

# Swinomish Channel Project Update

Scott H Brown, P.E.

USACE Seattle District



US Army Corps of Engineers  
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# Federal Navigation Structures



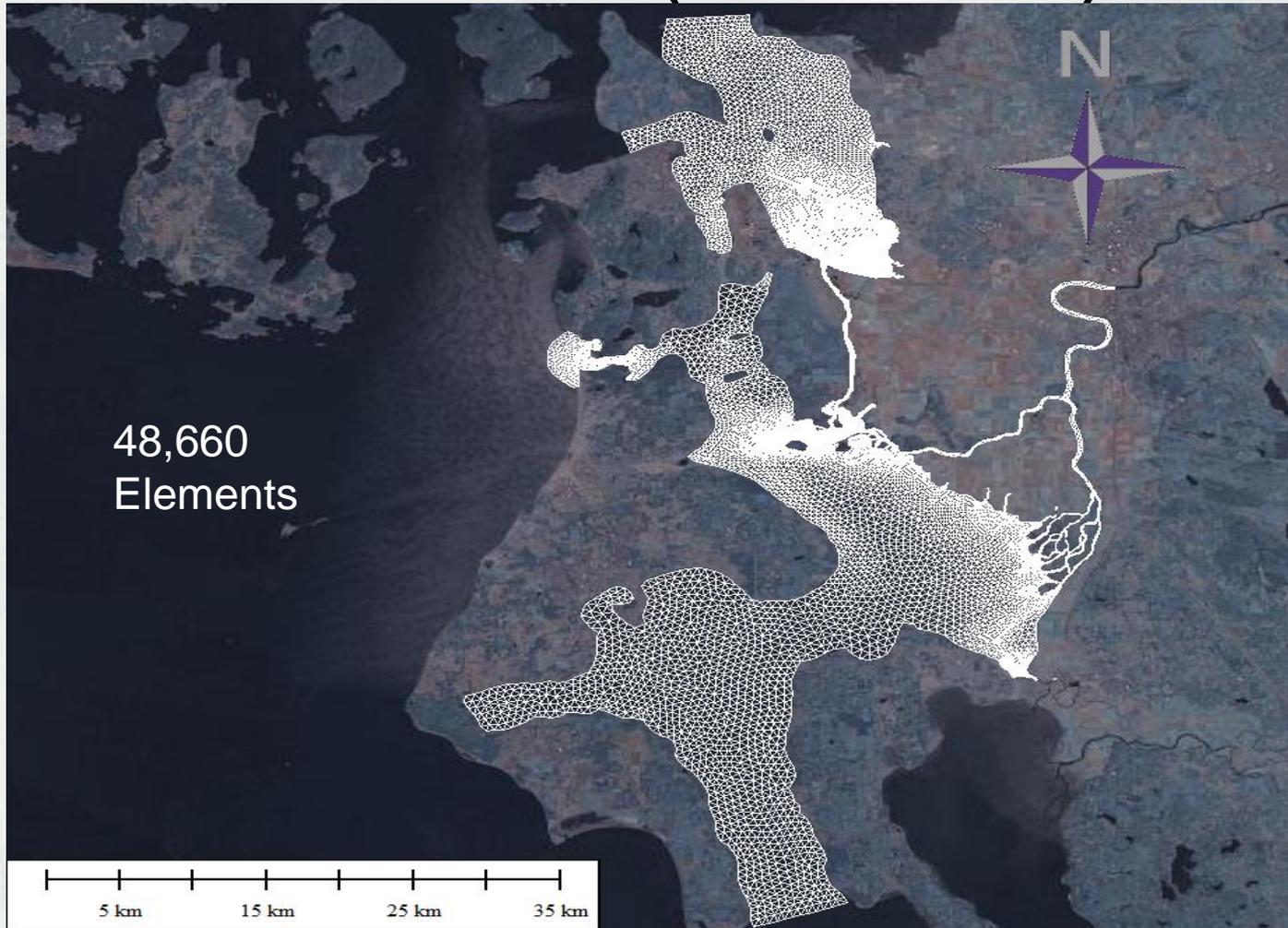
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# Study Approach

- Determine how to reduce sedimentation and dredging requirements in channel
- Apply a 3D hydrodynamic circulation and sediment transport model to evaluate:
  - ▶ Sediment delivery and shoaling in the Swinomish Channel
  - ▶ Assess performance of existing dikes and jetties
  - ▶ Evaluate dike repair and modification alternatives



# Finite Volume Community Ocean Model (FVCOM) Grid



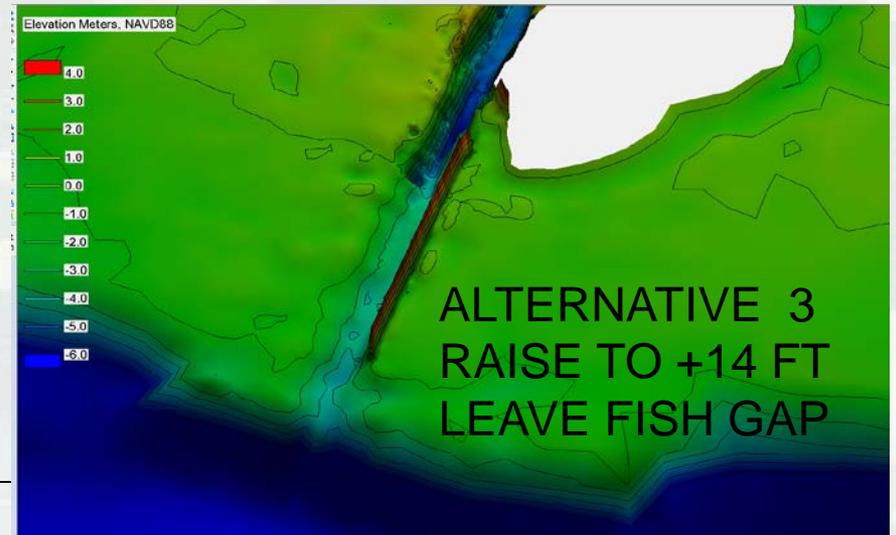
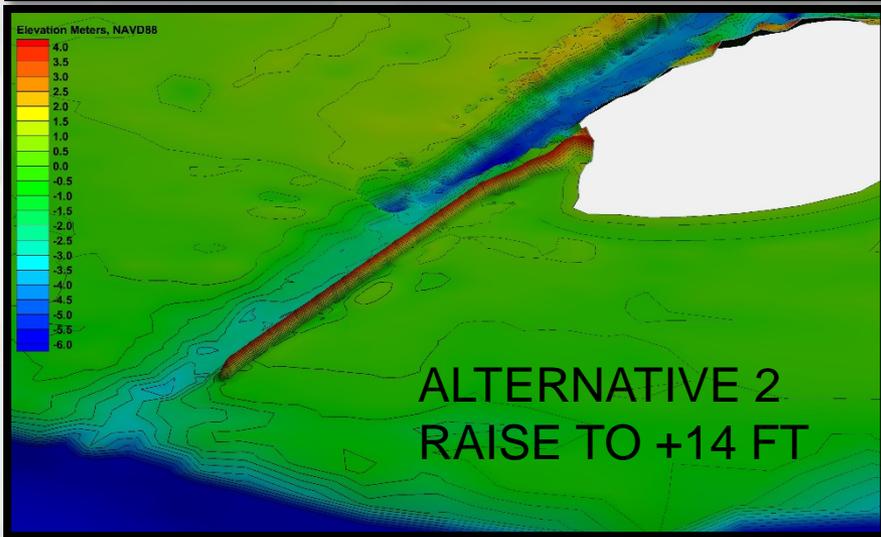
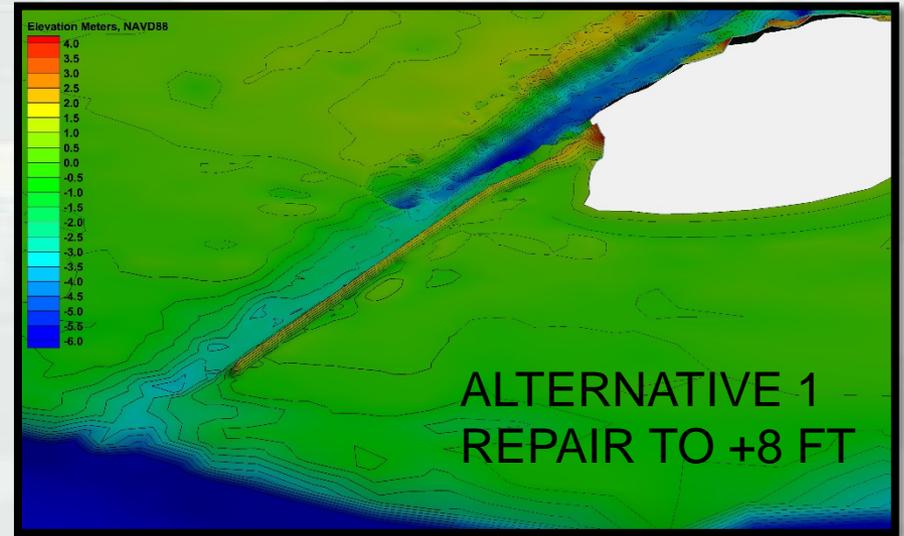
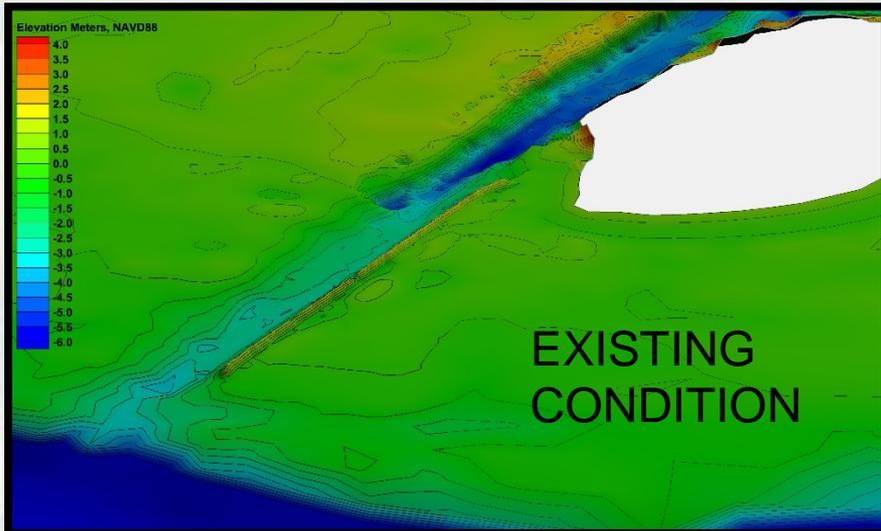
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# Alternatives

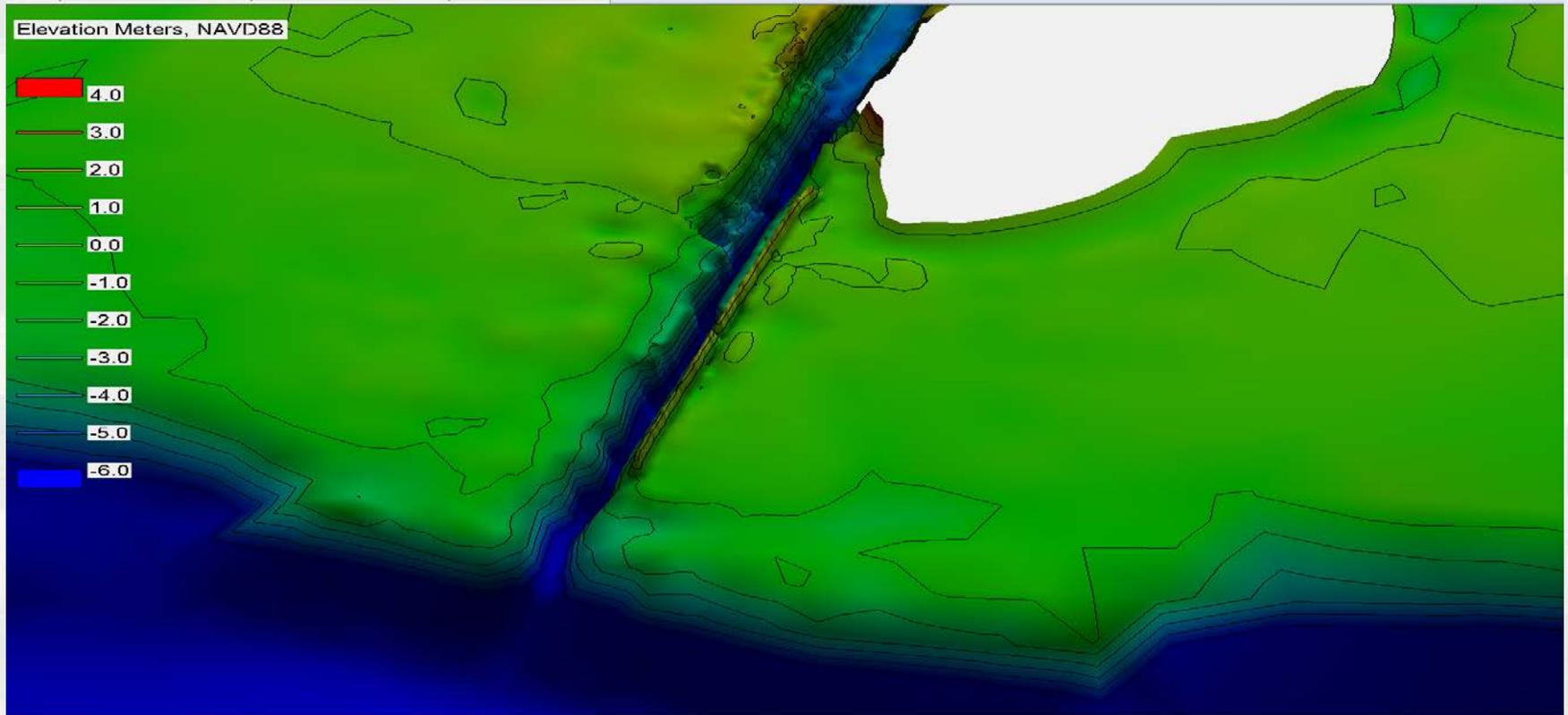
- ALT1. Close Goat Island Fish Gap and Repair Goat Island Jetty +8 FT MLLW
- ALT2. Close Goat Island Fish Gap and Raise Goat Island Jetty to +14 FT MLLW
- ALT3. Leave Goat Island Fish Gap and Raise Goat Island Jetty to +14 FT MLLW
- ALT4. 25 FT Deep Settling Basin Between Stations 20+00 and 50+00 (approx. 250,000 cy capacity)



# Structural Alternatives



# Alternative 4: Settling Basin



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# Initial Evaluation Criteria

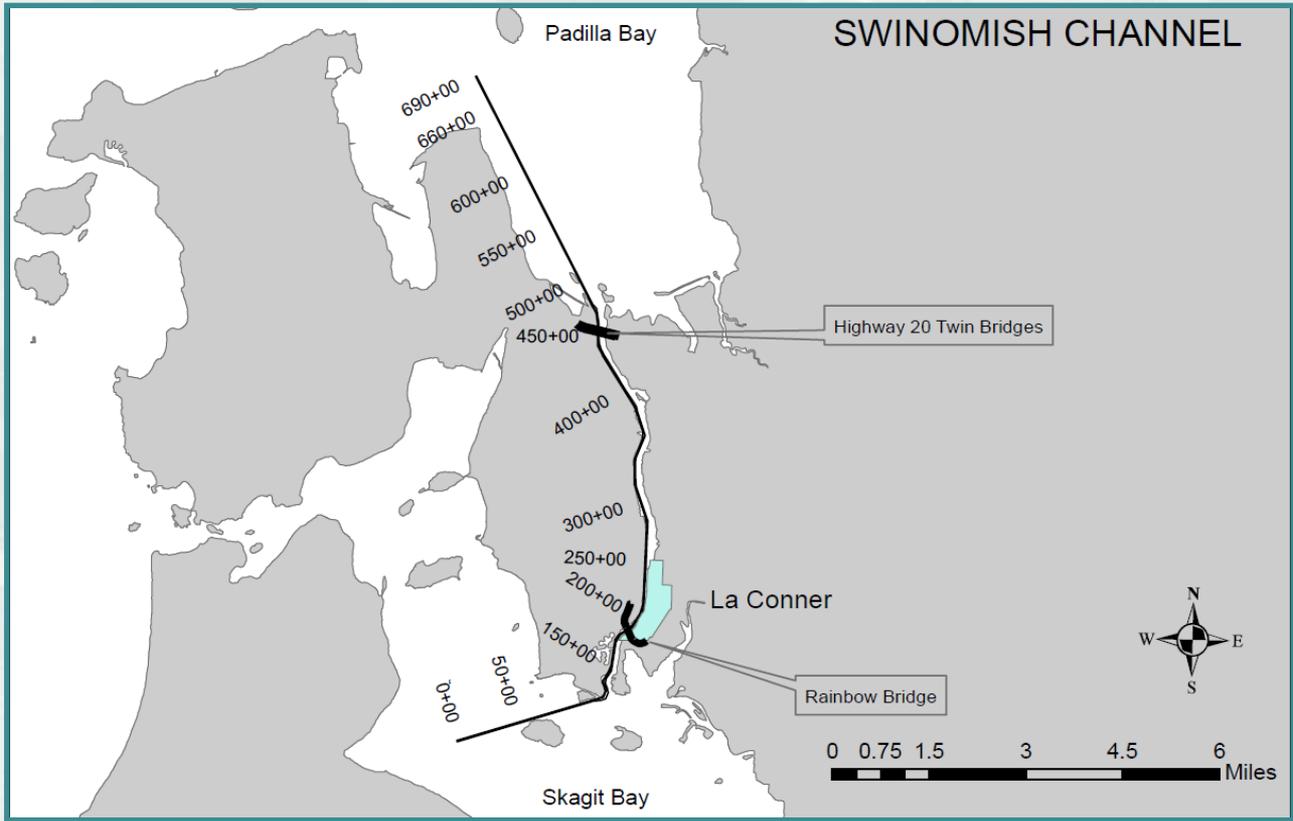
**Velocity** – Impacts to Navigability of the Channel

**Sedimentation Rate** – Impacts to Maintenance  
Dredging

**Salinity** – Impacts to Salmonids

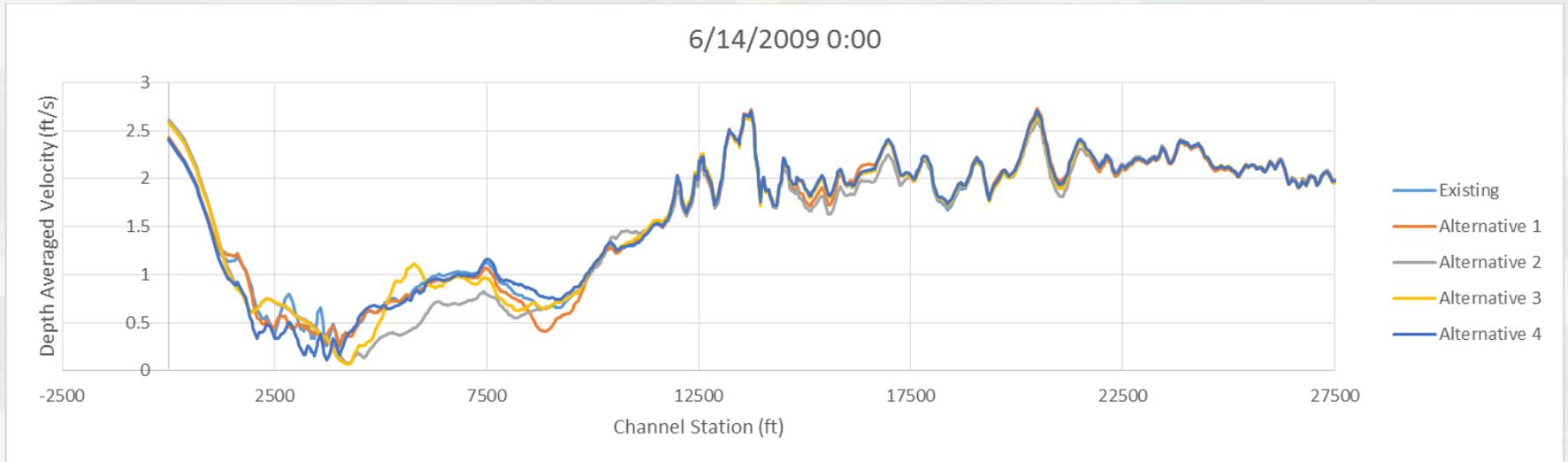


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# Model Velocities Along Channel Centerline



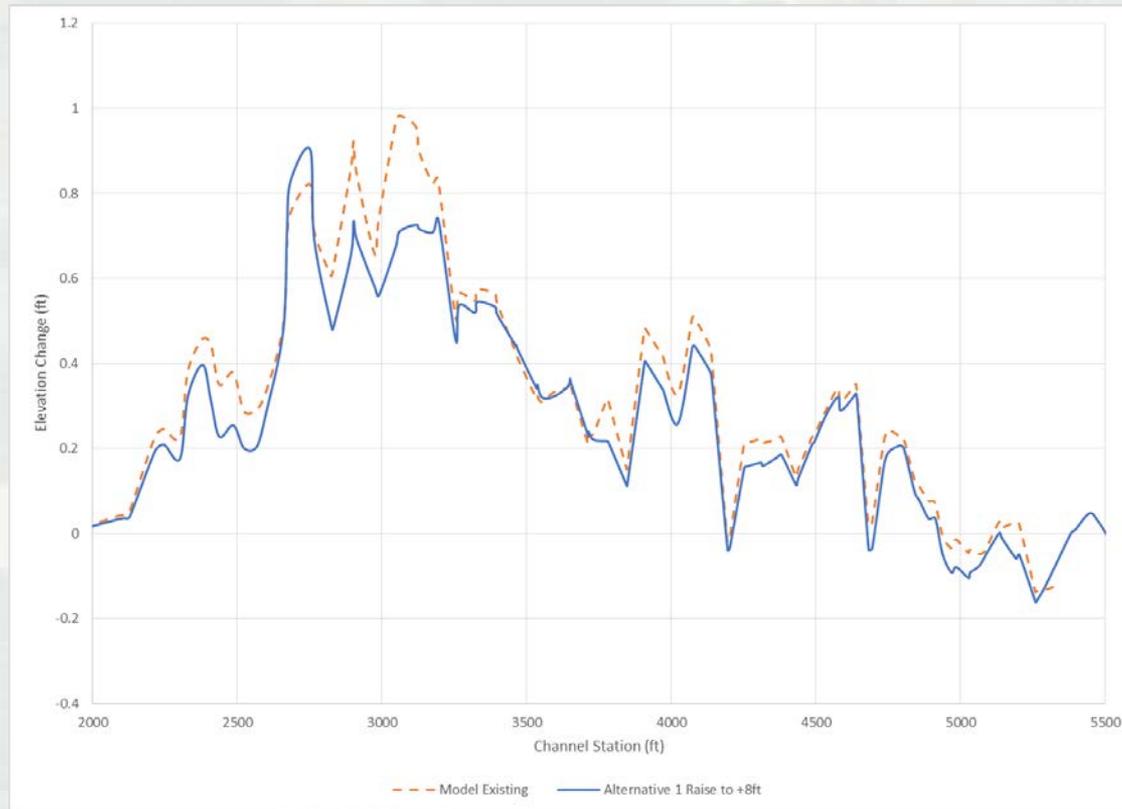
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# Predicted Changes in Velocities

- Maximum Velocity change in channel for Structural Alternatives (1-3) <math><0.5\text{-ft/second}</math>
- Maximum Velocity Change for Settling Basin (Alt 4) Approx. 1-ft/second
- No Significant Impacts to Navigability for Any Alternative

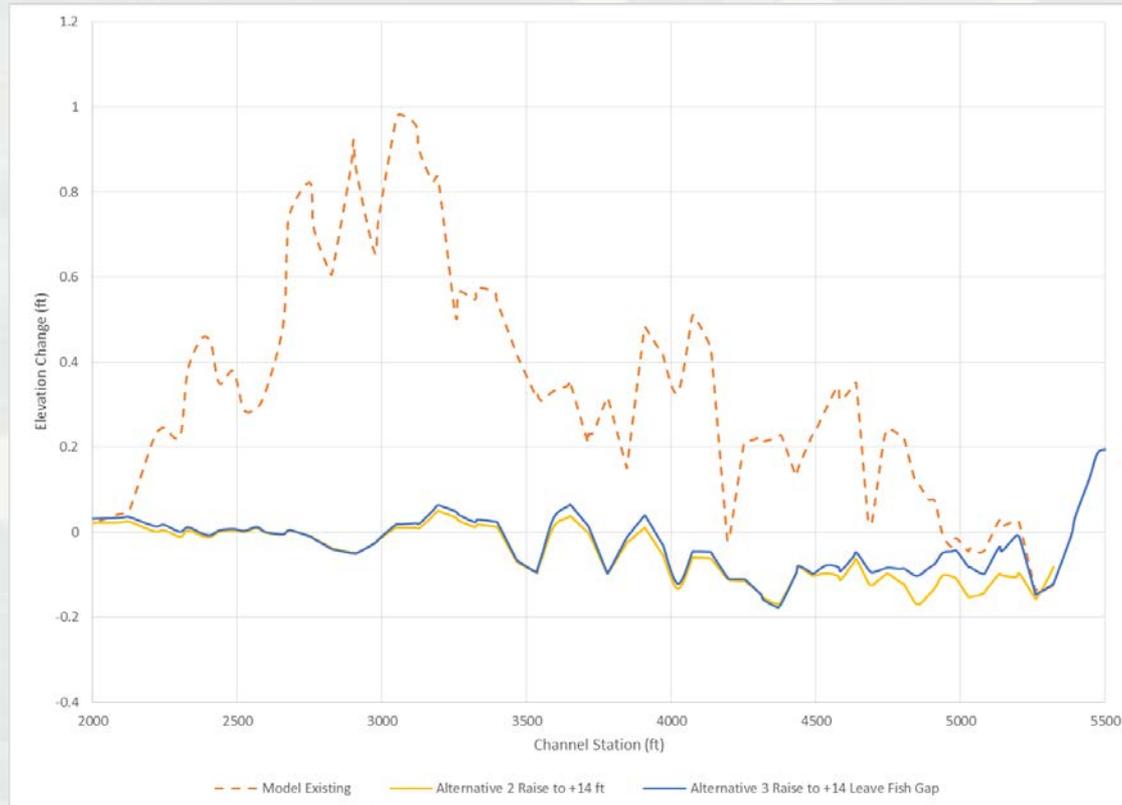


# Sediment Infill Alternative 1 (Raise Jetty to +8-ft Close Fish Gap)



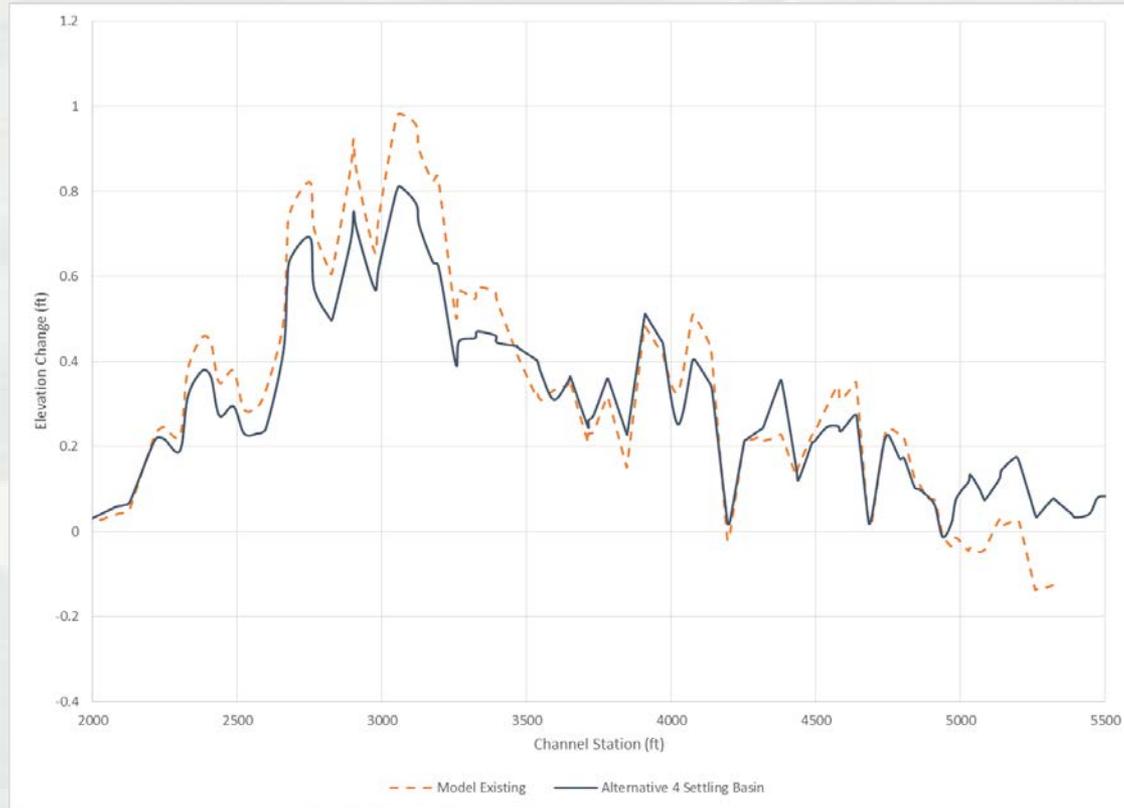
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# Sediment Infill Alternative 3 vs 2 (Jetty at +14-ft Fish Gap Opened and Closed)



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# Sediment Infill Alternative 4 (Settling Basin)



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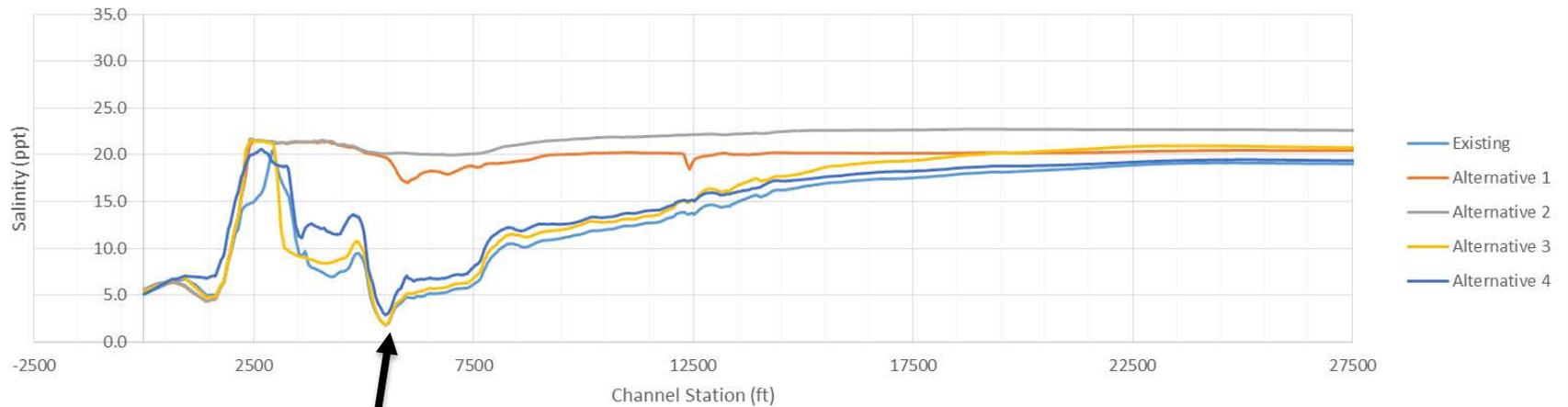
# Predicted Changes in Sedimentation Rates

- Alternatives 2 and 3 significantly reduce sediment infill, reducing dredging needs
- Alternatives 1 and 4 do not significantly reduce infill



# Model Salinity

6/14/2009 12:00



FISH GAP



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# Predicted Changes in Salinity

- Alternatives 1 and 2 significantly change the salinity gradient at the south entrance
- Alternative 3 has localized impacts to salinity gradient adjacent to jetty by minimal impact to rest of channel
- Alternative 4 has least impact to salinity but does not meet project objectives (Reducing Sedimentation Rate)



# Preliminary Recommended Alternative

- Alternative 3: Raising the Goat Island Jetty to +14-ft MLLW and leaving the existing fish gap in place.
- Provides significant reduction in shoaling rate in channel
- Does not alter velocities in the channel to a level that would affect navigability
- Minimizes changes to salinity gradient in channel



• Final DDR Summer 2017



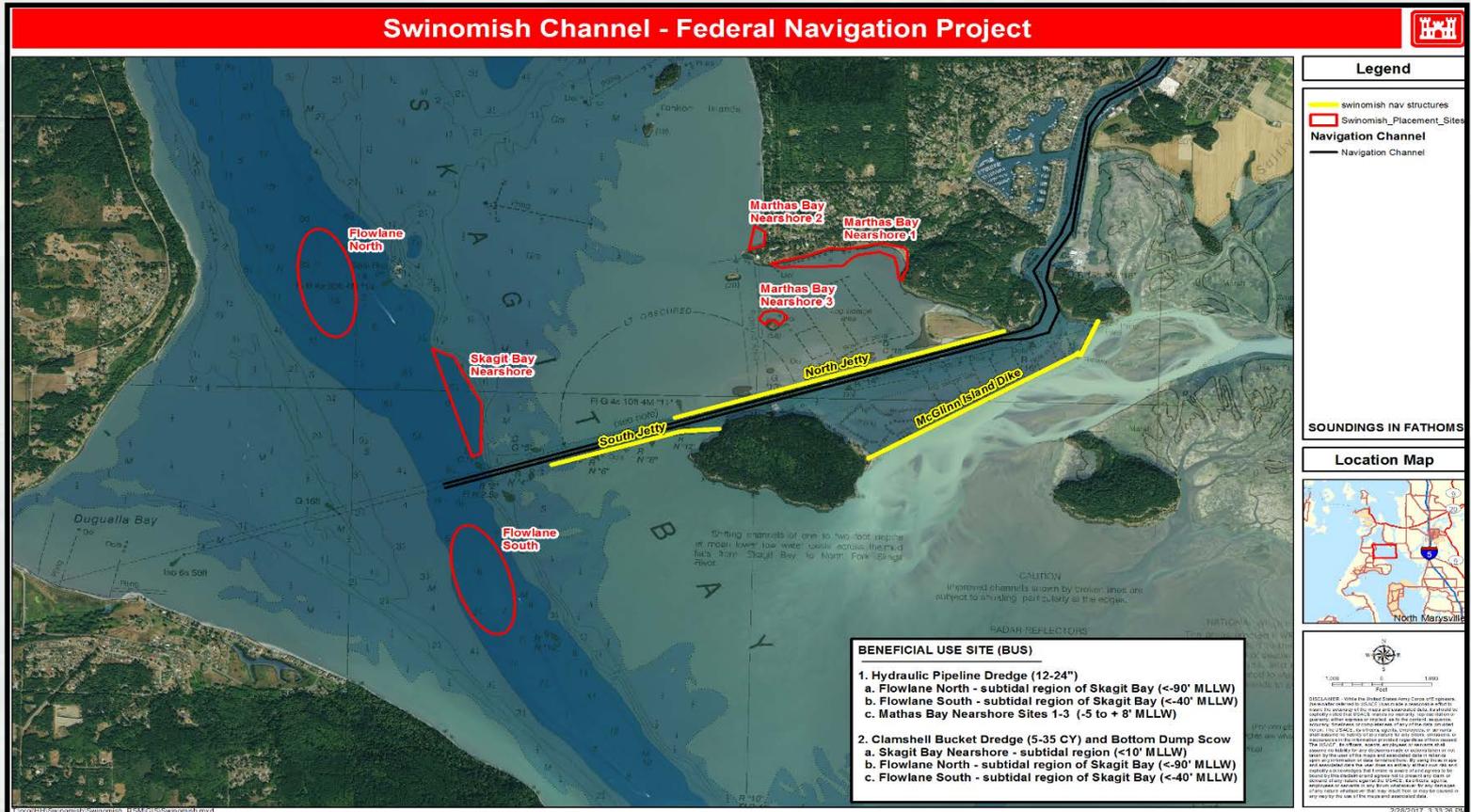
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# Regional Sediment Management Goals

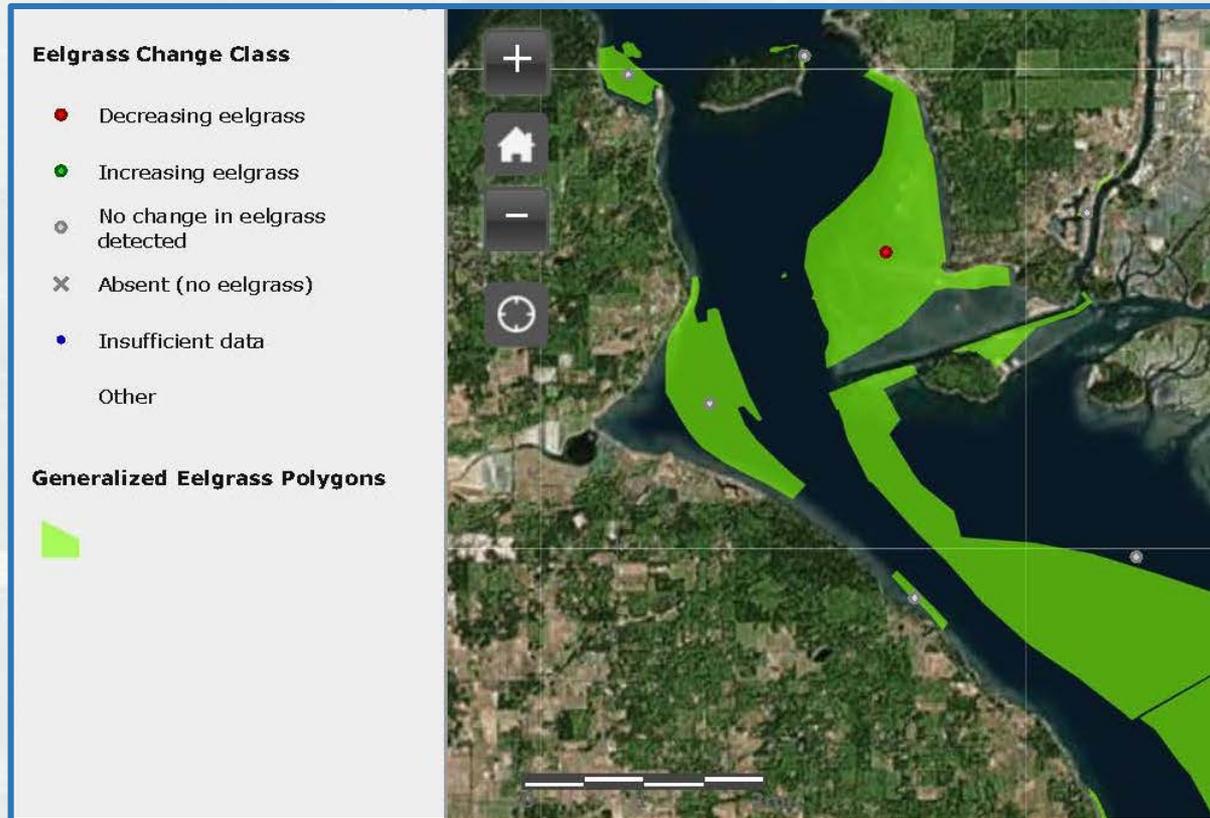
- Establish Beneficial Use Site for placement of Dredge Material
- Maintains Natural Processes
- Lower Transportation Cost and Emissions
- Enables use of Hydraulic Dredging



# Beneficial Use Sites Evaluated



# Eelgrass



# Forage Fish



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# Findings

- **Marthas Bay Nearshore Sites**
  - ▶ Not enough velocity for sediment movement
  - ▶ Limited Capacity
- **Skagit Bay Nearshore**
  - ▶ Potential Eelgrass and Forage Fish Impacts
- **Flowlane Sites**
  - ▶ South More Dispersive, Fines May Migrate Onshore



# Documents Produced

- Draft CZM
- Draft EA and 404
- Draft Public Notice
- PTM Modeling Report



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