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Pre-project monitoring of the Qwuloolt restoration in the Snohomish River Estuary

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Pre-project monitoring of the Qwuloolt restoration in the Snohomish River Estuary

Todd Zackey¹, Casey Rice², Josh Chamberlin², Jason Hall², Jason Schilling¹, Holly Zox³, Phil Roni¹

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Qwuloolt Estuary Restoration Project
Restore 350 acres Breach Scheduled for late Summer 2015
5 factors and ultimate response

Factors

- Landforms (elevation, channel morph, sediment dynamics)
- Hydrology (tidal regime, temperature, salinity)
- Energy & nutrients (organic matter, nutrients)
- Chemistry (contaminants)
- Biological interactions (competition, predation, disease)

Biological responses

- Community (veg, invert, fish, bird, mammal assemblage composition)
- Populations (salmonid abundance, growth, life history diversity)
Sampling to date

2009-present

year round fish (5+ yrs)
elevation
hydrology
Chemistry

vegetation
invertebrates
birds
mammals
FISH!
Hydrology
Hydrological Disconnection & subsidence

Qwuloolt verses Heron Point...

Consequences of land use
Subsidence effects-vegetation
vertical distribution of wetland plants in study area

Curveballs: freshwater, beaver, SLR, etc...
Invertebrate Assemblages: Fallout Traps & Benthic Cores

Neuston Tow samples have not been analyzed
Bird Assemblages

Site
- Ebey Island
- Forested Wetland
- Marysville Mitigation
- Quil Ceda
- Qwuloolt
- Smith Island

2D Stress: 0.16
Qwuloolt Fish/Amphibian Assemblage

214 samples
each dot = 1 site/month combination

Disconnected habitat = different fish assemblages

Less native (warm water invasives)

Native salmonids present
Pre-breach seasonal Chinook salmon size 2012
Beach seines and fyke traps combined
Pre-breach seasonal coho salmon size 2012

Beach seines and fyke traps combined
Qwuloolt and salmon
Pre-breach fish abundance—Ebey Slough 2012
101 beach seine sets
Future Data

Surface Elevation Table
- 4 installed
- 16 planned

Neuston Plankton Tow Samples

Isotopes

Otoliths

Stomach Content

DNA
Data Gaps

Watershed Response
Allen & Jones Creeks

Beaver alterations to Qwuloolt site Pre & Post Breach?

Groundwater Levels and Salinity
Conclusions

Qwuloolt is
• subsided and disconnected
• degraded
  – Less diverse
  – Less indigenous
  – Less salty

• Monitoring is doing a good job of documenting pre-breach conditions and setting up meaningful short and long-term evaluations at project and system level
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Questions?