

Successes:

- Watershed-scale evaluation over a long time period (outmigrant monitoring continues today)
- Monitored multiple life stages
- Used life-stage focused metrics that directly related to the treatment (i.e., survival)
- Monitored both physical and biological responses

Challenges:

- External confounding factors (1996 flood event; low spawner abundance)
- Reference stream did not track treatment stream
  - Reference stream juvenile densities were initially low (limited by spawner abundance)

Future Directions/Lessons Learned

- Long-term, sustained monitoring is key to identifying a response to habitat treatment.
- Consider intense monitoring vs. widespread monitoring (e.g., two life stages at two sites vs. outmigrants only at three or more sites).
- Monitor additional life stages - Monitoring spawners can provide context, but spawner abundance is an expensive covariate.
- Monitor when abundance is sufficient to exploit increased habitat from restoration.

Cooperators included the US Forest Service, National Audubon Society, and Tenmile Creek landowners

The Oregon Department of Fish and Wildlife extends a special thank you to the dedicated field crews who made this work possible.