OLYMPIC MOUNTAINS

PROJECT EFFECTIVENESS MONITORING

Results will inform reach-scale outcomes associated with innovative restoration actions.

STATUS AND TRENDS MONITORING

Establish baseline status of aquatic species and watershed conditions and document changes through time.

Beaver Dam Analogs Project Effectiveness Study

Status: Post-implementation Monitoring

Preliminary Recommendations:

Sourcing materials: Untreated conifer wood posts are hard to come by. If working with timber landowners, ask to cut posts from pre-commercial thinning (PCT) sites.

Finished height: For sites with higher stream power, we recommend cutting posts off at a height approximately level with the adjacent floodplain, or ~2 feet above the top of the weave in deeply incised channels. This helps to reduce potential passage impediments for migrating adult salmon and minimizes scour associated with accumulation of flood debris.

Initial Installation with fir boughs.

Trimmed to finished height.

Fir boughs: Start with a thick layer of green fir boughs set through the posts (not woven between the posts) that extends several feet upstream and downstream from the BDA to provide a protective scour mat. Add 5-10 rows of fir boughs, alternately facing upstream and downstream, over the entire width of the BDA. The natural curve of the bough should face down like a dome, not up like a cup.

Preliminary results from the BDA monitoring effort have shown variable success relative to the durability of BDAs in streams under varying high flow conditions, with streams breaching several BDAs during high-flow events.

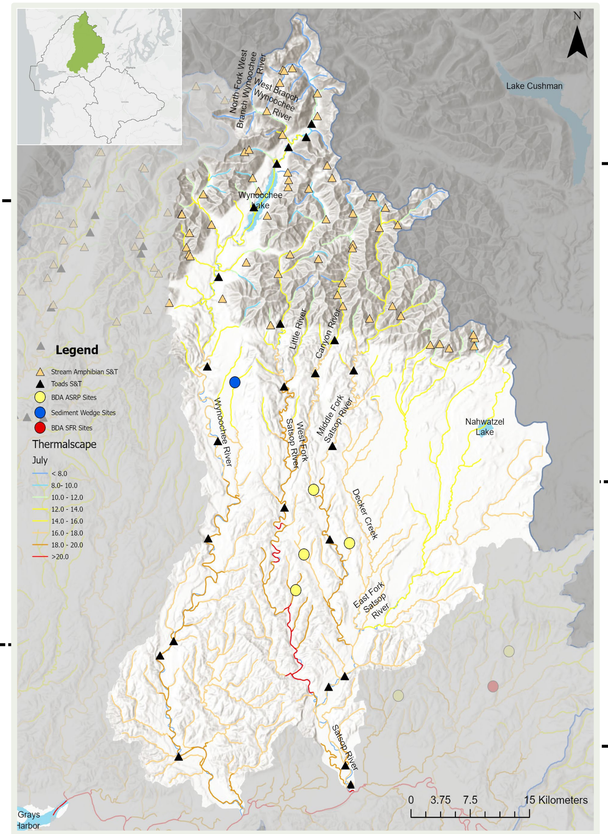
Sediment Wedge Project Effectiveness Study

Status: Post-implementation Monitoring

Delezene post-treatment.

Schafer post-treatment.

Post-construction surveys showed coho redds upstream of the sediment wedge, indicating it did not represent a barrier to fish passage. Electrofishing surveys performed directly after construction revealed few coho in the treatment reach. The summer following treatment, numerous juvenile coho were observed throughout the wedge structure.



Center Map: Olympic Cluster Boundary including all study locations and Thermalscape stream lines.

Target Species Studies

The Olympic Rivers serve as a vital habitat for the **Western Toad**. Research indicates that breeding sites for toads are not linked to riparian forest cover but are positively correlated with overall landscape forest cover, exhibiting significant differences among watersheds. Additionally, breeding shows a weak negative correlation with stream temperature. These findings suggest that safeguarding upland forest habitats is likely beneficial for toads, highlighting the importance of both local (microhabitat conditions within pools) and landscape-scale (forest cover) habitat associations.

Western Toad (*Anaxyrus boreas*)

Cope's Giant Salamander (*Dicamptodon copei*)

Stream-associated Amphibians are found throughout the Chehalis Basin. Coastal Tailed Frogs were detected at 59%, giant salamanders at 67%, and torrent salamanders at 44% of sites basin-wide. Species are sensitive indicators of habitat conditions and climate change. Study findings varied by region and species.

Olympic Torrent Salamander (*Rhyacotriton olympicus*)

Coastal Tailed Frog (*Ascaphus truei*)

Freshwater mussel inventory efforts in the Olympics have been limited to the lower Satsop River. In other areas of the Chehalis, die-offs of the Western Ridged Mussel have been recorded at 7 of 9 historic sites (78%), with the remaining two sites showing very low densities. Only 5 new sites, also with low densities, were identified during 200 miles of river and stream surveys. Continued monitoring efforts have been utilizing environmental DNA (eDNA). These findings will guide restoration actions aimed at improving mussel habitat and reducing disturbances from other restoration activities.

Western Pearlshell Mussel (*Margaritifera falcata*)

Coastal Cutthroat Trout (*Oncorhynchus clarkii clarkii*)

Olympic Mudminnow, (*Novumbra hubbsi*)

Sculpin (*Cottus sp.*)

Brook Lamprey (*Lampetra spp.*)

Coho Salmon (*Oncorhynchus kisutch*)

Thermalscape Temperature Monitoring and Fish Studeies

Thermalscape and **non-native fish** projections inform future threats to aquatic systems. Cool water habitat that decreased the likelihood of Smallmouth Bass occurrence was prevalent at relatively higher elevations and in subbasins draining the southern slopes of the Olympic Mountains. Warmer conditions are expected to become more common in the future increasing prevalence of suitable habitat upstream, predominately in the Humptulips, Wynoochee, and West and Middle Fork Satsop Rivers.

Surveys of **native fish** detected prickly sculpin and cutthroat at 85% and 84% of sites, and Olympic mudminnow and coastrange sculpin at only 2% of sites. Predicted occupancy for shorthead sculpin was highest in both the headwaters of the Cascade and Olympic Mountain regions. Across all species, cumulative drainage and elevation were the most frequent largest positive and negative covariates, respectively. This effort, initially developed under the ASRP, has expanded to new areas of the state.

Office of Chehalis Basin