

# Snohomish Estuary Pilings – Prioritization for Removal (Preliminary Results)

Paul Schlenger, Colin Struthers, and  
Christina Hersum –  
Environmental Science Associates



**Snohomish County**  
Marine Resources  
Committee



**Northwest  
Straits**  
INITIATIVE



**PUGET SOUND**  
PARTNERSHIP



# Project Team



**Snohomish County**  
Marine Resources  
Committee



**Paul Schlenger**  
Project Manager



**Colin Struthers**  
GIS



**Christina Hersum**  
Field Verification



## Project Goals

- Develop inventory of pilings in the Snohomish River estuary that are not associated with docks or bulkheads
- Conduct a prioritization of pilings for removal based on ecological benefits and feasibility





## Presentation Outline

- Prepare a GIS database inventory of pilings
- Conduct field verification of pilings – mainly to assess if creosote-treated
- Draft a prioritization framework
- Run prioritization framework





# Pilings in the Estuary



15,526 pilings in database



# GIS Database

- Database populated with a series of relevant fields for each piling to inform the prioritization
- Organized to allow users to extract a specified subset; for example, City of Marysville can query to only select pilings on parcels owned by the City



# Field Verification



*Ebey Slough*



*Ebey Slough*



*At the mouth*



*Quilceda estuary*



*Heron Rookery at 10<sup>th</sup> Street*



*Log rafting in Union Slough*





# Creosote-Treated Pilings



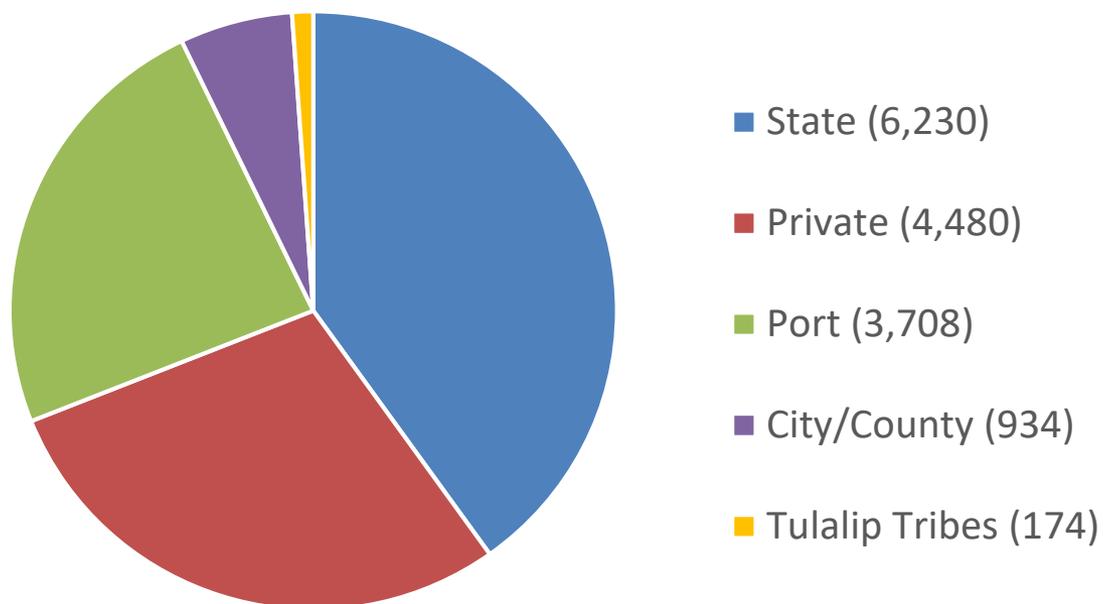
2,455 pilings or  
nearly 16% are  
creosote-treated

Red = Creosote  
Green = Not  
Creosote



# Ownership Overview

Ownership by Count





# Private Ownership

Top Ten Private	Number of Pilings
HOOK INVESTMENTS	933
KIMBERLY-CLARK WORLDWIDE INC	782
DUNLAP TOWING CO	666
B&B-SI-1 LLC	507
WILDLANDS OF WASHINGTON LLC	435
CEDAR GROVE COMPOSTING INC	158
BNSF RAILWAY COMPANY	156
DELTA TIDELANDS LLC	152
M A P #2 LLC	134
W&W EVERETT INVESTMENTS LLC	63

- The top ten private piling owners, own 89% of all privately-owned pilings.



# Draft Prioritization Framework

- Reviewed other recent restoration/ protection prioritizations in the region
  - Port of Vancouver Derelict Pile and In-water Structure Removal Strategy (2019)
  - Prioritization of Coastal Streams Impacted by Railroad (2019)
  - Salmon Overlay to Snohomish Estuary Wetland Integration Plan (2001)
  - West Sound Nearshore Integration and Synthesis (2017)
  - WRIA 1 Nearshore & Estuarine Assessment and Prioritization (2013)
- Pilings evaluated using a scoring system
- Rather than one collective score, decided to separately characterize for each piling the ecological benefits of removal and the feasibility of removal

# Prioritization Framework

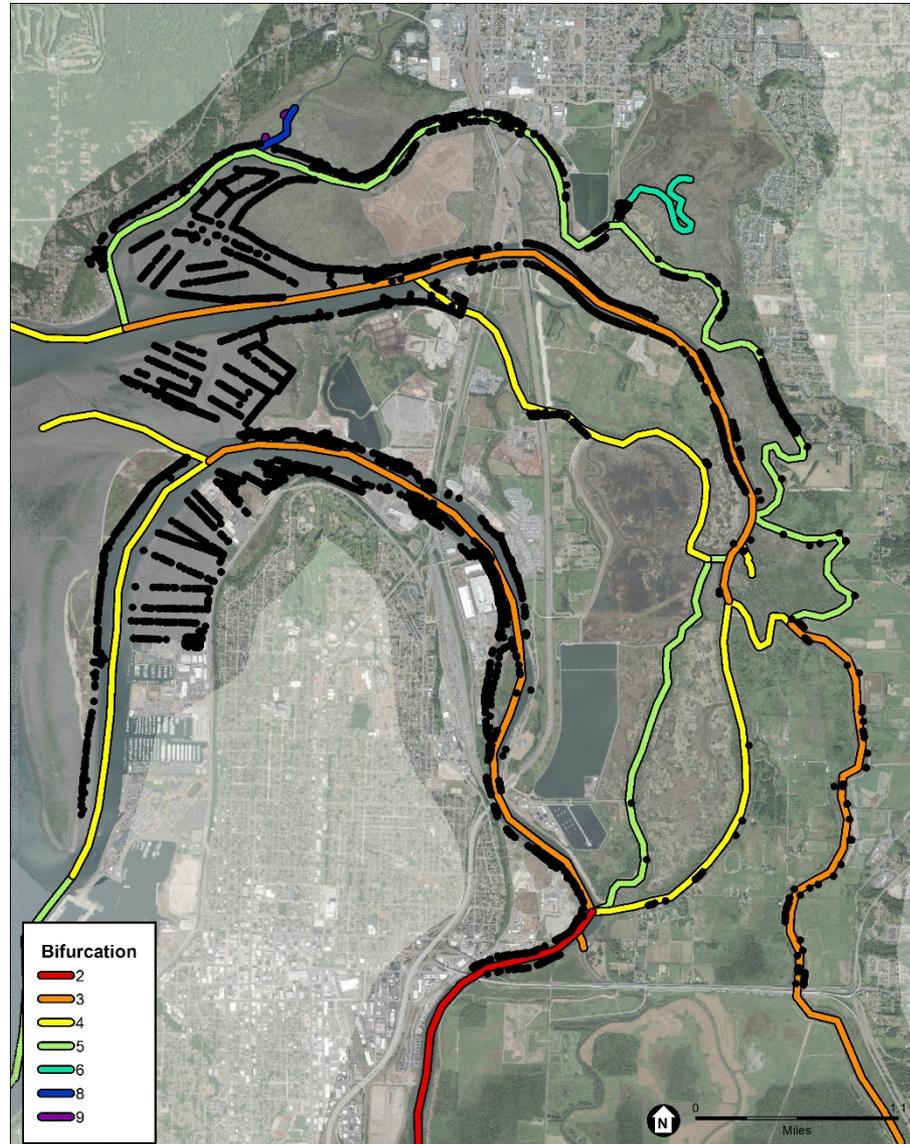
- Ecological benefits of removal

Ecological Benefit	Scores
Creosote-treated	Yes = 10 No = 0
Habitat type (based on elevation)	> +13 ft MLLW = 2 MHHW to +13 ft = 3 MLLW to MHHW = 5 -10 ft to MLLW = 3 < -10 ft MLLW = 0
Salt marsh / eelgrass present	Continuous = 5 Patchy = 3 None = 0
Landscape connectivity (based on Beamer (2005))	Order 1 to 3 = 4 Order 4 to 5 = 2 Order 6 to 9 = 0
Habitat function (based on SEWIP*)	High = 3 Medium = 2 Low = 0
Single or clustered piling	>25 pilings = 3 6 to 25 = 2 2 to 5 = 1 1 piling = 0
Wildlife use	Yes = -5 No = 0

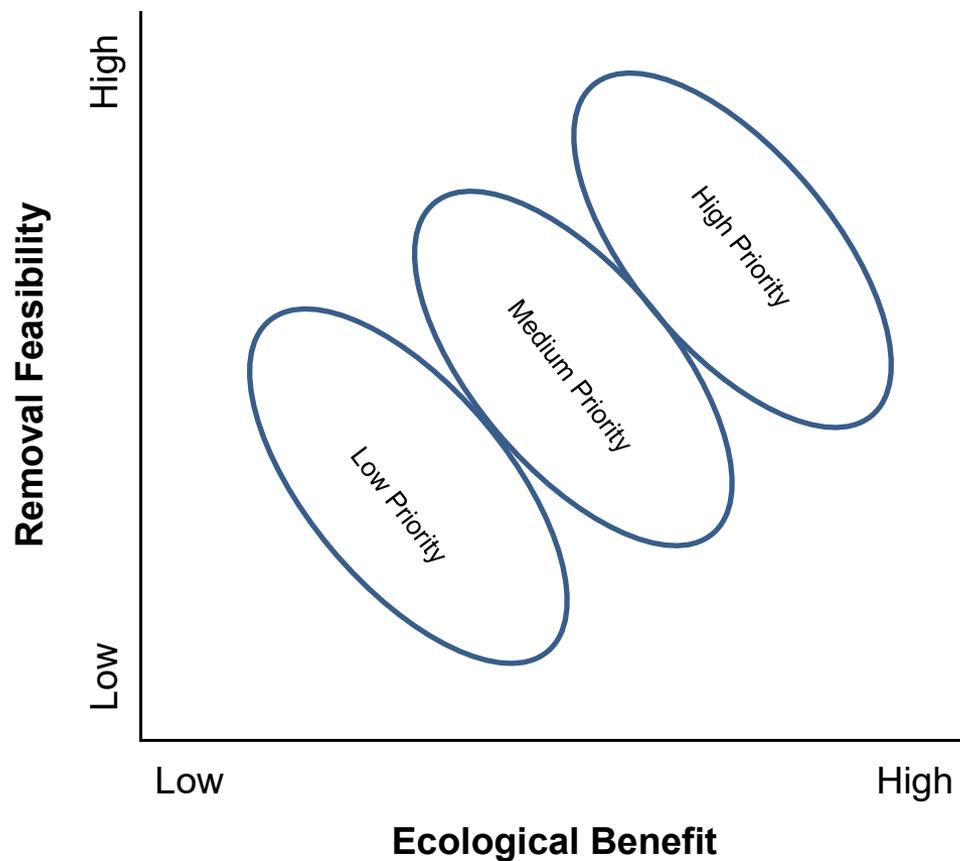
- Feasibility of removal

Feasibility	Scores
Ownership	State = 5 City/County/Port = 3 Tribe = 3 Private = 0
Risk of Contamination at Site	"Awaiting Cleanup" = -5 Other = 0
Pilings in Use	No = 5 Historically = 2 Currently in Use = 0

# Landscape Connectivity

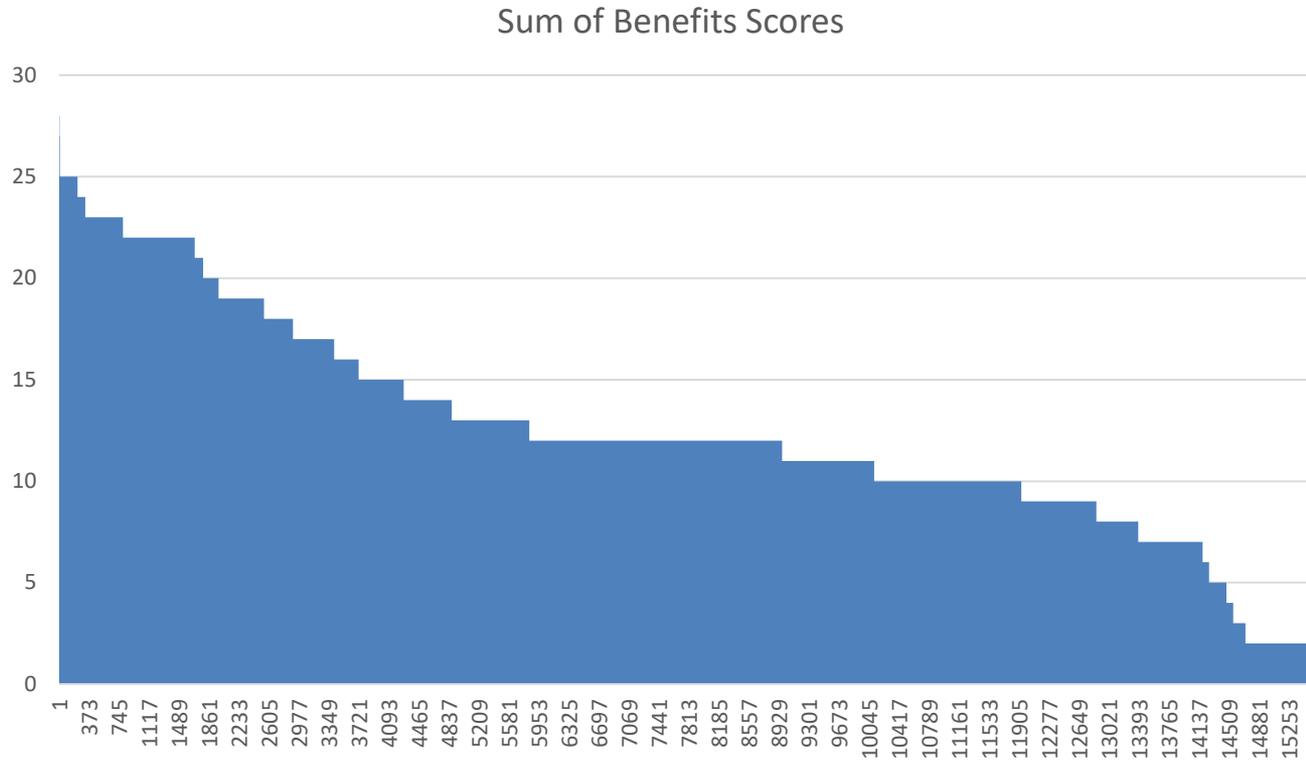


# Conceptual Depiction of Two-Axis Prioritization Approach





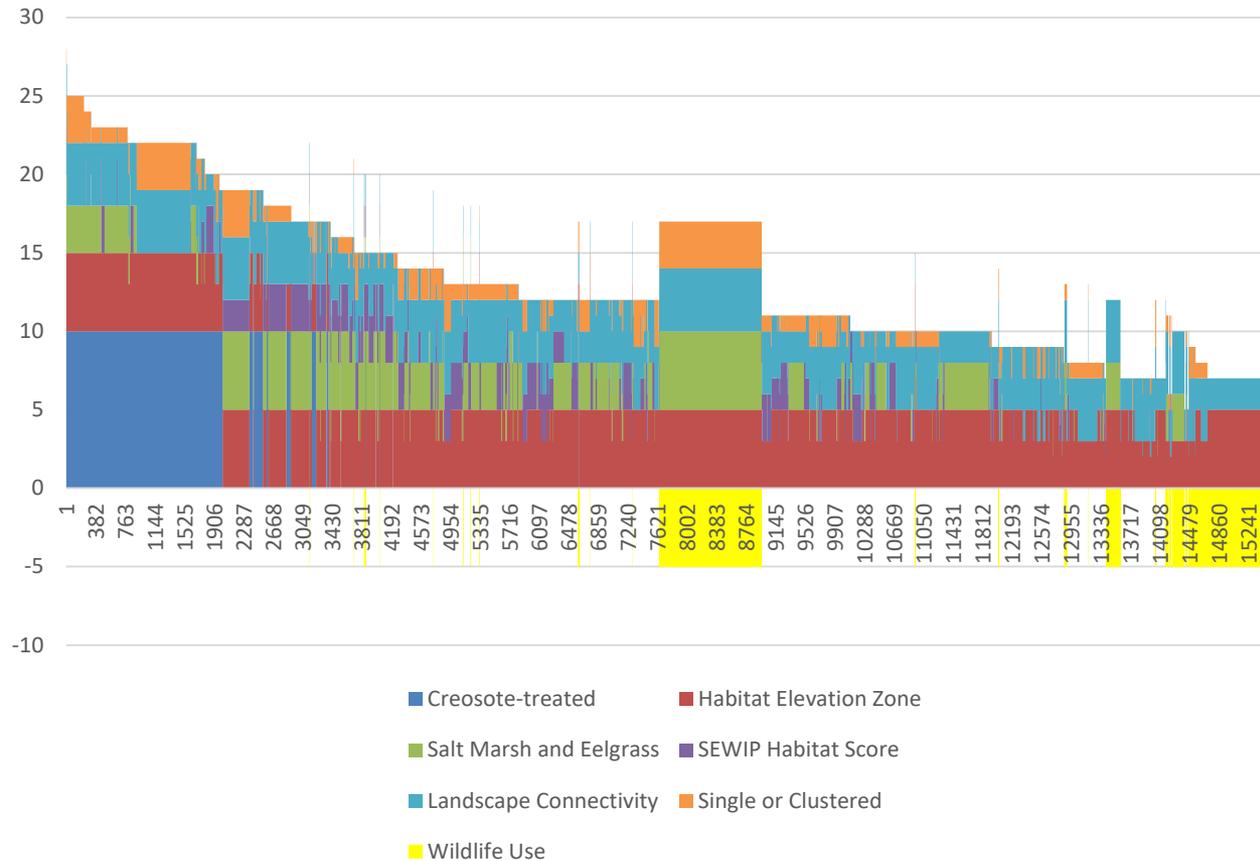
# Prioritization Results – Ecological Benefits





# Prioritization Results – Ecological Benefits

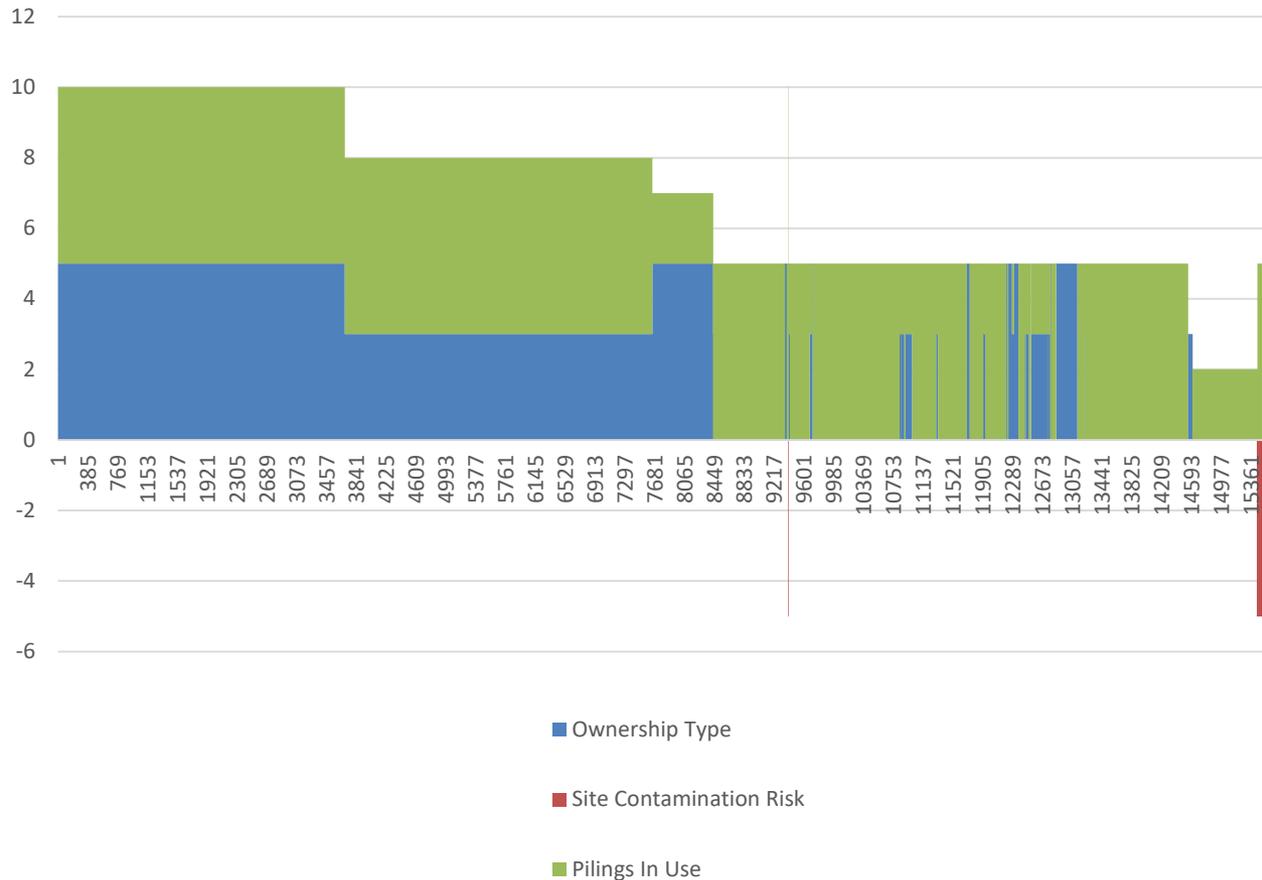
Benefit Score by Parameter





# Prioritization Results – Feasibility

Feasibility Score by Parameter





## Interpreting Benefit and Feasibility Scores

- Used Natural Breaks to Assign Four Tiers to Benefit Scores and Feasibility Scores
  - High
  - Medium-High
  - Medium
  - Low
- Assign Overall Prioritization Ranking based on Benefit and Feasibility Tiers



# Assigning Priority Rankings

Removal Feasibility	High				
	Med-High				
	Medium				
	Low				
		Low	Medium	Med-High	High
		Ecological Benefits			



# Assigning Priority Rankings

Removal Feasibility	High	Medium	Medium	High	High
	Med-High	Low	Medium	High	High
	Medium	Low	Low	Medium	Medium
	Low	Low	Low	Low	Medium
		Low	Medium	Med-High	High
Ecological Benefits					



# Priority Ranking of Pilings



Blue = High  
Orange = Medium  
Yellow = Low

26% High  
38% Medium  
36% Low



## Next Steps

- Draft report in review by MRC
- Final report by end of August





Thank you!

This project has been funded wholly or in part by the United States Environmental Protection Agency. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency under Assistance Agreement (CE-01J65401). The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.