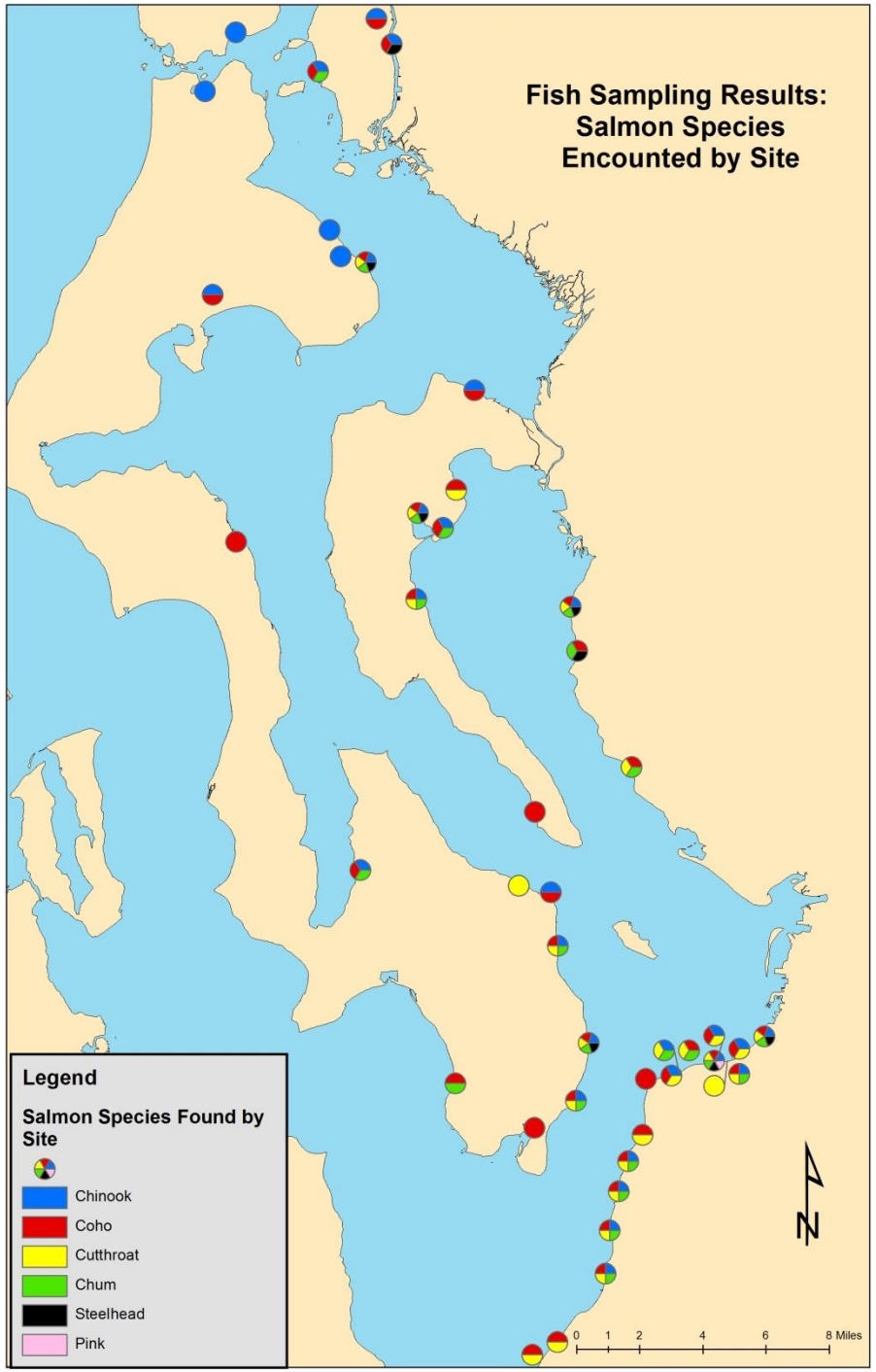
Coastal Streams and WRIA 8 Nearshore Restoration Projects

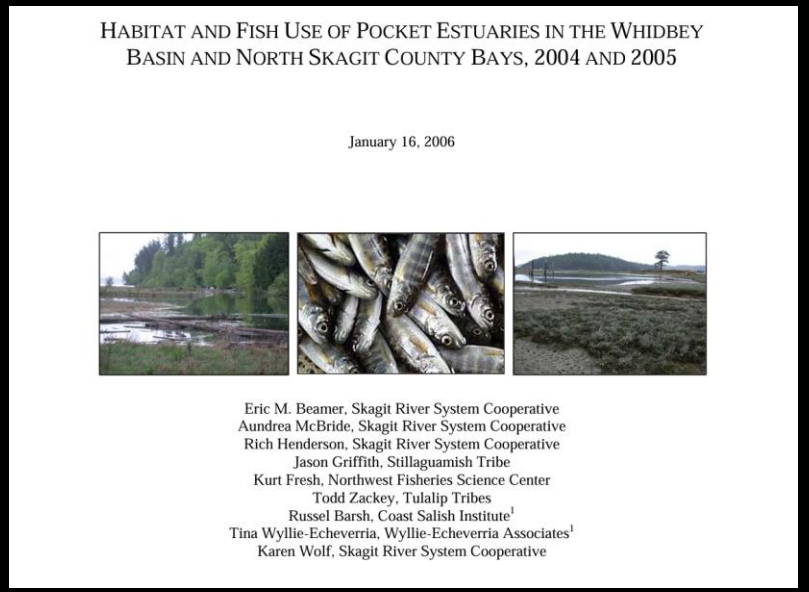
Salmon Recovery Council Meeting
May 21, 2026

Todd Zackey
Field Studies Program Manager
Tulalip Tribes Natural & Cultural Resources Dept.



In the Beginning – We sampled

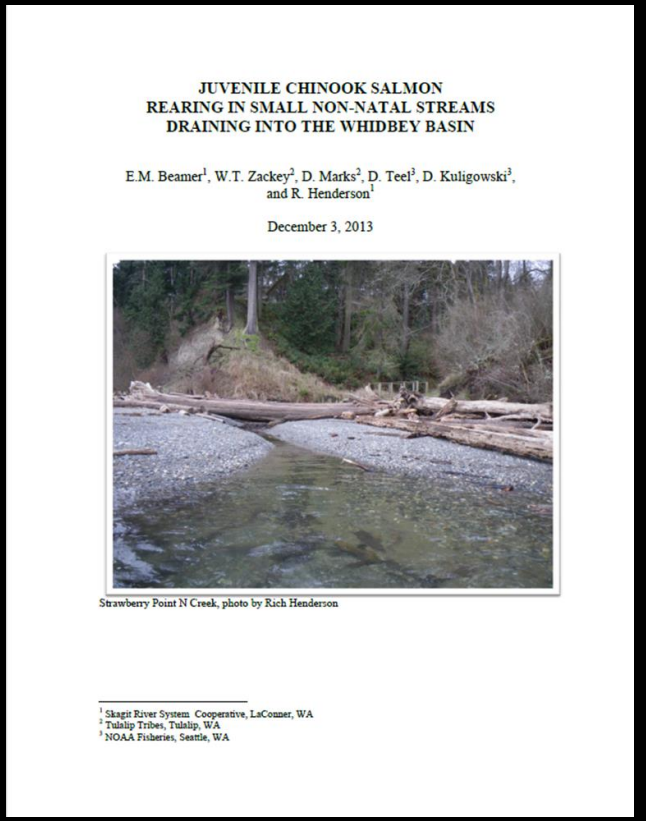
- 63 Streams Sampled
- 61 Habitat Surveys
- Sampled intertidal and stream channel



HABITAT AND FISH USE OF POCKET ESTUARIES IN THE WHIDBEY BASIN AND NORTH SKAGIT COUNTY BAYS, 2004 AND 2005

January 16, 2006

Eric M. Beamer, Skagit River System Cooperative
Aundrea McBride, Skagit River System Cooperative
Rich Henderson, Skagit River System Cooperative
Jason Griffith, Stillaguamish Tribe
Kurt Fresh, Northwest Fisheries Science Center
Todd Zackey, Tulalip Tribes
Russel Barsh, Coast Salish Institute[1]
Tina Wyllie-Echeverria, Wyllie-Echeverria Associates[1]
Karen Wolf, Skagit River System Cooperative



JUVENILE CHINOOK SALMON
REARING IN SMALL NON-NATAL STREAMS
DRAINING INTO THE WHIDBEY BASIN

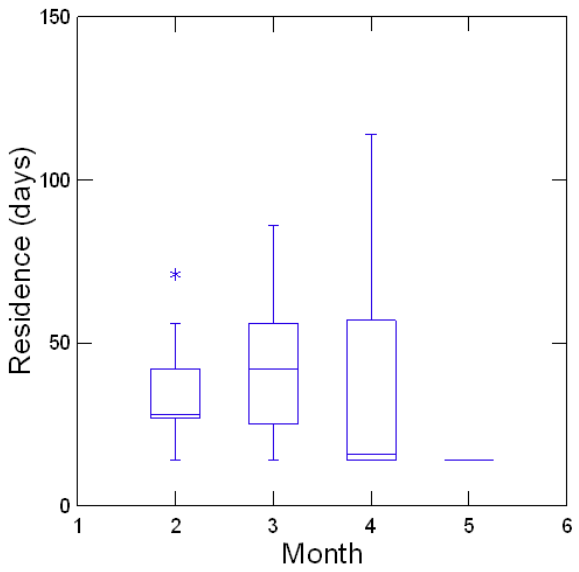
E.M. Beamer[1], W.T. Zackey[2], D. Marks[2], D. Teel[3], D. Kuligowski[3], and R. Henderson[1]

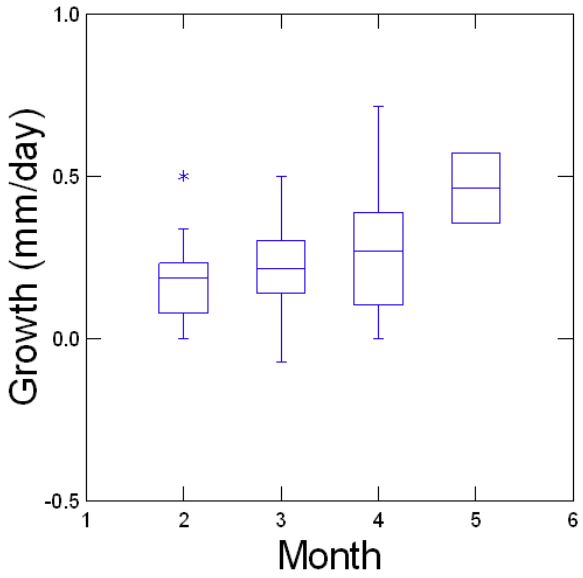
December 3, 2013

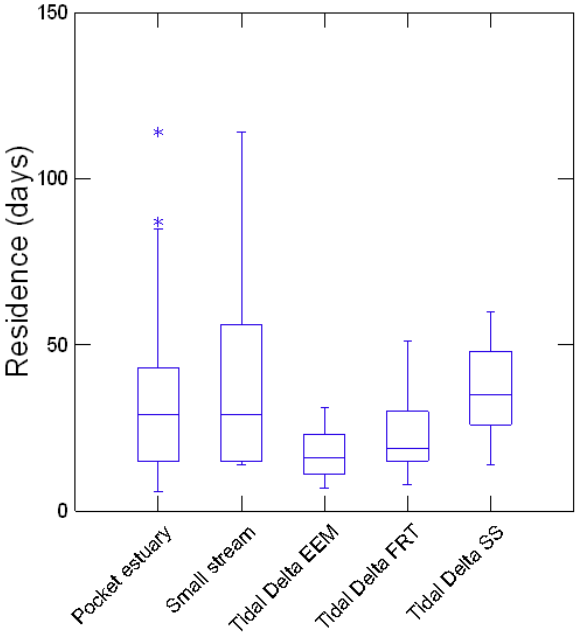
Strawberry Point N Creek, photo by Rich Henderson

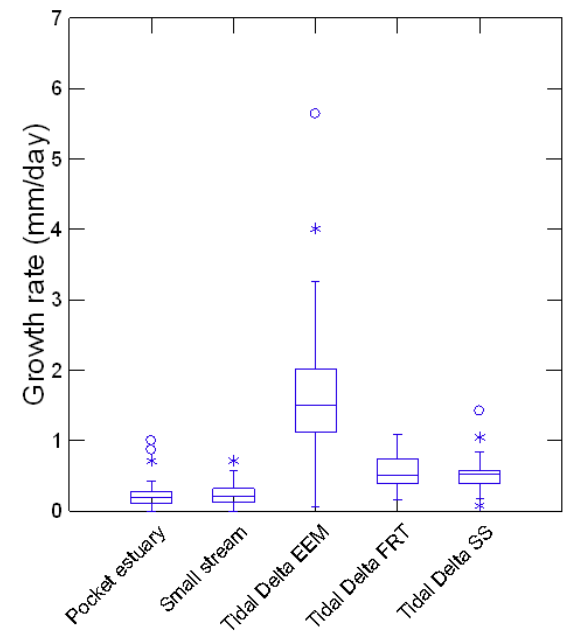
[1] Skagit River System Cooperative, LaConner, WA
[2] Tulalip Tribes, Tulalip, WA
[3] NOAA Fisheries, Seattle, WA

Some Results…









MDS: Salmonids 2010

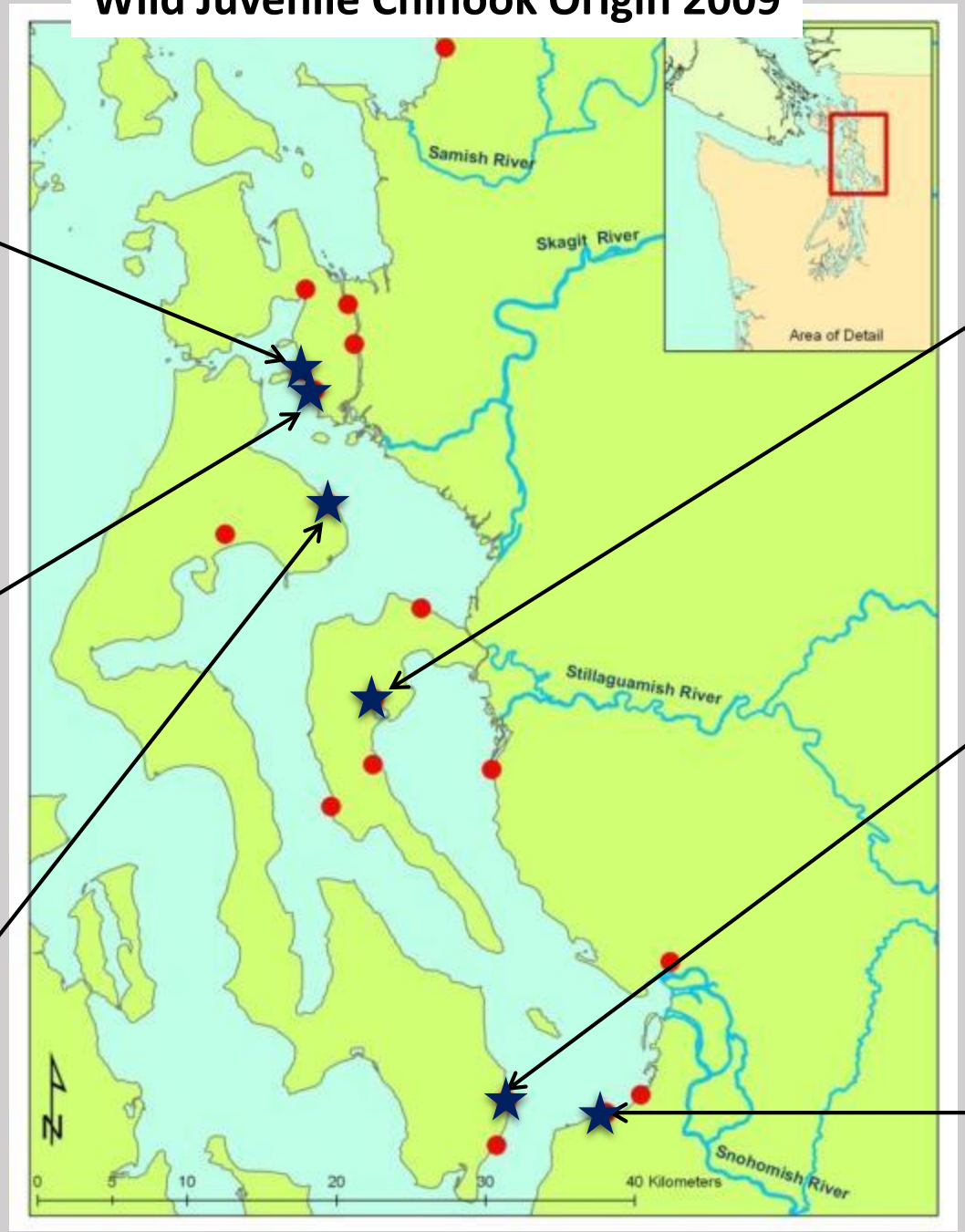
(1 point = 1 mo

Glendale Creek

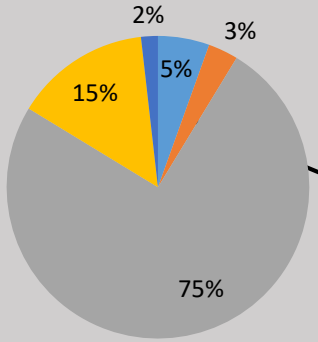
Warm Beach South

Pigeon #1 Creek
Warm Beach South
Zook Creek

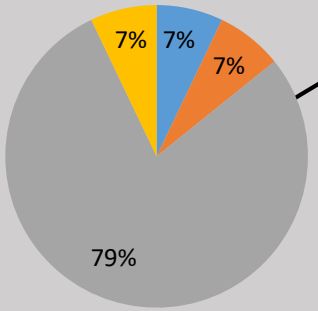
Wild Juvenile Chinook Origin 2009



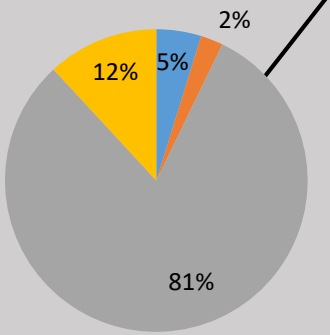
Lone Tree Creek
220 Fish



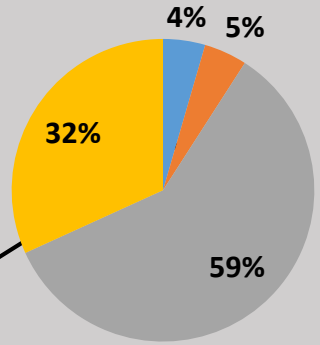
SneeOosh Creek
14 Fish



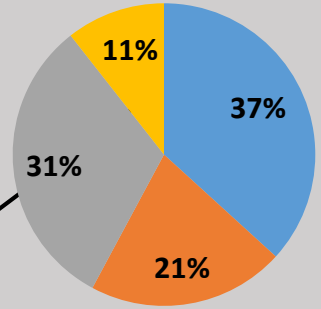
Strawberry Pt Creek
42 Fish



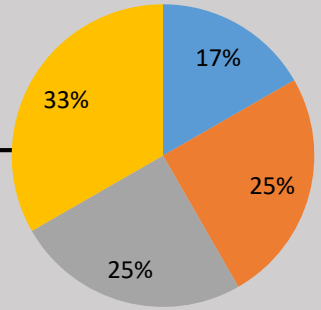
Kristoferson Creek
22 Fish



Zook Creek
19 Fish

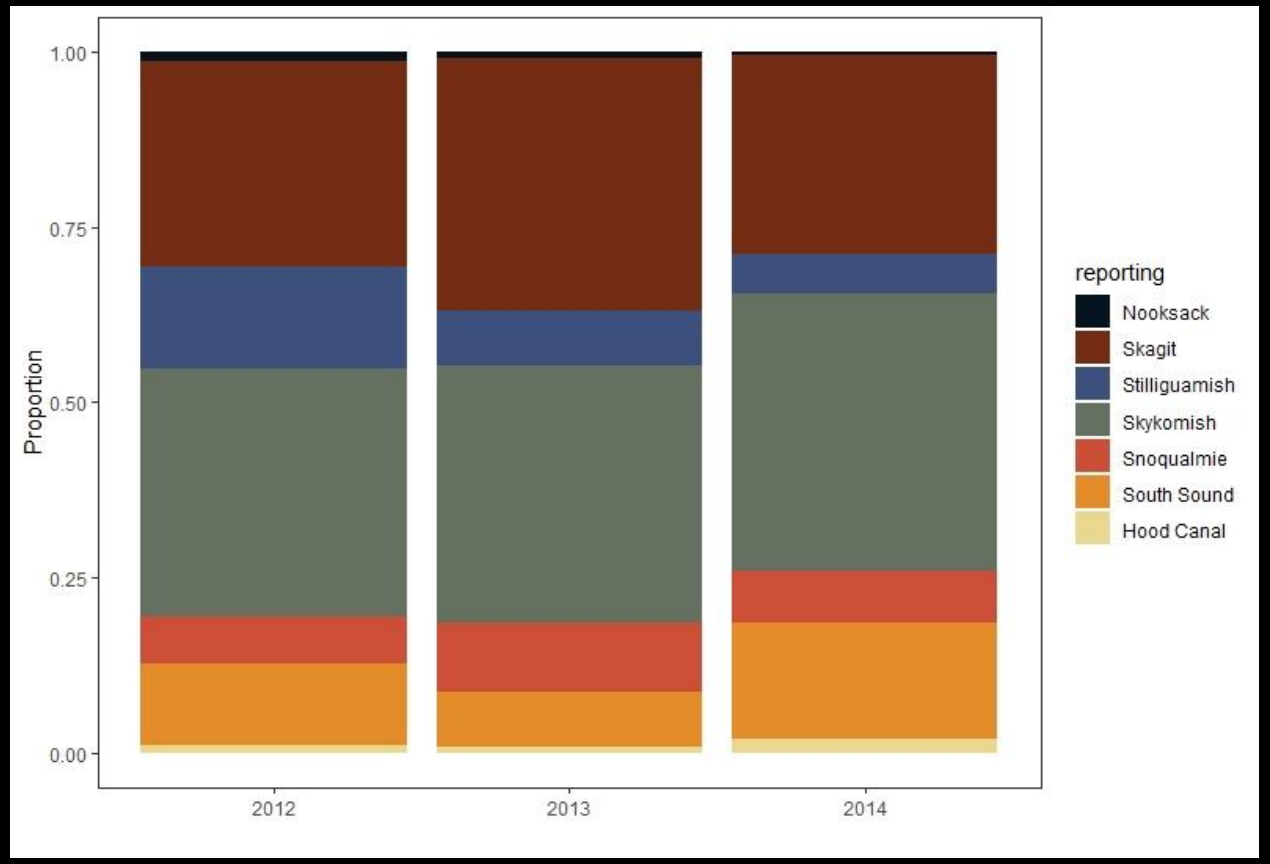


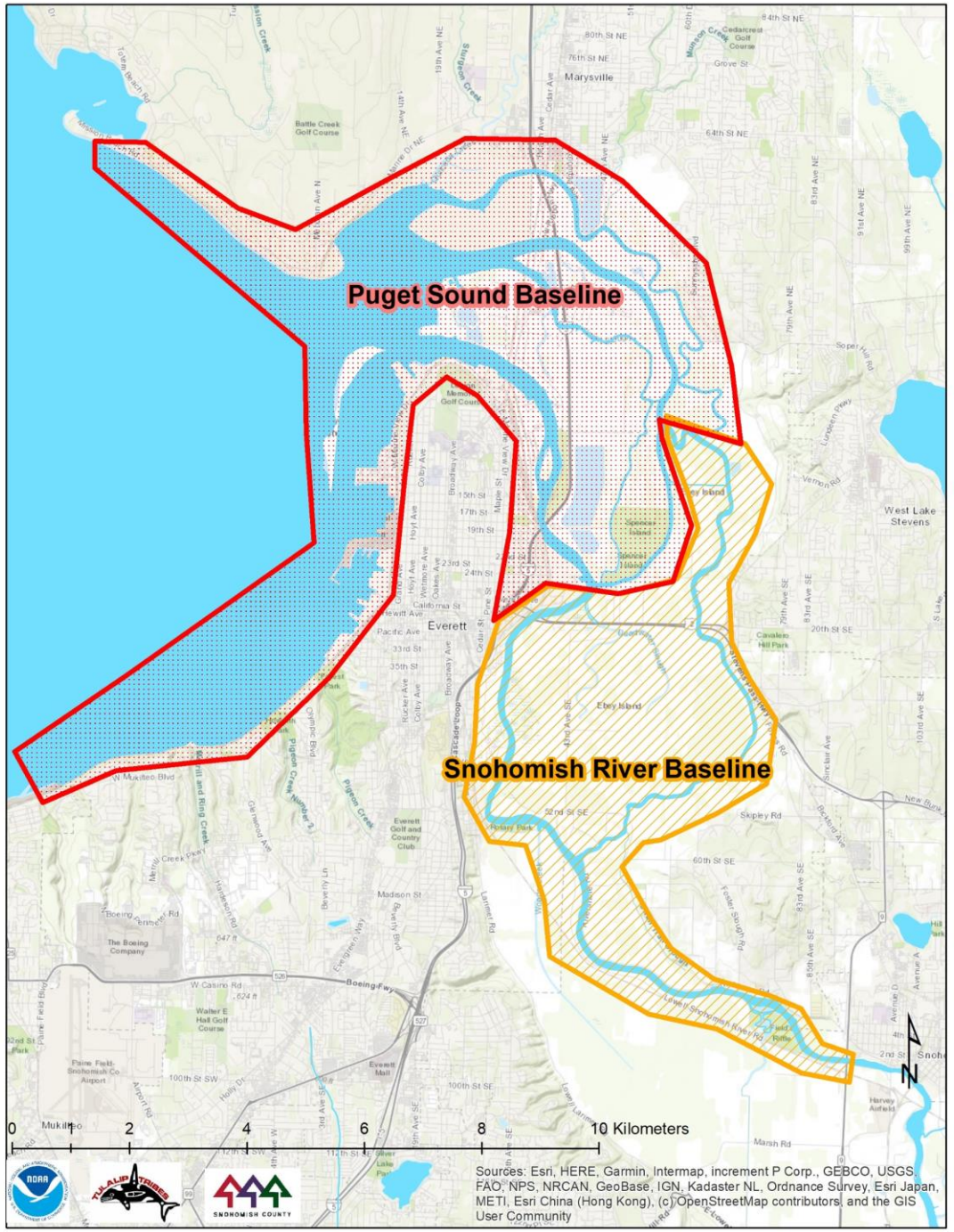
Merrill & Ring Creek
12 Fish



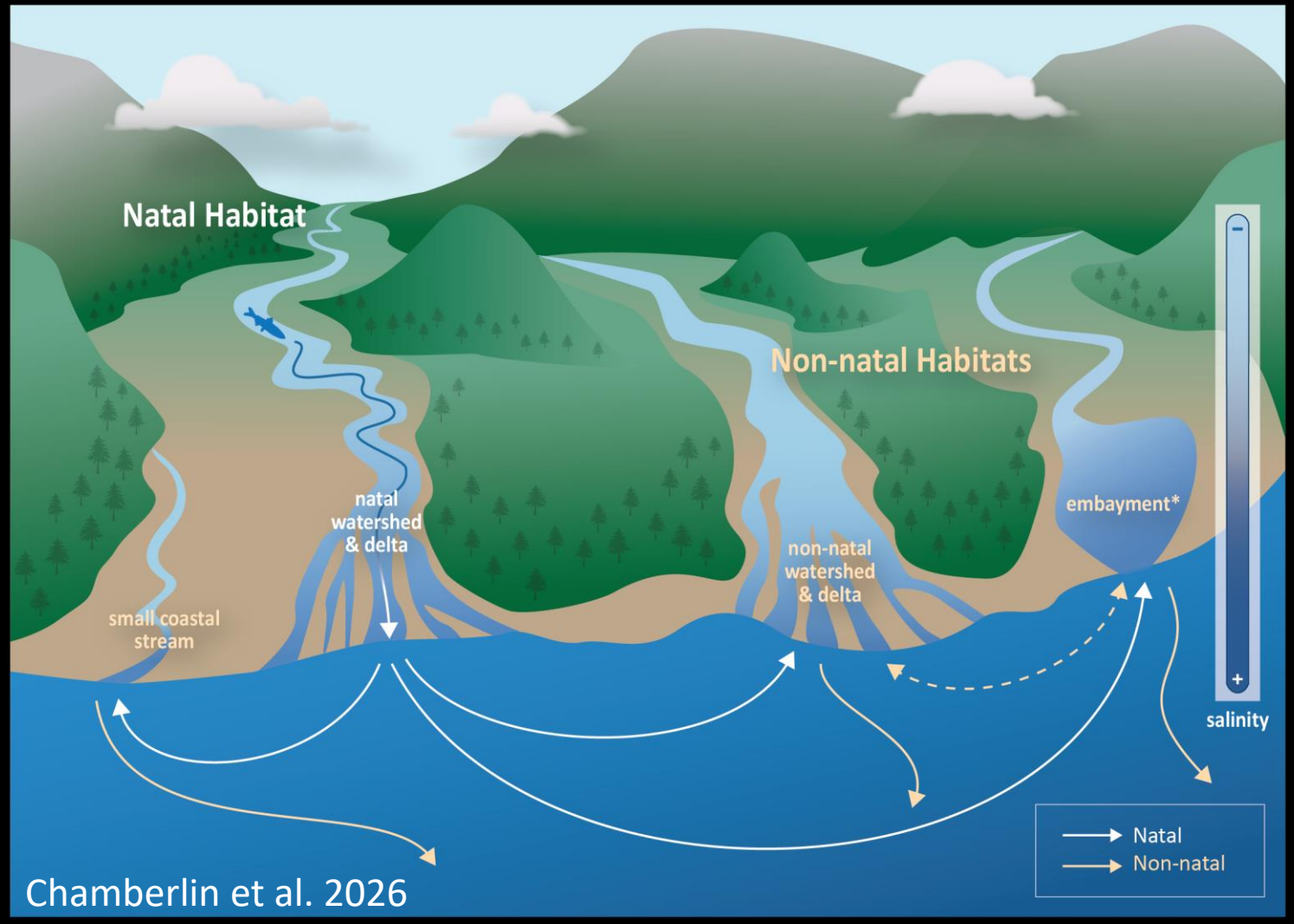
Beamer et al 2013

Lower Snohomish Estuary Population Structure

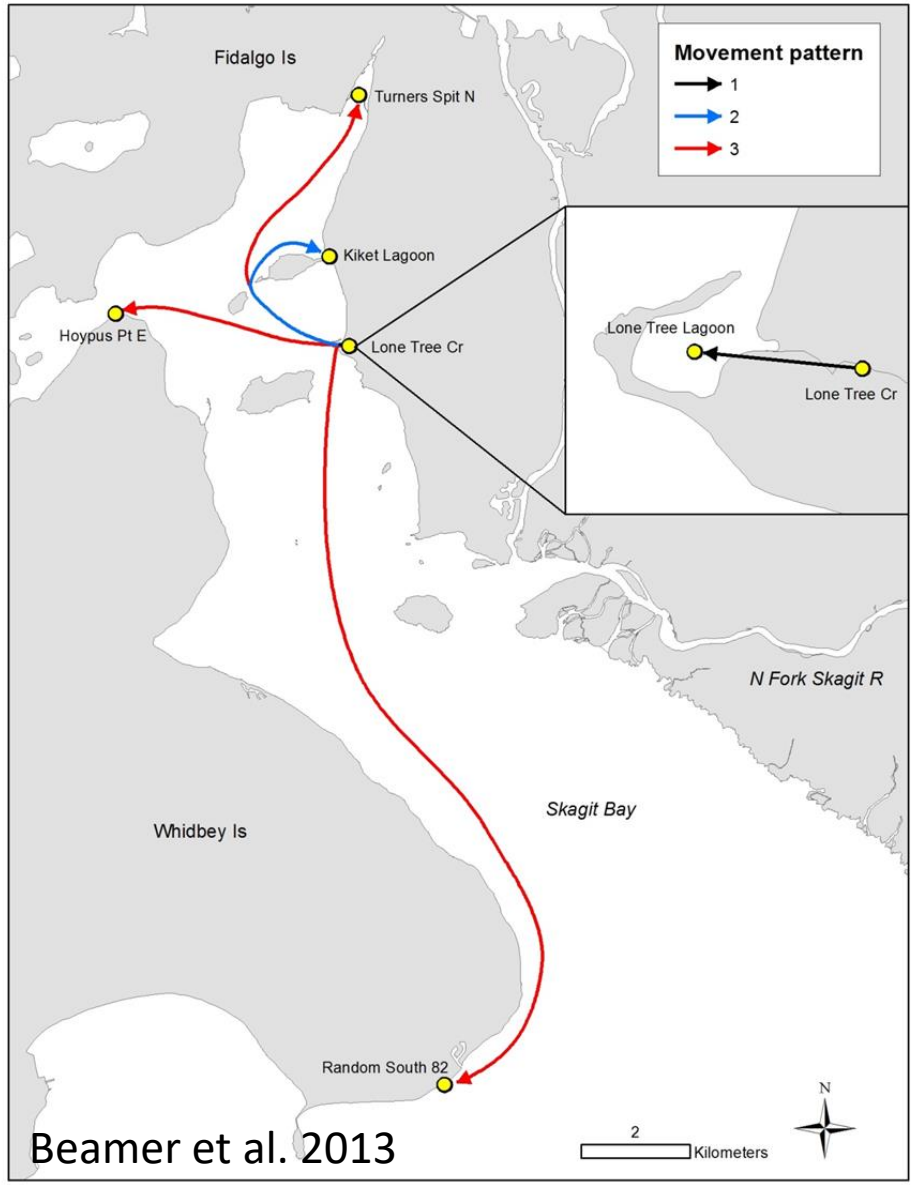




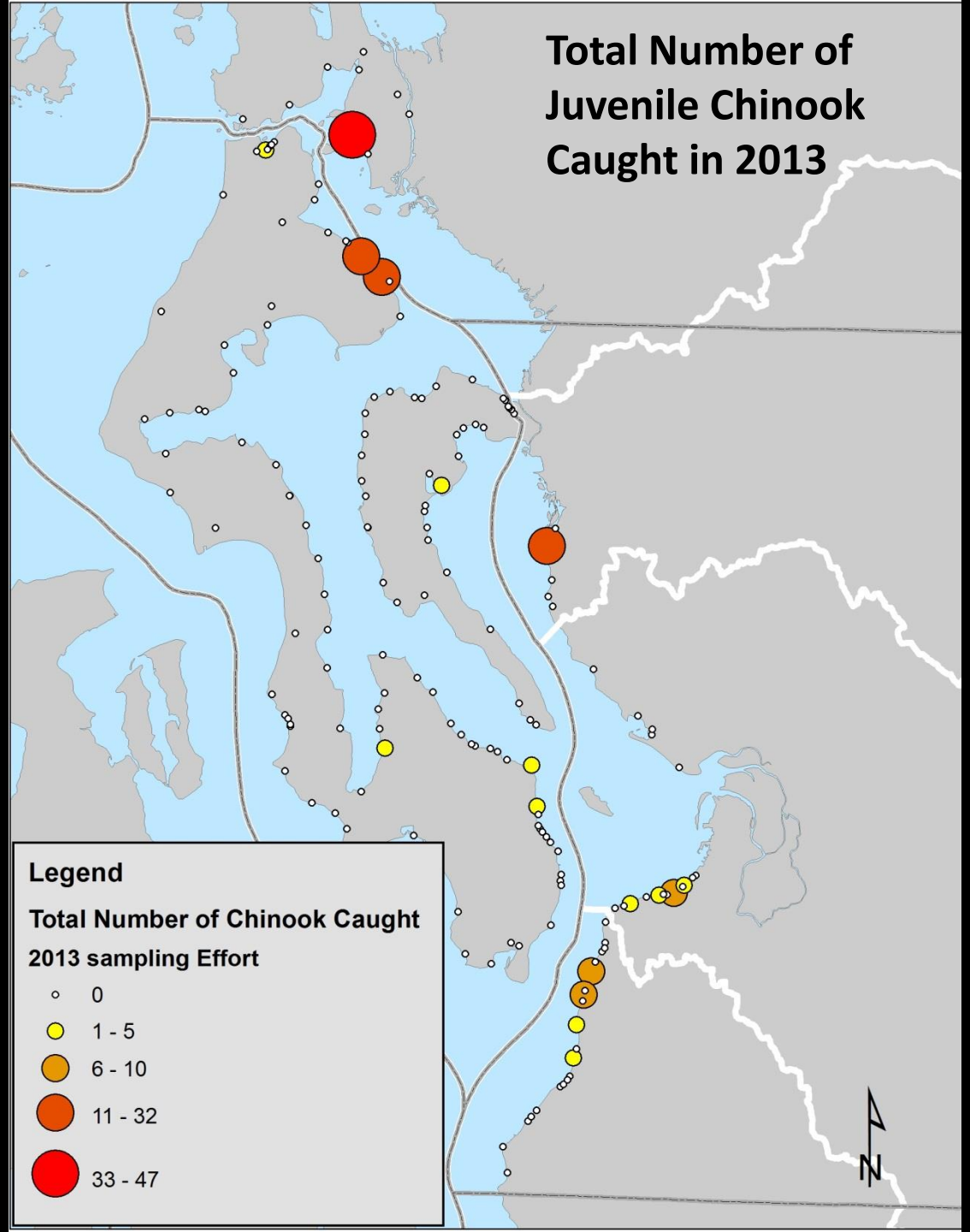
Juvenile Chinook migrate along the shoreline and rear in small stream mouths and embayments

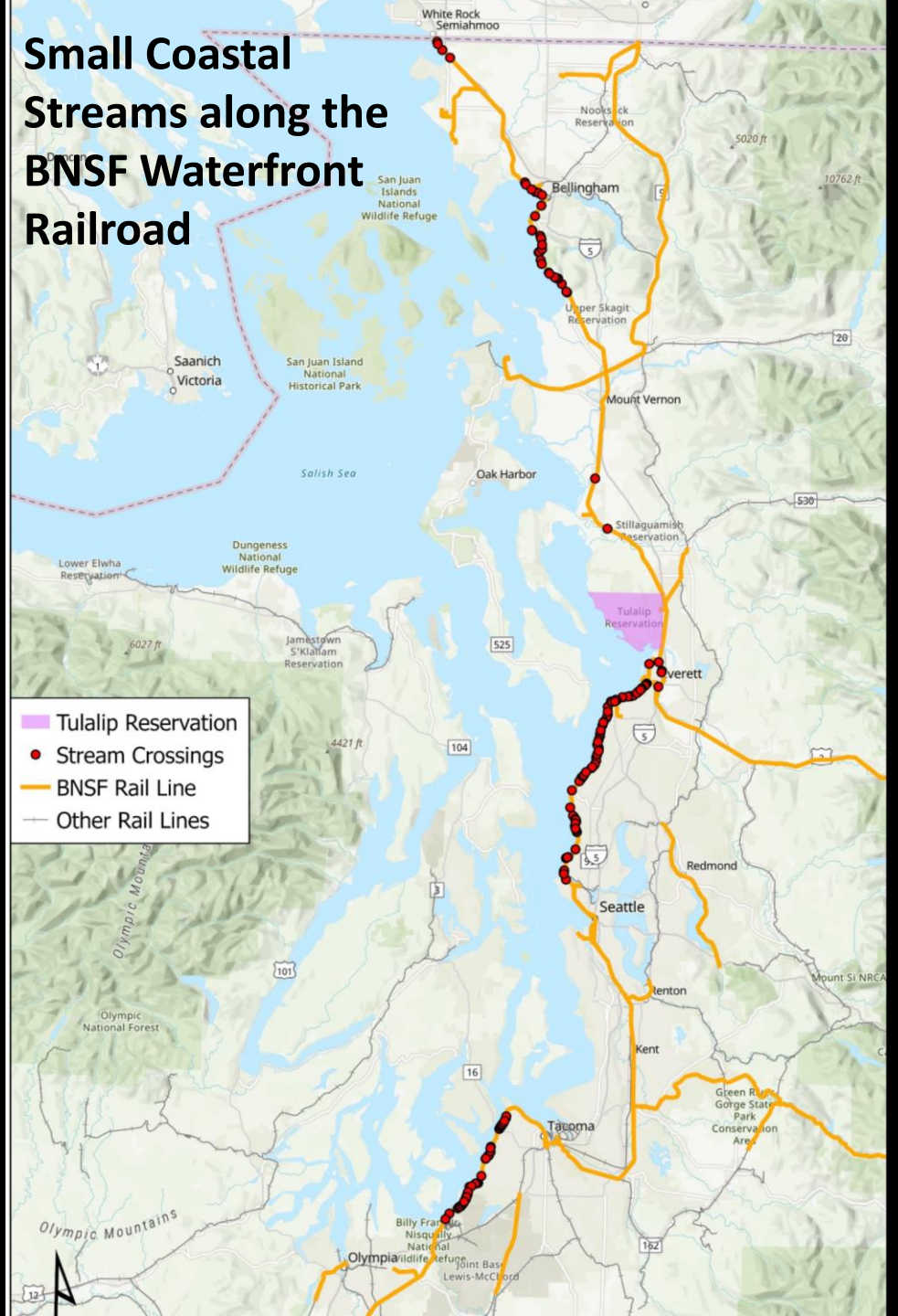


Chamberlin et al. 2026



Beamer et al. 2013


Total Number of Juvenile Chinook Caught in 2013
Legend
Total Number of Chinook Caught
2013 sampling Effort
0
1 - 5
6 - 10
11 - 32
33 - 47
N


Small Coastal Streams along the BNSF Waterfront Railroad
Tulalip Reservation
Stream Crossings
BNSF Rail Line
Other Rail Lines
White Rock
Semiahmoo
Bellingham
Saanich
Victoria
Salish Sea
Oak Harbor
Mount Vernon
Everett
Seattle
Redmond
Kent
Tacoma
Olympia
Olympic Mountains

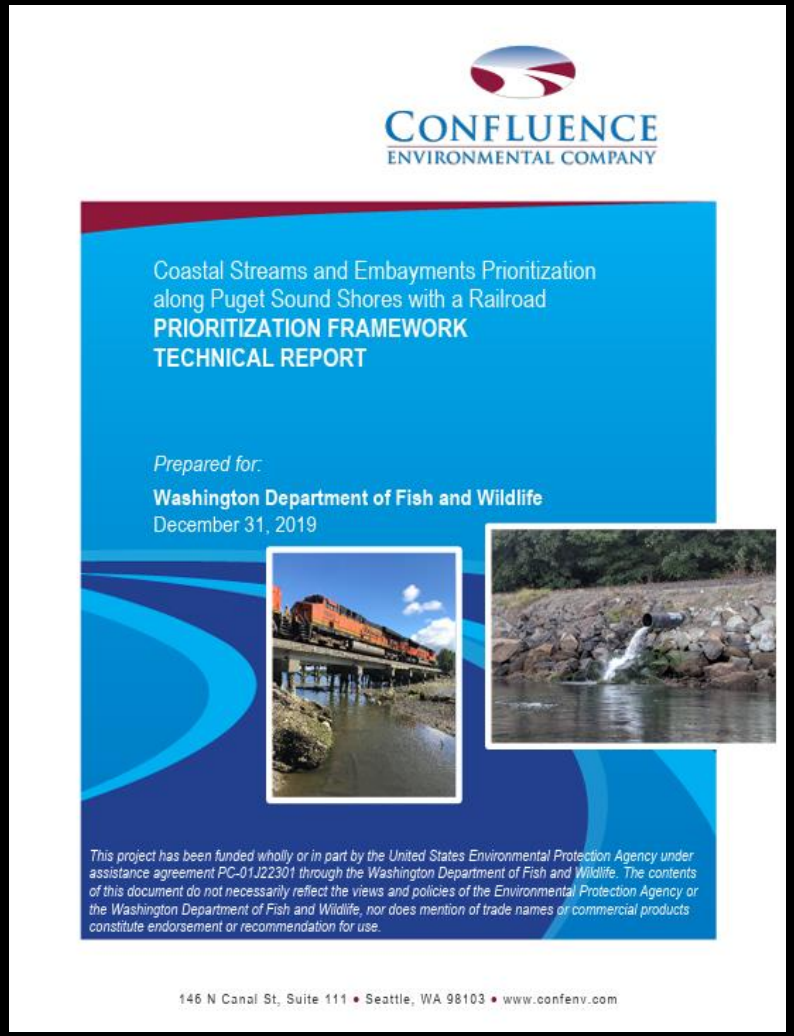
Magnitude of Issue

- 52 miles of Puget Sound shoreline with railroad
- 21 miles of railroad within 200 ft of shoreline
- 196 culverts at stream mouths
- Approx. 125 perennial streams
- Approx. 70 draining non-perennial streams or primarily stormwater drainage
- 13 embayments

Phase 1 – Prioritized Sites for Restoration

- Prioritized based on:
  - likelihood of use by juvenile Chinook salmon
  - quality of upstream habitat

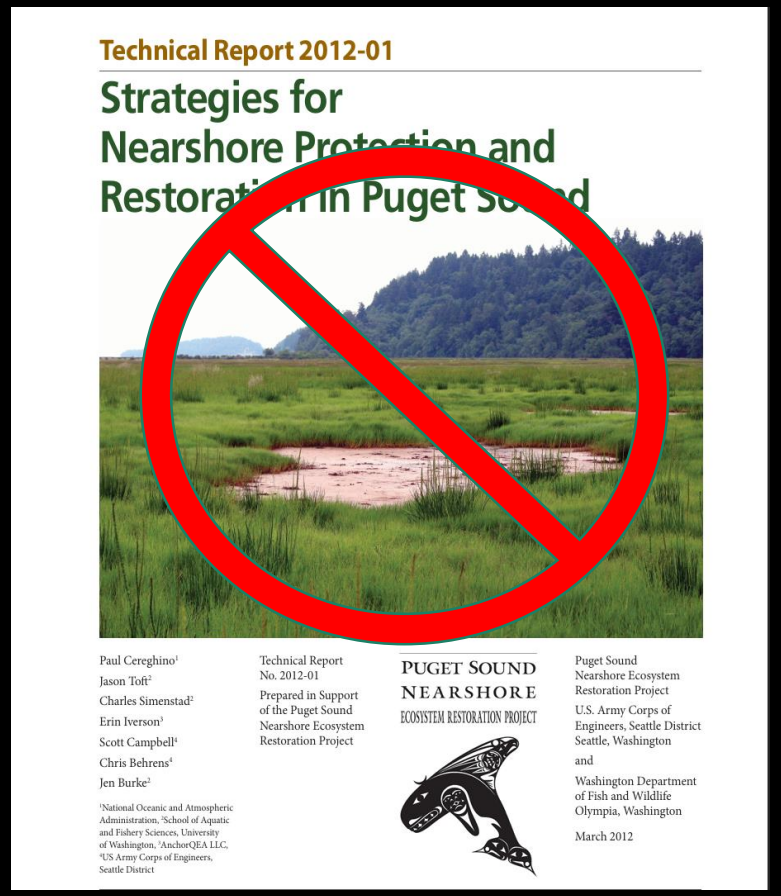
- 44 streams identified as highest or high priority
- 7 embayments identified as high priority

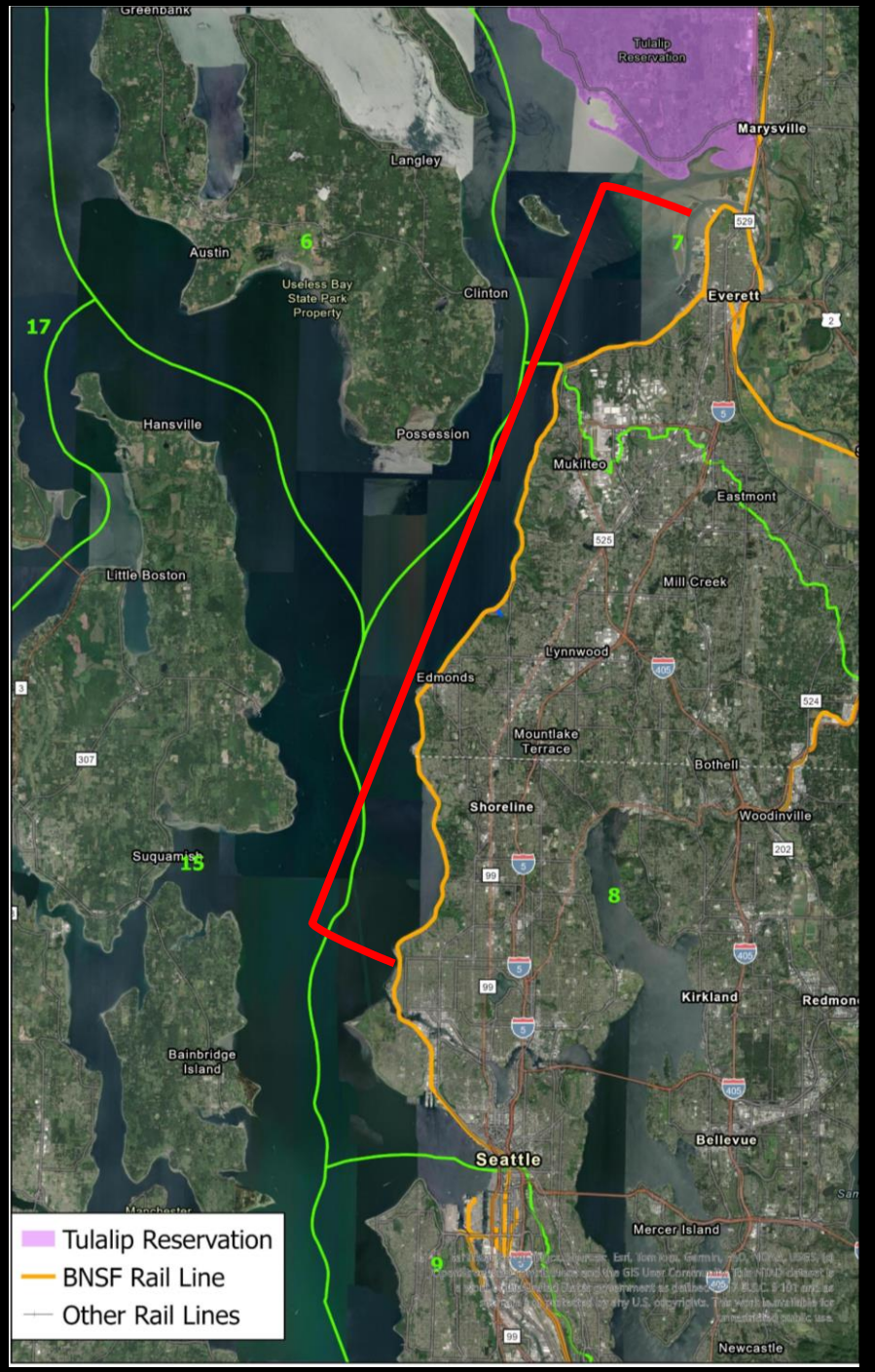


Phase 1 report available online

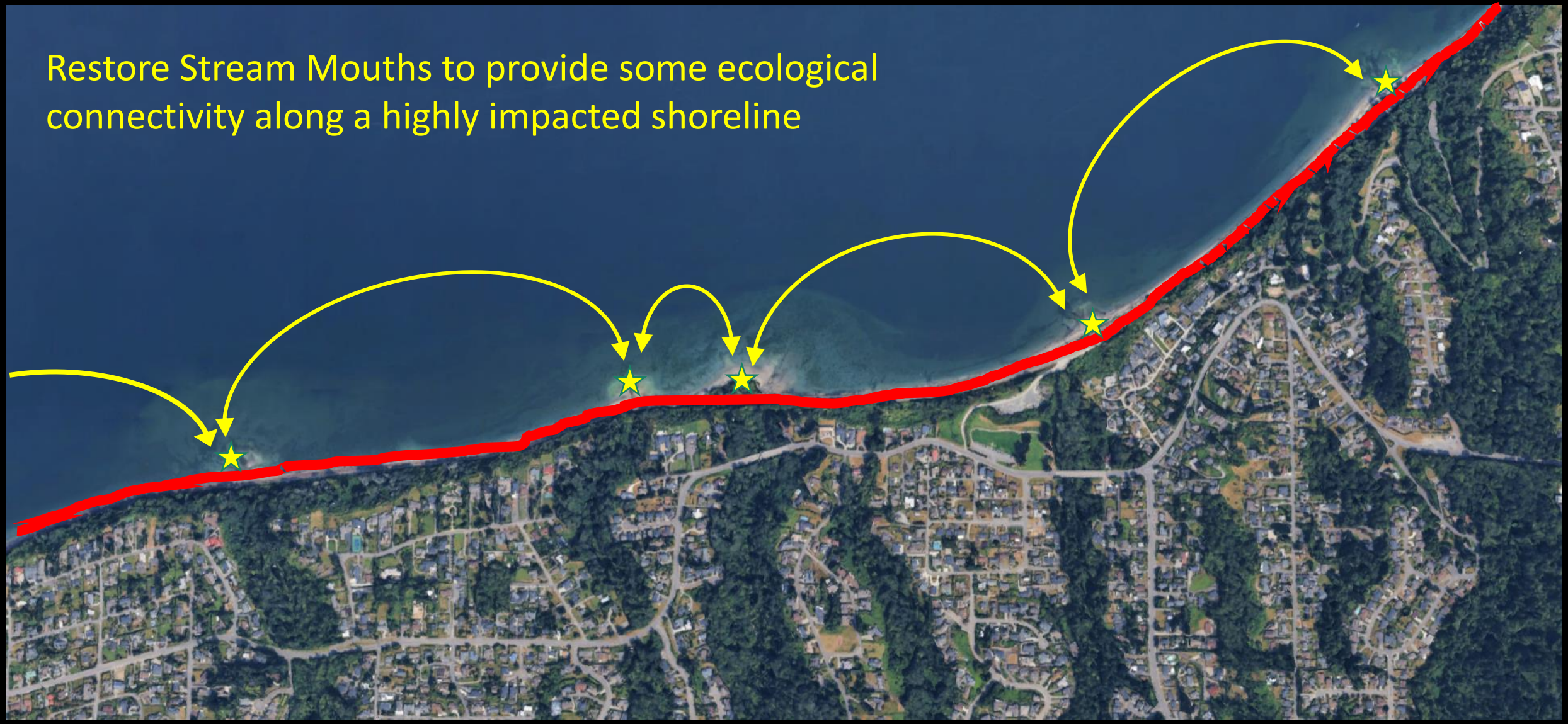
https://nr.tulaliptribes.com/Topics/HabitatMonitoringAndResearch/RailroadStreamCrossing

Waterfront railroad identified as problem
No practical strategy to do restoration or enhancement along waterfront railroad

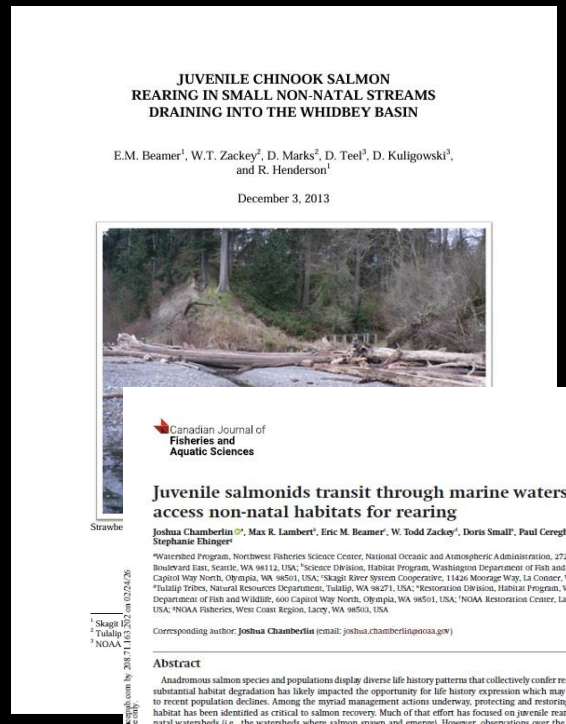




What can be done along the waterfront railroad?



Science and Fish Use



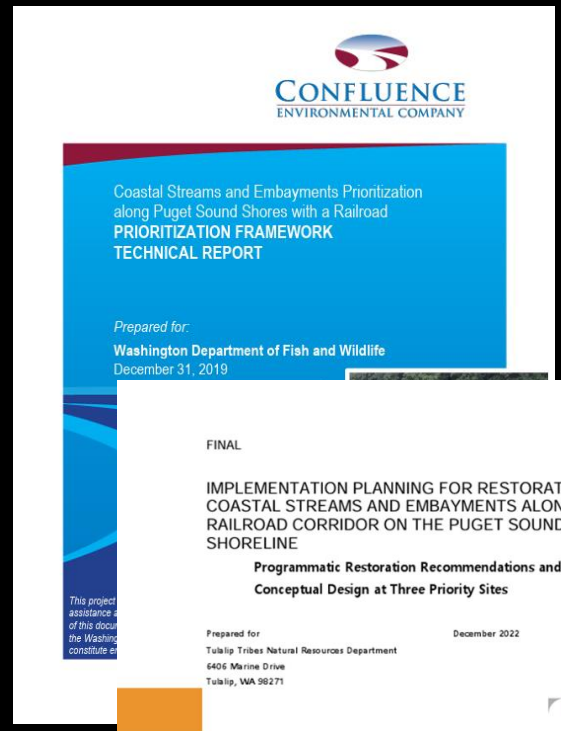
JUVENILE CHINOOK SALMON
REARING IN SMALL NON-NATAL STREAMS
DRAINING INTO THE WHIDBEY BASIN

E.M. Beamer[1], W.T. Zackey[2], D. Marks[2], D. Teel[3], D. Kuligowski[3], and R. Henderson[1]

December 3, 2013

Strawbe

[1] Skagit R
[2] Tulalip
[3] NOAA

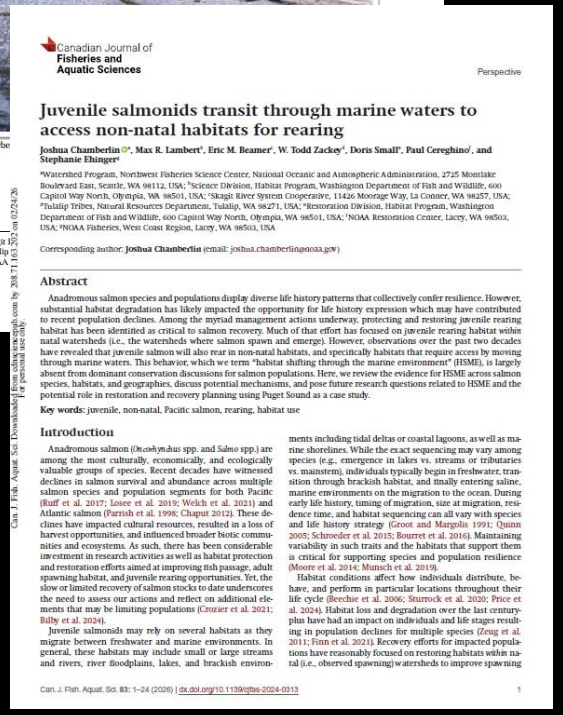


CONFLUENCE
ENVIRONMENTAL COMPANY

Coastal Streams and Embayments Prioritization along Puget Sound Shores with a Railroad
PRIORITIZATION FRAMEWORK
TECHNICAL REPORT

Prepared for:
Washington Department of Fish and Wildlife
December 31, 2019

This project assistance a of this docu the Washing constitute e



Canadian Journal of Fisheries and Aquatic Sciences

Perspective

Juvenile salmonids transit through marine waters to access non-natal habitats for rearing

Joshua Chamberlin, Max R. Lambert, Eric M. Beamer, W. Todd Zackey, Doris Small, Paul Cereghino, and Stephanie Ehinger

Abstract

Anadromous salmon species and populations display diverse life history patterns that collectively confer resilience. However, substantial habitat degradation has likely impacted the opportunity for life history expression which may have contributed to recent population declines. Among the myriad management actions underway, protecting and restoring juvenile rearing habitat has been identified as critical to salmon recovery. Much of that effort has focused on juvenile rearing habitat *within* natal watersheds (i.e., the watersheds where salmon spawn and emerge). However, observations over the past two decades have revealed that juvenile salmon will also rear in non-natal habitats, and specifically habitats that require access by moving through marine waters. This behavior, which we term "habitat shifting through the marine environment" (HSME), is largely absent from dominant conservation discussions for salmon populations. Here, we review the evidence for HSME across salmon species, habitats, and geographies, discuss potential mechanisms, and pose future research questions related to HSME and the potential role in restoration and recovery planning using Puget Sound as a case study.

Key words: juvenile, non-natal, Pacific salmon, rearing, habitat use

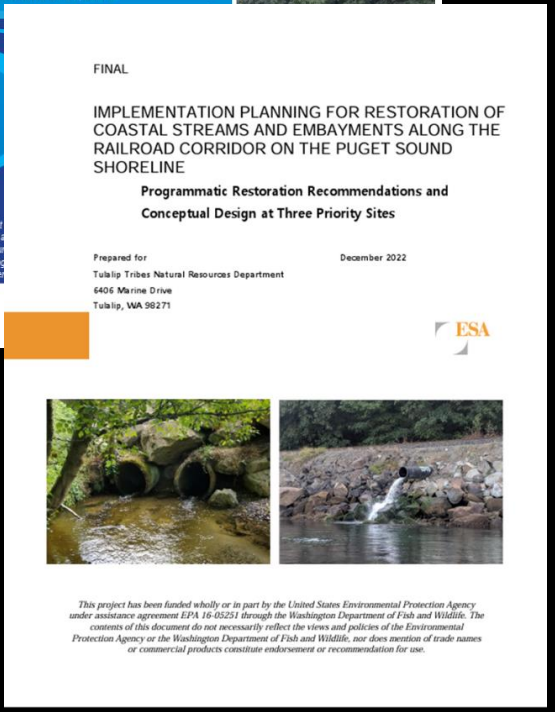
Introduction

Anadromous salmon (*Oncorhynchus* spp. and *Salmo* spp.) are among the most culturally, economically, and ecologically valuable groups of species. Recent decades have witnessed declines in salmon survival and abundance across multiple salmon species and population segments for both Pacific (Ruff et al. 2017; Losee et al. 2019; Welch et al. 2021) and Atlantic salmon (Parrish et al. 1998; Chaput 2012). These declines have impacted cultural resources, resulted in a loss of harvest opportunities, and influenced broader biotic communities and ecosystems. As such, there has been considerable investment in research activities as well as habitat protection and restoration efforts aimed at improving fish passage, adult spawning habitat, and juvenile rearing opportunities. Yet, the slow or limited recovery of salmon stocks to date underscores the need to assess our actions and reflect on additional elements that may be limiting populations (Crozier et al. 2021; Bilby et al. 2024).

Juvenile salmonids may rely on several habitats as they migrate between freshwater and marine environments. In general, these habitats may include small or large streams and rivers, river floodplains, lakes, and brackish environments including tidal deltas or coastal lagoons, as well as marine shorelines. While the exact sequencing may vary among species (e.g., emergence in lakes vs. streams or tributaries vs. mainstem), individuals typically begin in freshwater, transition through brackish habitat, and finally entering saline, marine environments on the migration to the ocean. During early life history, timing of migration, size at migration, residence time, and habitat sequencing can all vary with species and life history strategy (Groot and Margolis 1991; Quinn 2005; Schroeder et al. 2015; Bourret et al. 2016). Maintaining variability in such traits and the habitats that support them is critical for supporting species and population resilience (Moore et al. 2014; Munsch et al. 2019).

Habitat conditions affect how individuals distribute, behave, and perform in particular locations throughout their life cycle (Beechie et al. 2006; Sturrock et al. 2020; Price et al. 2024). Habitat loss and degradation over the last century-plus have had an impact on individuals and life stages resulting in population declines for multiple species (Zeug et al. 2011; Finn et al. 2021). Recovery efforts for impacted populations have reasonably focused on restoring habitats *within* natal (i.e., observed spawning) watersheds to improve spawning

Can. J. Fish. Aquat. Sci. 83: 1–24 (2026) | dx.doi.org/10.1139/cjfas-2024-0313



FINAL

IMPLEMENTATION PLANNING FOR RESTORATION OF COASTAL STREAMS AND EMBAYMENTS ALONG THE RAILROAD CORRIDOR ON THE PUGET SOUND SHORELINE

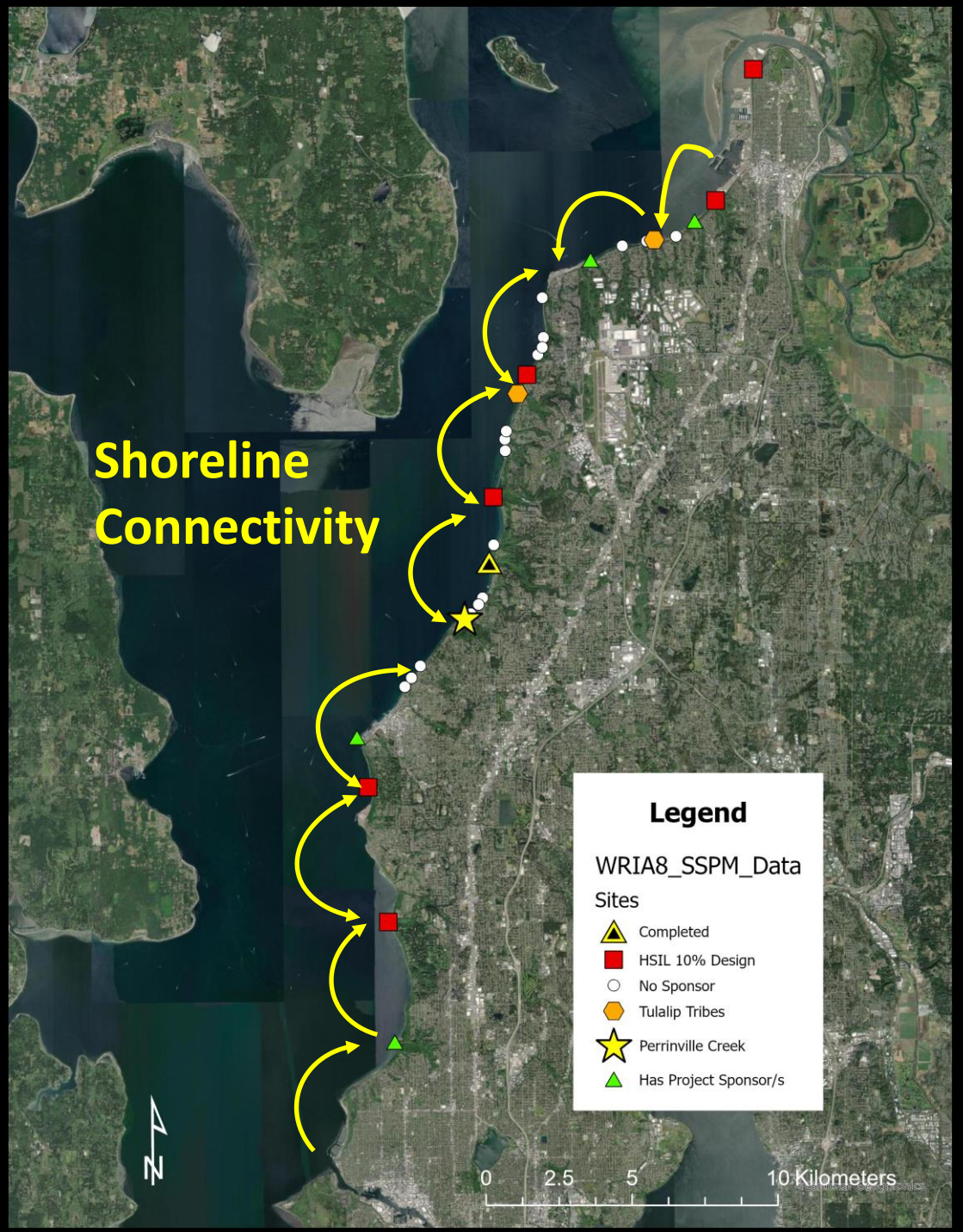
Programmatic Restoration Recommendations and Conceptual Design at Three Priority Sites

Prepared for
Tulalip Tribes Natural Resources Department
6406 Marine Drive
Tulalip, WA 98271

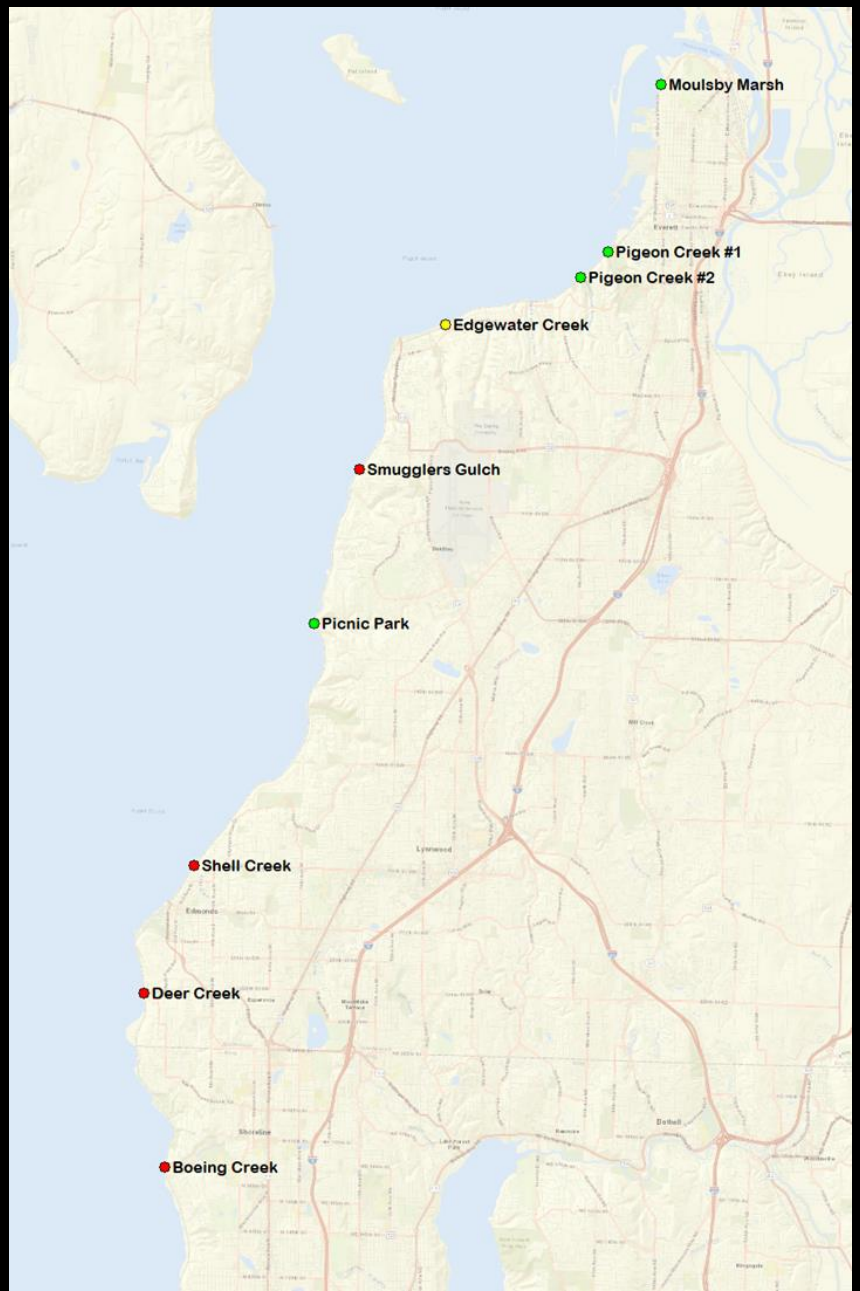
December 2022

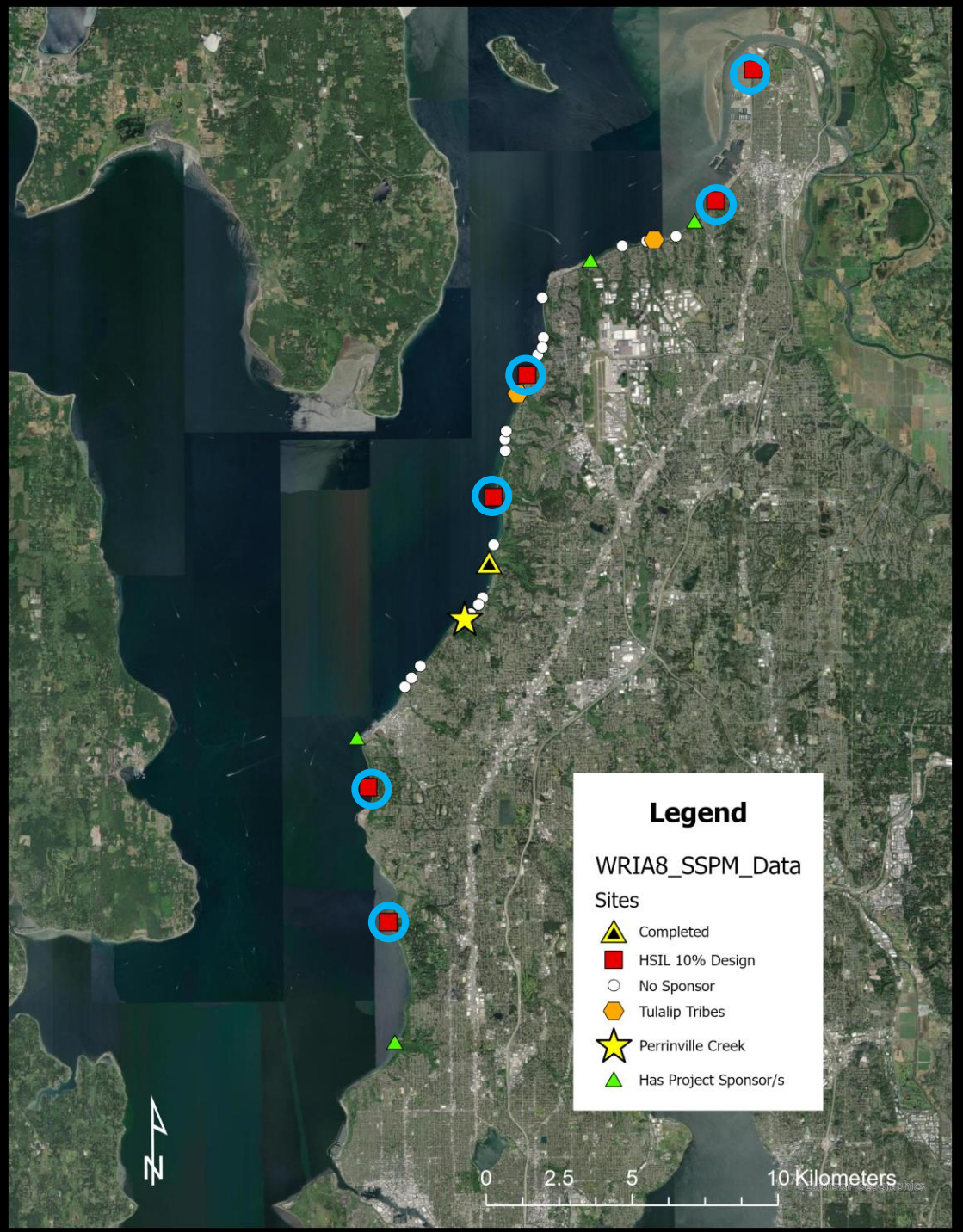
ESA

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement EPA 16-05251 through the Washington Department of Fish and Wildlife. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency or the Washington Department of Fish and Wildlife, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

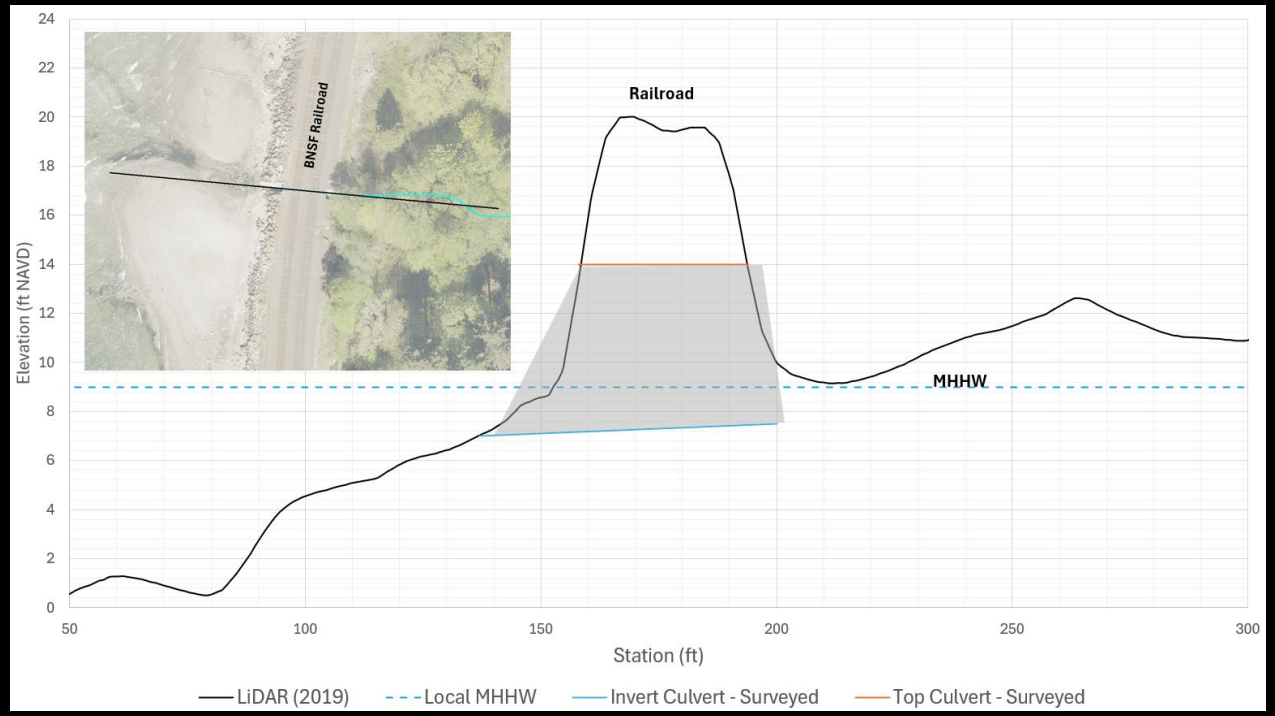


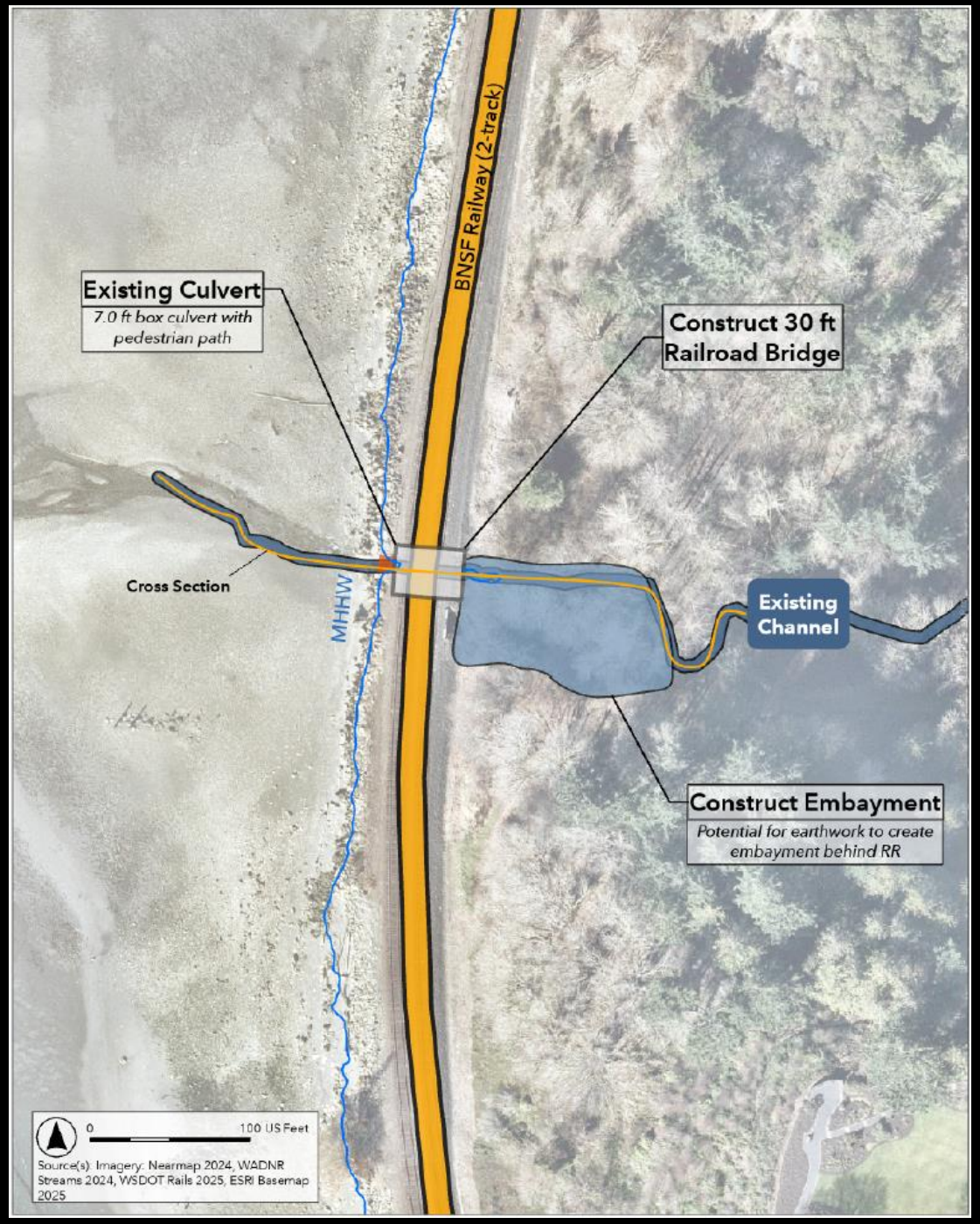
HSIL Grant to develop 10% designs for 9 sites





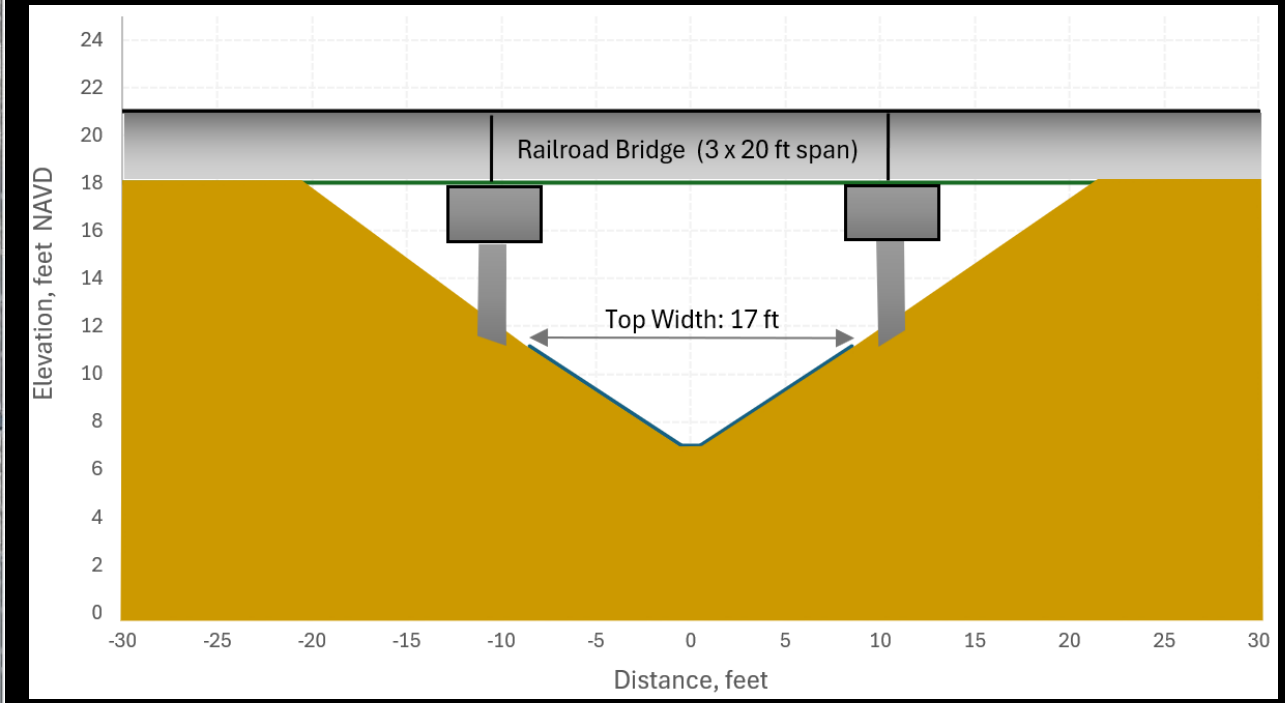
Boeing Creek

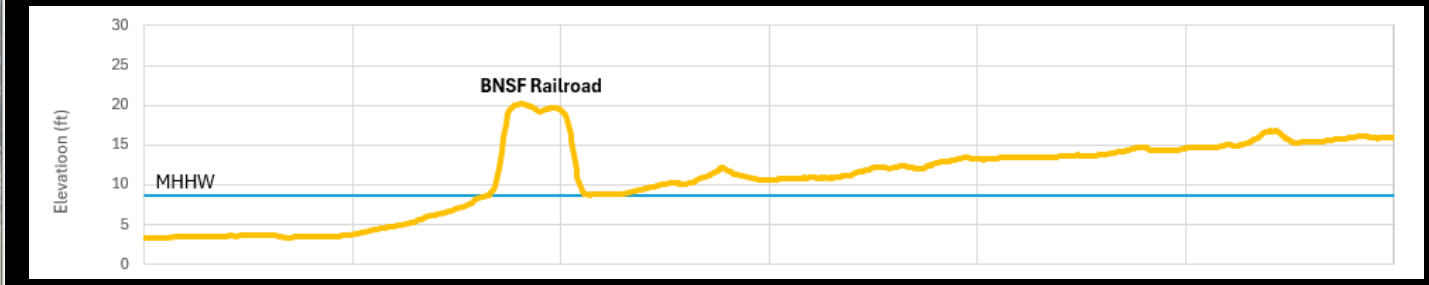




BFW = 17 ft

Bridge opening 23 ft





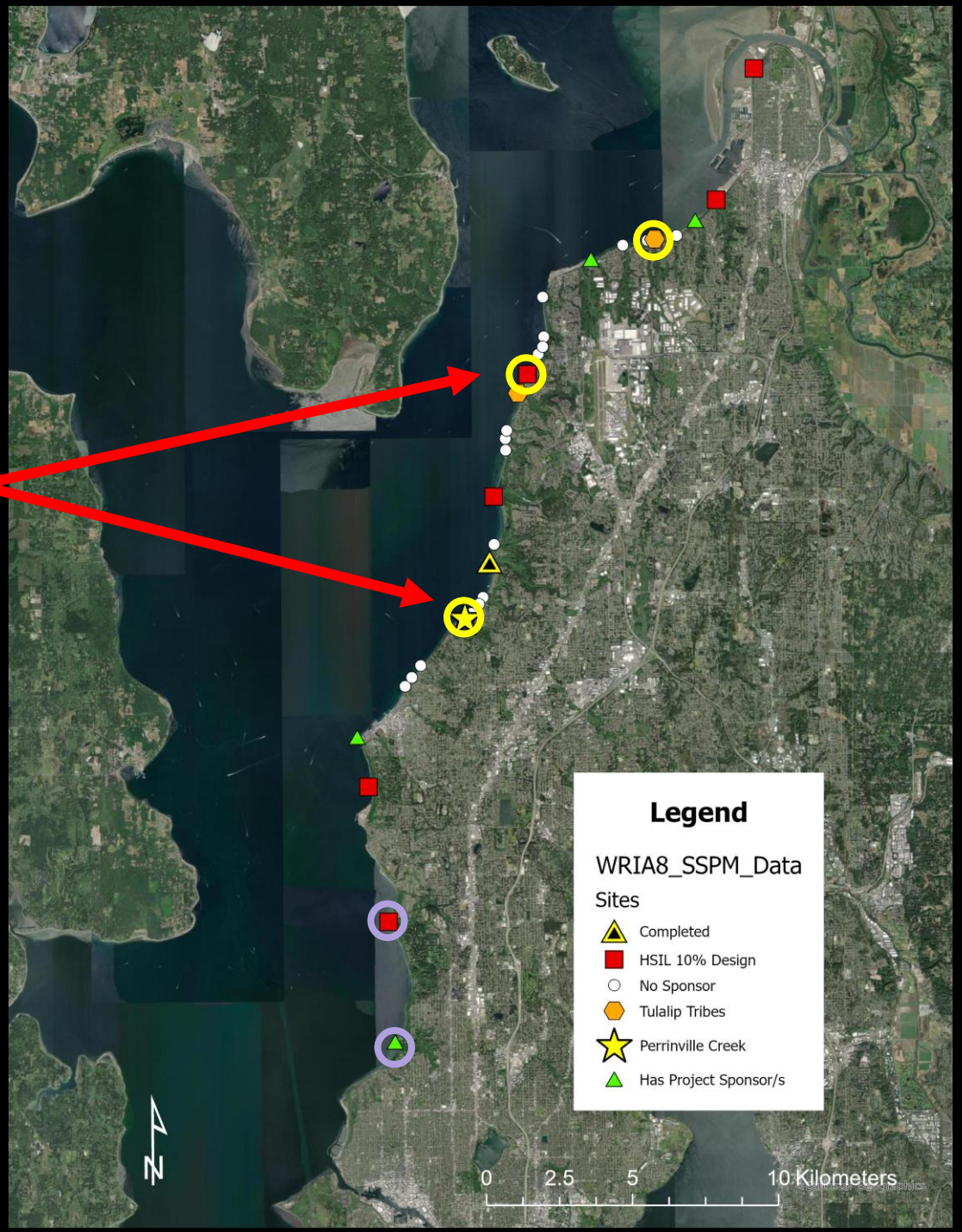
Tulalip Tribes are working on constructing 3 Railroad bridge crossings with BNSF

- Merrill and Ring Creek
- Big Gulch Creek
- Perrinville Creek

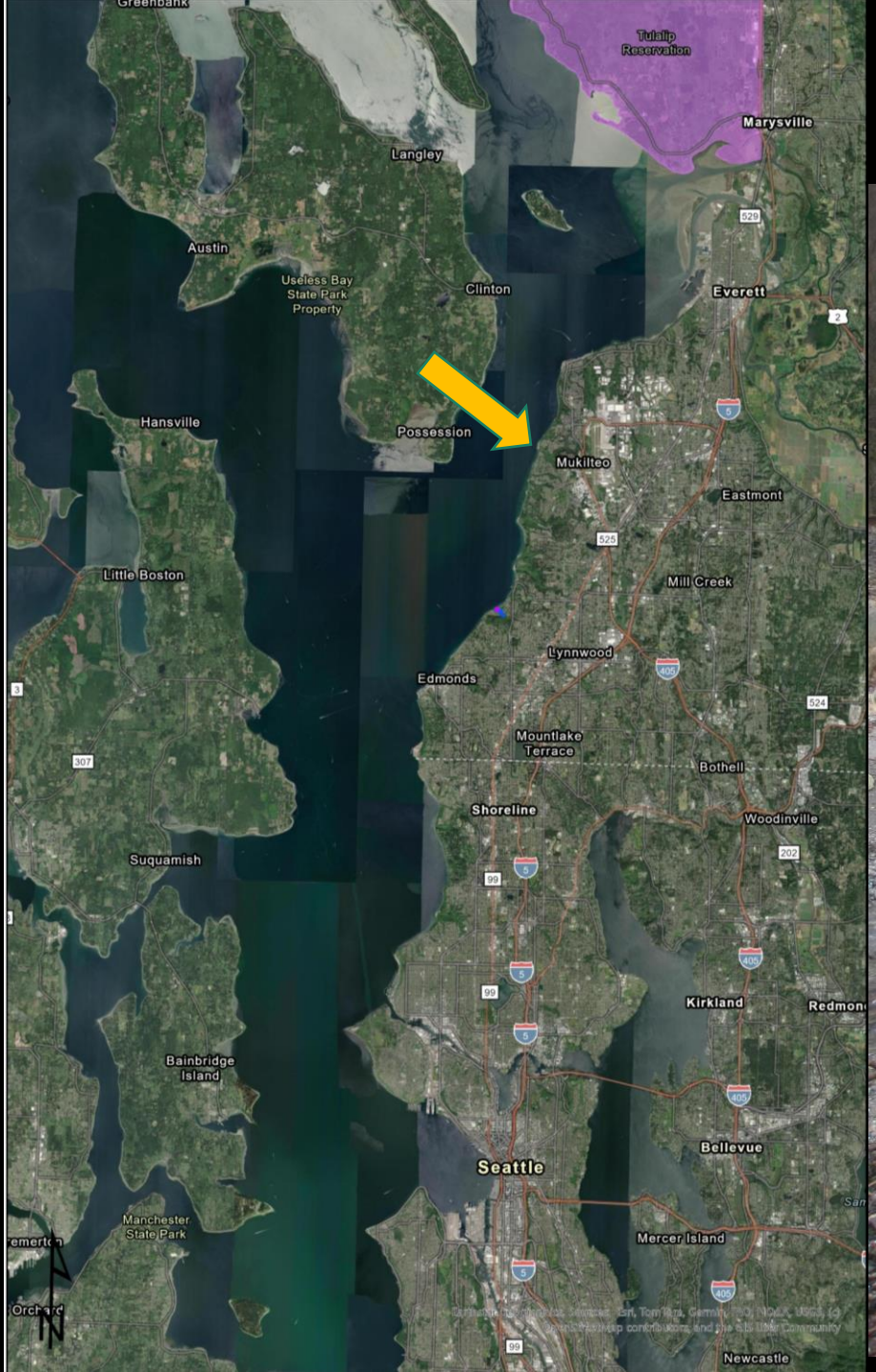
WRIA 8 2026 SRFB Projects

Suquamish Tribe is interested in working on two coastal streams

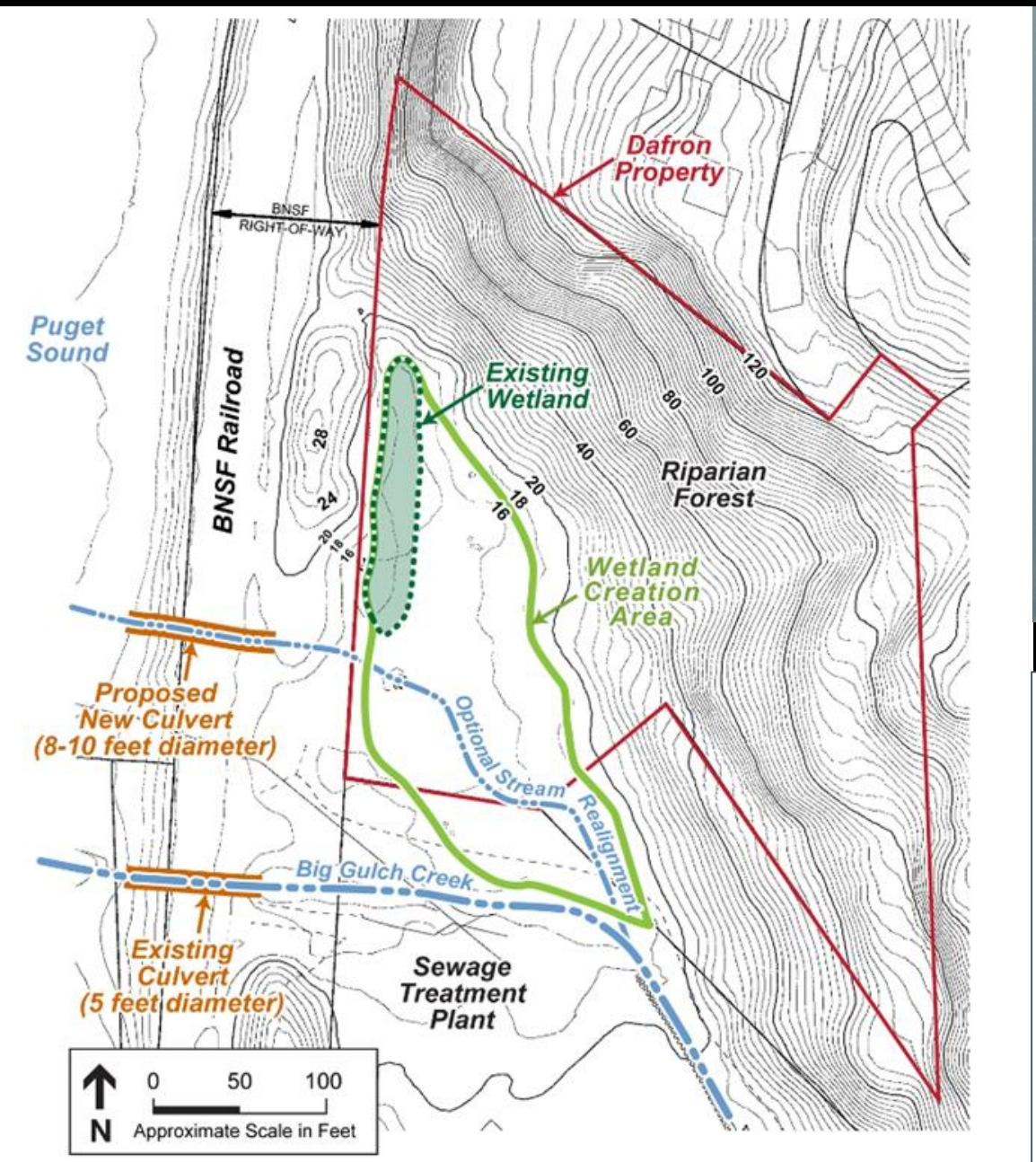
- Pipers Creek
- Boeing Creek

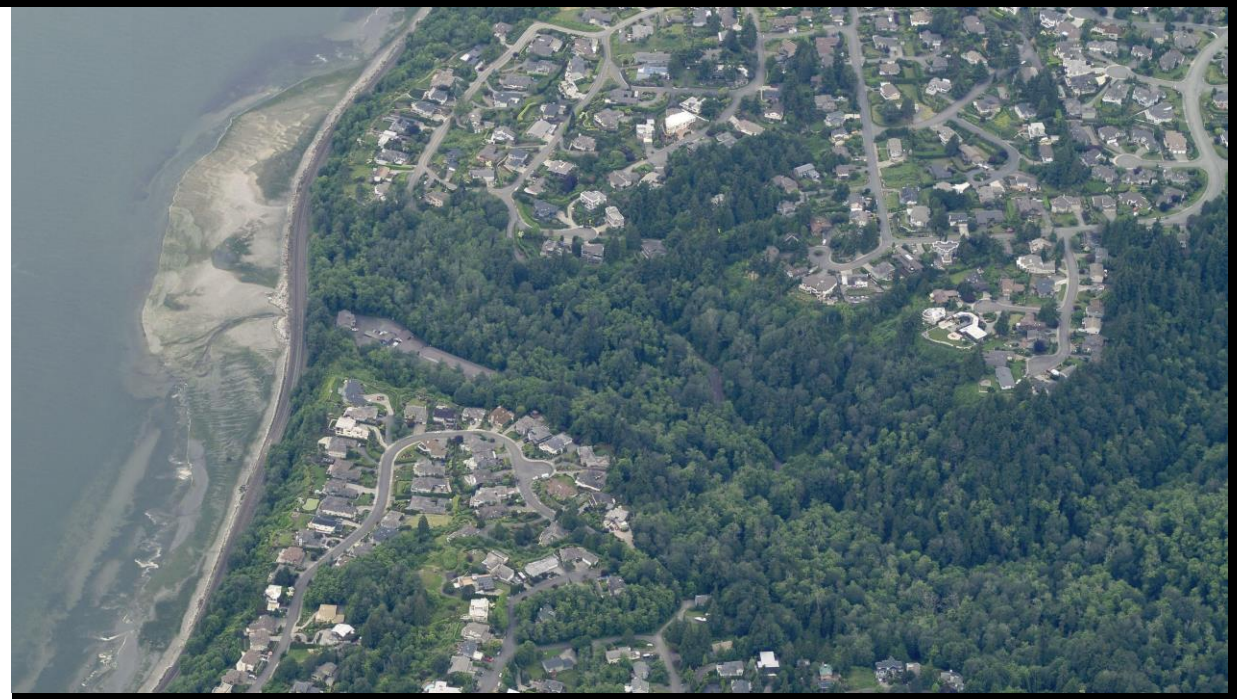


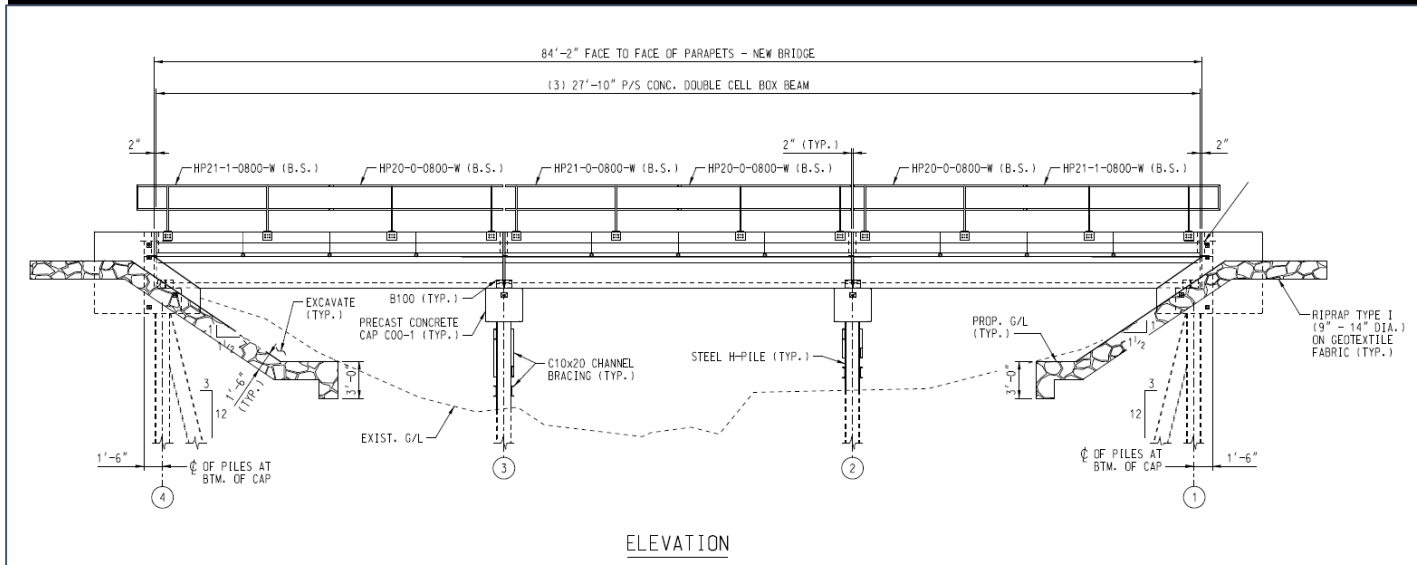
Big Gulch Creek Project Location



Proposed Restoration



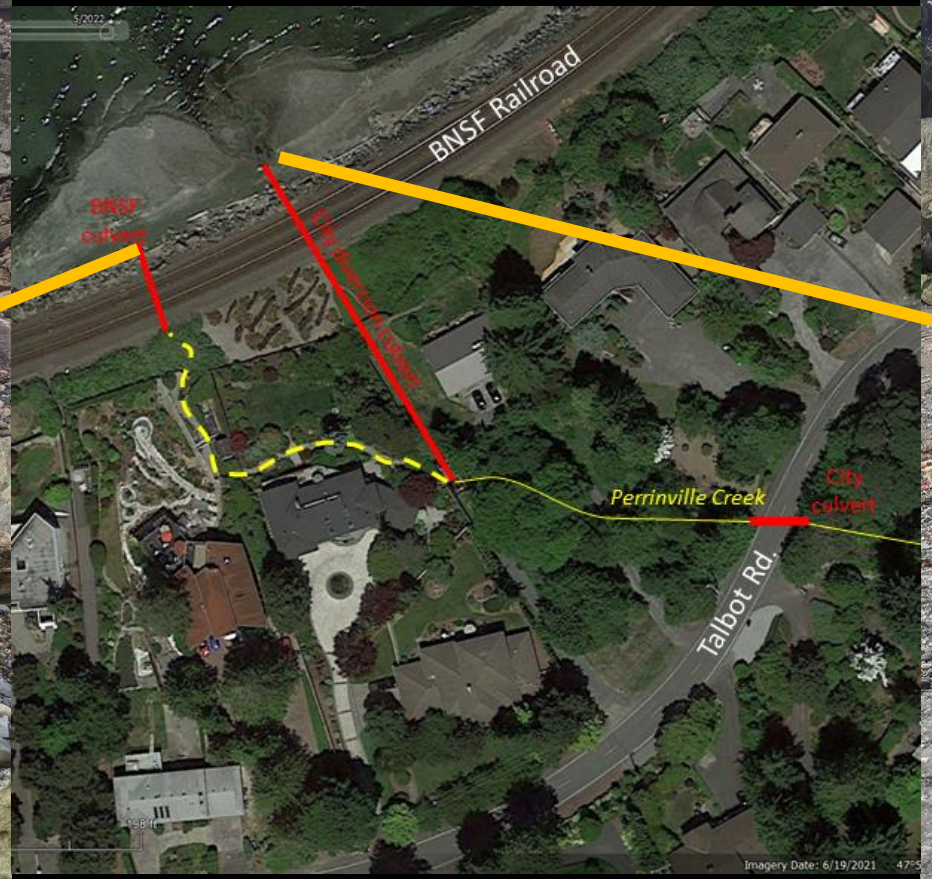




Perrinville Creek Project Location

Perrinville Creek Current Condition

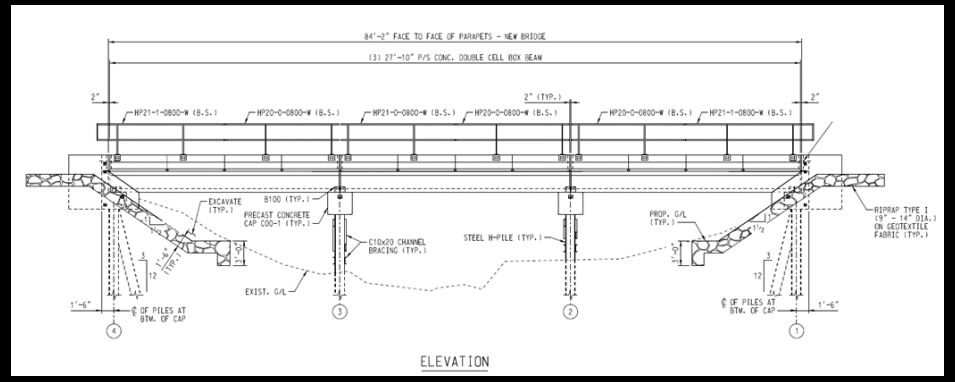
BNSF Perrinville Creek outfall

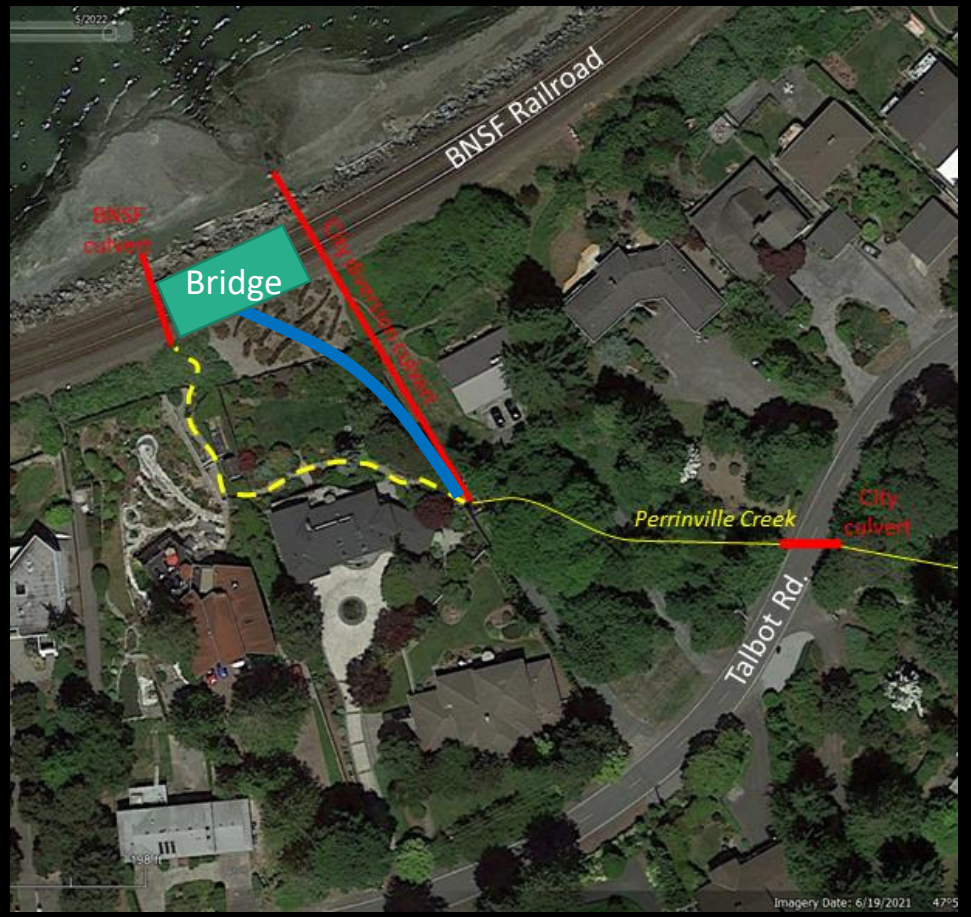


City of Edmonds diversion outfall

Proposed Work

- Hydrologic and Hydraulic modeling
  - ESA has done some H & H modeling
- Geotech investigation
- Archeological review
- Railroad bridge design 90%
- Stream channel realignment design 60%
- Site ready for permitting and construction





Questions?