

# PUGET SOUND

## National Estuary Program

### PRIORITIZING COASTAL STREAMS AND EMBAYMENTS ALONG PUGET SOUND SHORES WITH A RAILROAD

The railroad is a prominent modification on long stretches of the eastern shore of Puget Sound. Coastal streams and embayment along the railroad are routed through culverts (pipes) or bridges that may be undersized or in poor condition, and therefore may limit, habitat size and quality, as well as fish access.

Restoring undersized culverts with properly sized structures will provide significant habitat benefits. However, the restoration is very expensive. To help inform decisions about which projects may be more beneficial than others, this project will conduct a prioritization of coastal streams and embayments based on the potential ecological benefits of restoration.

#### What we're doing

We will identify all known stream and embayment crossings. Each site will then be assessed for potential fish and habitat value using existing map data and aerial photos, as well as field observations at a subset.



#### How we're doing it

Staff will visit a subset of priority sites to characterize the current and potential salmonid habitat function of the stream crossing or embayment.



#### WHY THIS ISSUE IS IMPORTANT

There are hundreds of small coastal streams that drain directly into Puget Sound. Many of these streams cross the BNSF railroad. Recent research in Puget Sound has shown juvenile Chinook salmon who originate in large rivers migrating into Puget Sound, then moving into smaller coastal streams. Culverts can limit the accessibility of these streams, as well as the quantity and quality of the habitats available in the streams.

#### WHAT YOU CAN DO

Future restoration will require funding to help partner with BNSF to improve fish habitat along the railroad. Support state and federal funding programs providing funding for Puget Sound restoration.

#### ABOUT THE CONFLUENCE TEAM

Confluence Environmental Company is leading a team that includes representatives from the Tulalip Tribes and Coastal Geologic Services. This team includes leaders in evaluating and restoring shoreline and estuarine habitats through public and private projects.

#### FOR MORE INFORMATION

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This project provides a systematic identification and rating of all streams and embayments along the marine shoreline component of the railroad operated by BNSF Railway. The outcomes improve understanding of the stream characteristics and stream crossing structures between Olympia and Canada. Because these stream crossing structures occur at the mouths of regional streams, they may affect the potential restoration value of upstream projects. In addition, the railroad affects long contiguous lengths of shoreline and, therefore, these sites represent a large fraction of non-natal stream habitats available to juvenile salmonids for rearing.

#### Project outcomes

- The project team identified all locations where streams cross the BNSF Railway along the Salish Sea shoreline between Olympia and Canada.
- Field data were collected to characterize stream, crossing structure, and habitat conditions for 196 stream crossing structures.
- Field and regional data were compiled to evaluate 13 embayments.
- The project team created and applied a site prioritization framework that identifies stream or embayment habitat priorities for Chinook salmon.



Photo Source:  
Confluence



Photo Source:  
Confluence

#### Major Accomplishments

- Created GIS database containing new spatial data, field inventory information, and prioritization scores for stream crossings and embayments.
- Delivered technical report describing field methods, prioritization framework, and outcomes.

#### Future Opportunities

Future restoration will require funding to help partner with BNSF to improve fish habitat along the railroad. Future work evaluating high-priority stream or embayment sites should evaluate upstream conditions to identify the full scope of opportunities. Developing preliminary design and costs for high-priority sites would be an important step towards implementing restoration.

#### About the Project Team

Confluence Environmental Company led a team that includes representatives from Environmental Science Associates, the Tulalip Tribes, and Coastal Geologic Services. BNSF provided important strategic, safety guidance, and access to sites.

#### FOR MORE INFORMATION

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