



US Army
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Portland District

Mouth of the Columbia River Jetties Major Rehabilitation Study

Public Information Meeting
Maritime Museum
Astoria, Oregon
July 31, 2006
7:00 - 9:00 pm



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MCR Jetty Rehabilitation

- This is an Informational Meeting, **not** a public hearing – No recording will be made of the meeting
- It is an **opportunity** for you to ask questions and talk with Corps representatives about the MCR Jetties Major Rehab Study.
- Please save your questions for after the presentations
- Submit your written comments on the Environmental Assessment (EA) to the Corps, comment period ends August 4, 2006



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Tonight's Agenda

- | | |
|-------------|--|
| 7:00 - 7:10 | Introductions and overview |
| 7:10 - 7:25 | Overview of the Project –
Laura Hicks |
| 7:25 - 7:40 | Technical Overview –
Heidi Moritz |
| 7:40 - 8:00 | Environmental Overview –
Steve Helm |
| 8:00 - 9:00 | Open House |



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Overview of the Project

Laura Hicks



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Project Overview

- Background
- Corps Guidance for Major Rehab
- Project Alternatives
- Next Steps/Project Schedule

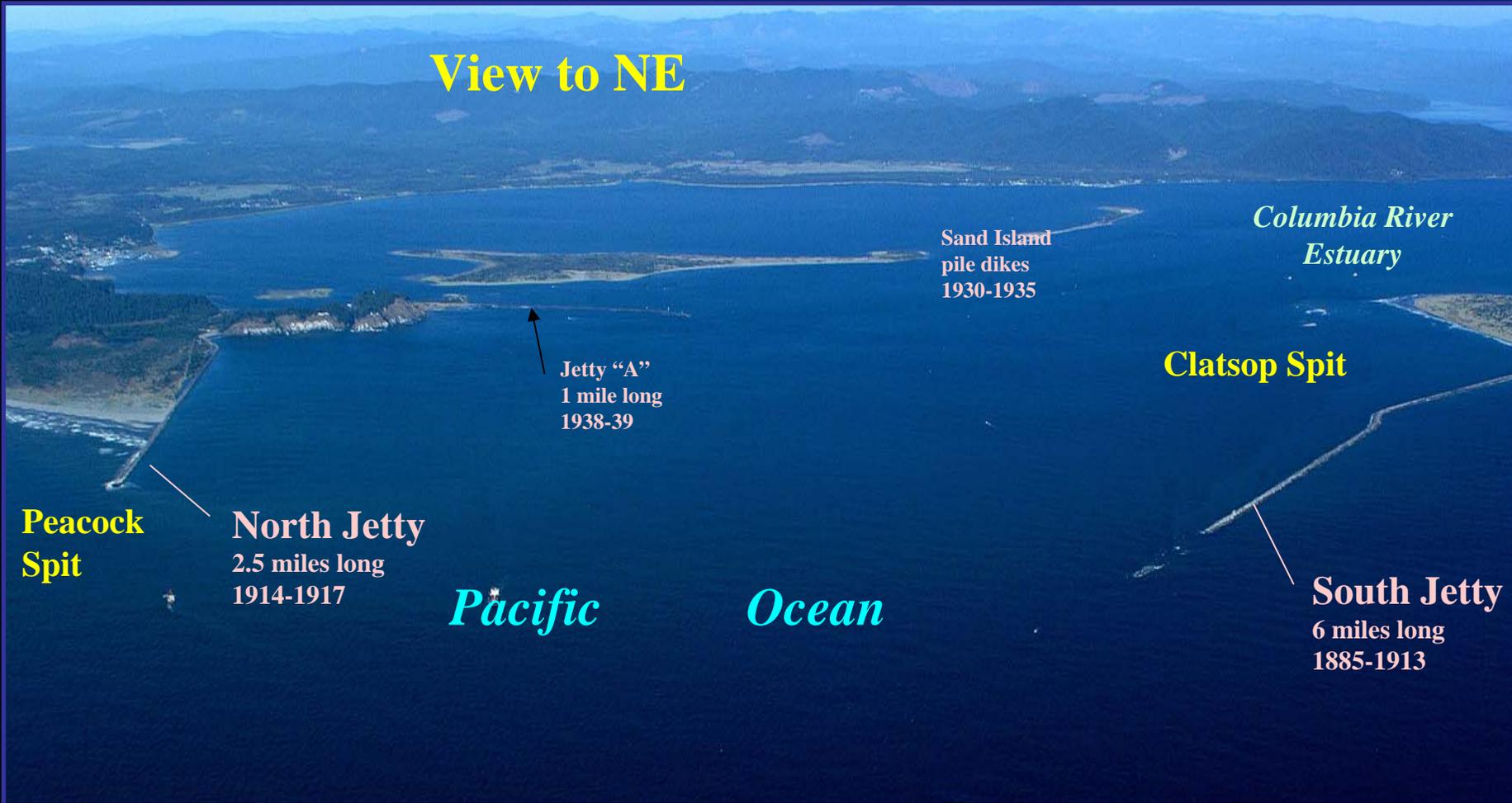


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Background

Mouth of the Columbia River

View to NE



Peacock Spit

North Jetty
2.5 miles long
1914-1917

Jetty "A"
1 mile long
1938-39

Sand Island
pile dikes
1930-1935

Columbia River
Estuary

Clatsop Spit

South Jetty
6 miles long
1885-1913

Pacific

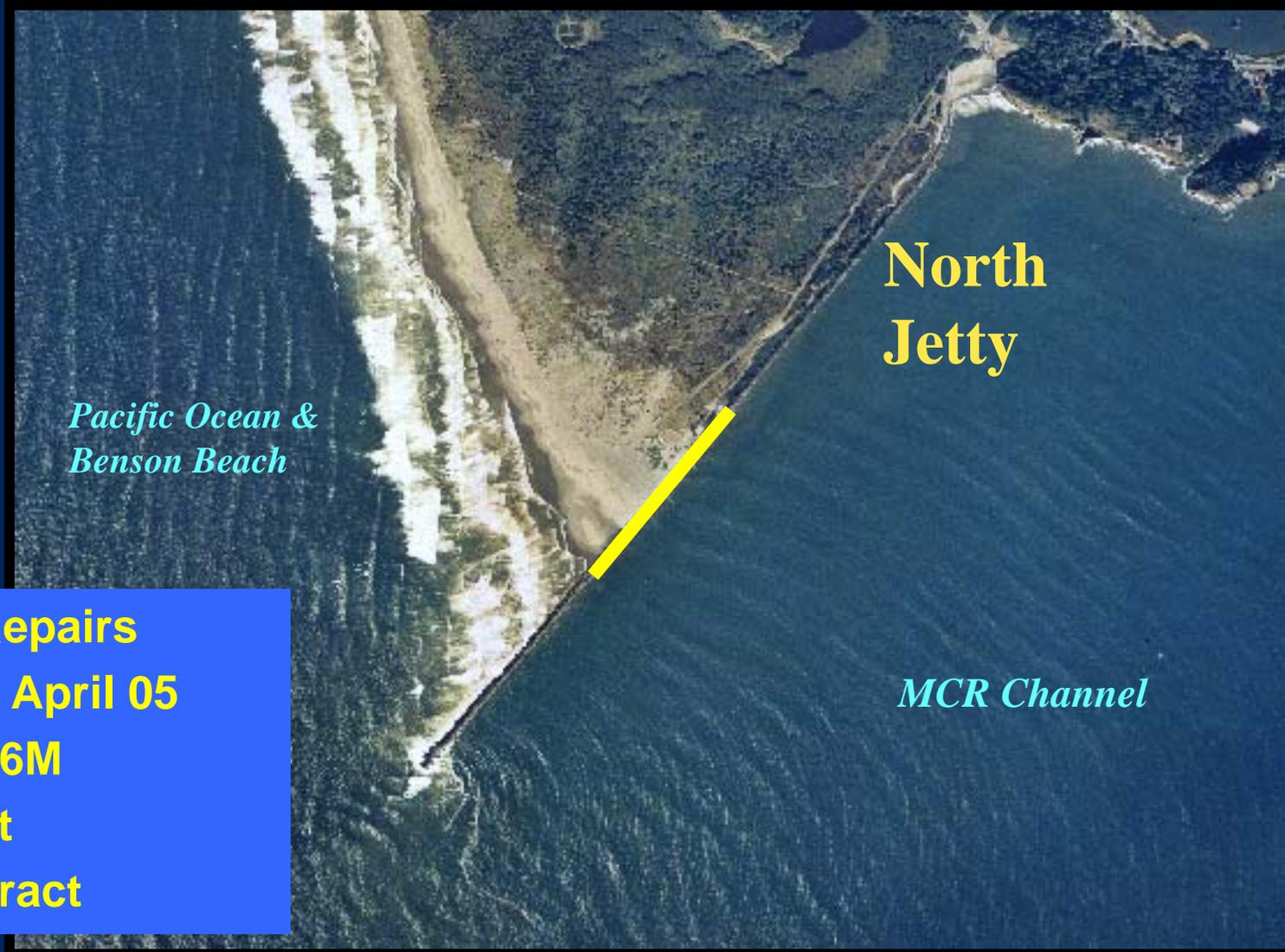
Ocean



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Background

North Jetty – Interim Repairs



*Pacific Ocean &
Benson Beach*

**North
Jetty**

MCR Channel

- **Interim Repairs**
- **Awarded April 05**
- **Cost: ~ \$6M**
- **3,000 feet**
- **1-yr contract**

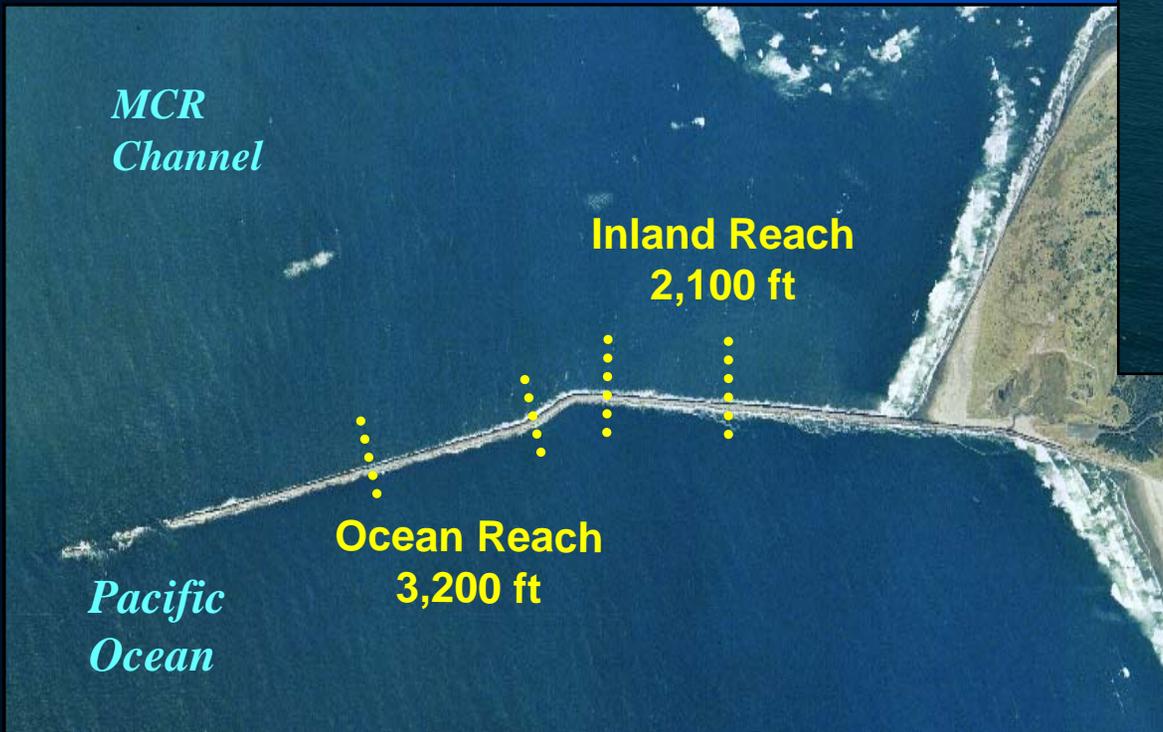


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Background

South Jetty – Interim Repairs

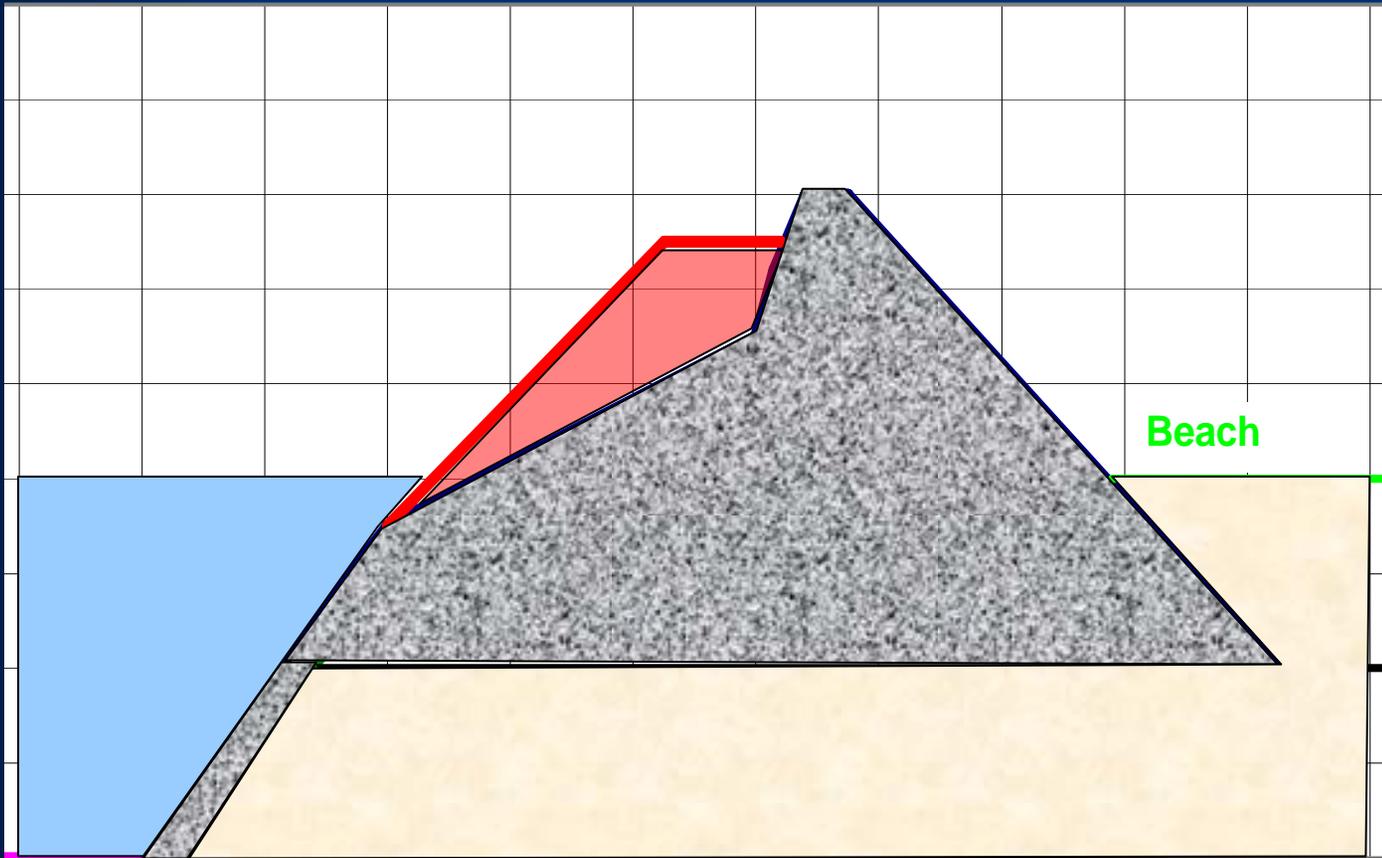
- Interim Repairs
- Awarded Feb 06
- Cost: \$11.4M w/ ~ \$8M options
- 2-yr contract, complete in Oct 07





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Background Interim Repairs





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Corps Guidance

Major Rehab Study

Consists of either one or both of two categories:
Reliability or Efficiency Improvement

Reliability: Major feature restoration consisting of structural work on Corps operated and maintained facility

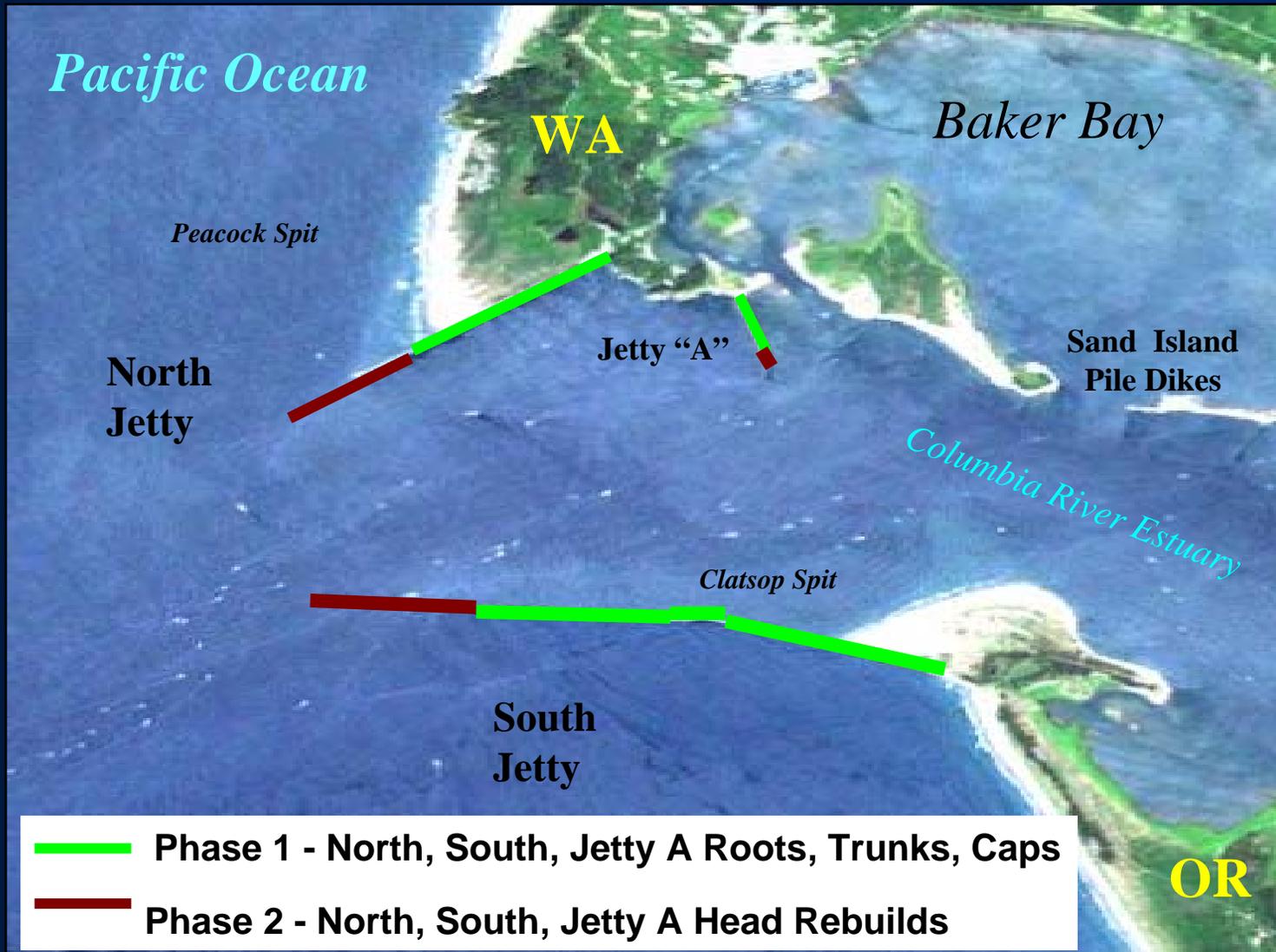
- Goal: to improve the reliability of the structure; resulting in a deferral of capital expenditures to replace the structure
- Construction over 2-years and over \$5.0 million



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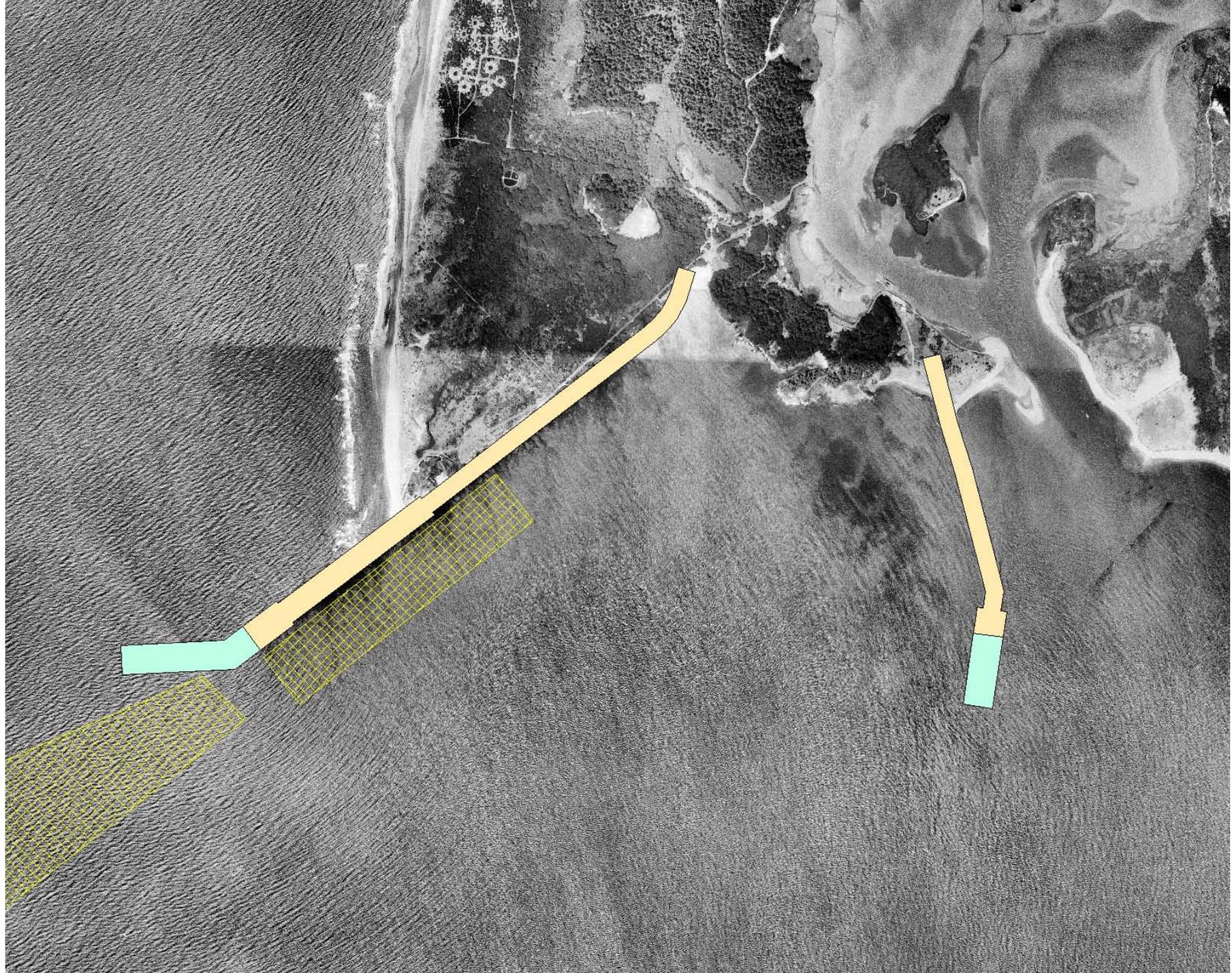
MCR Jetties

Major Rehabilitation Study





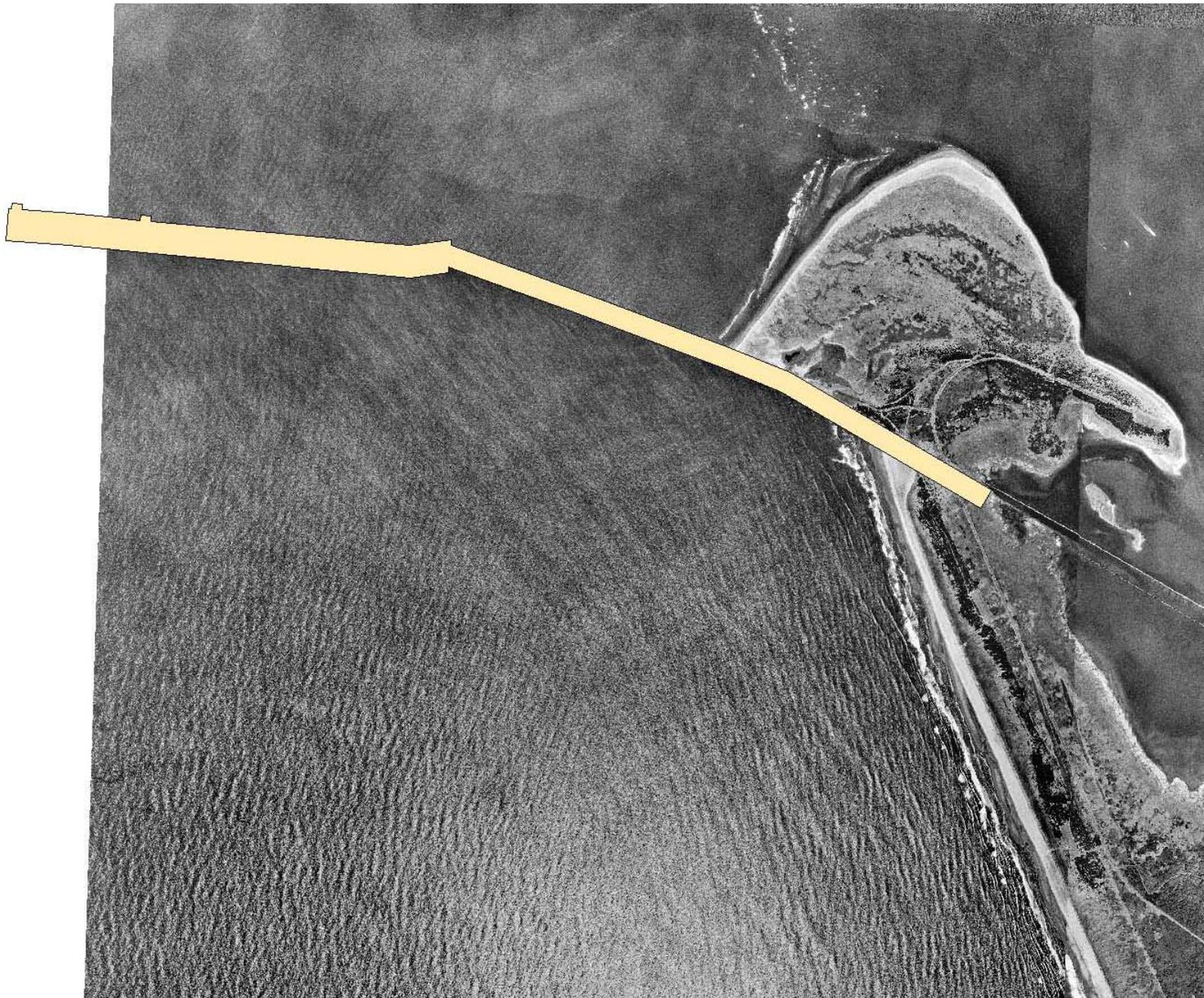


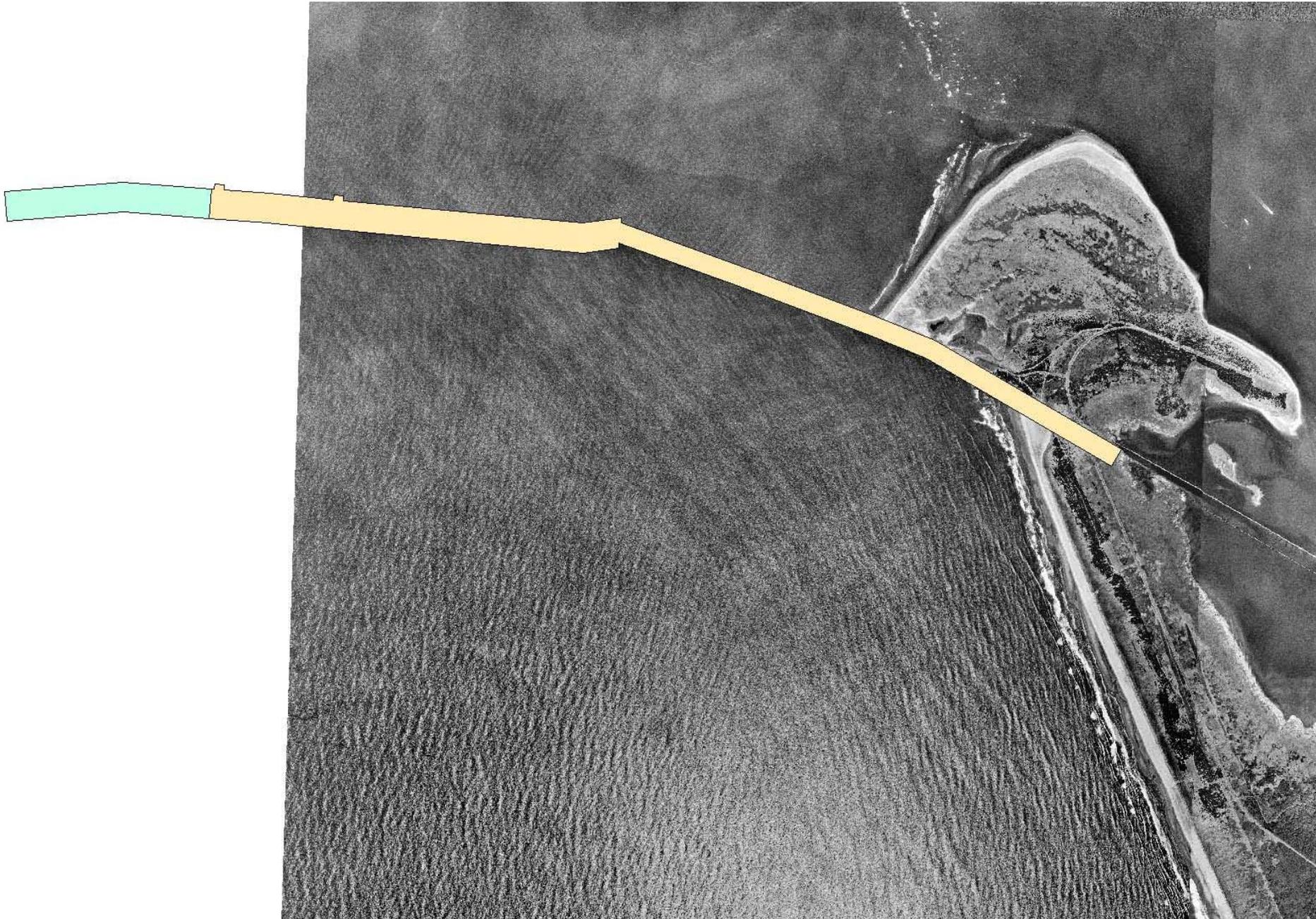


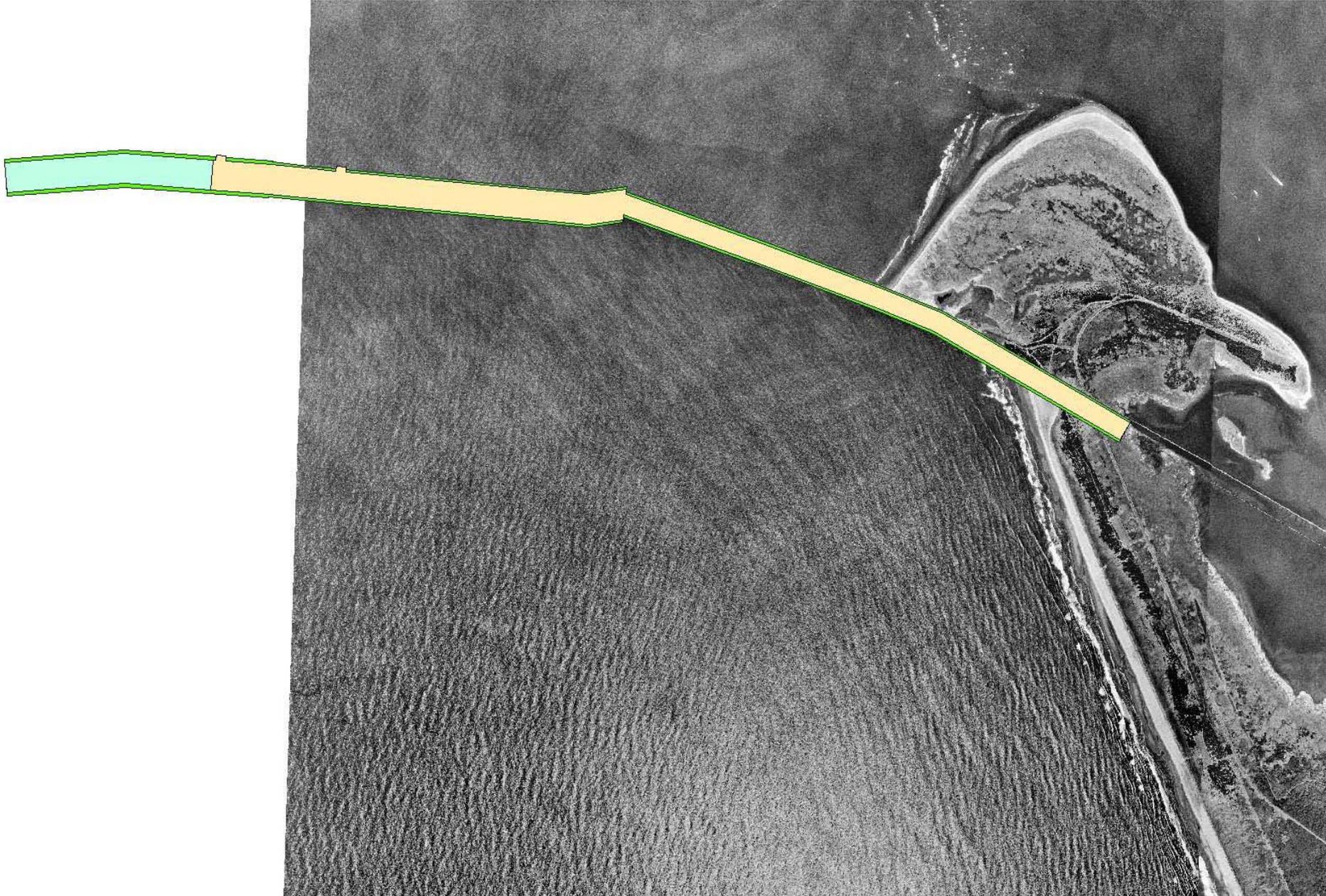


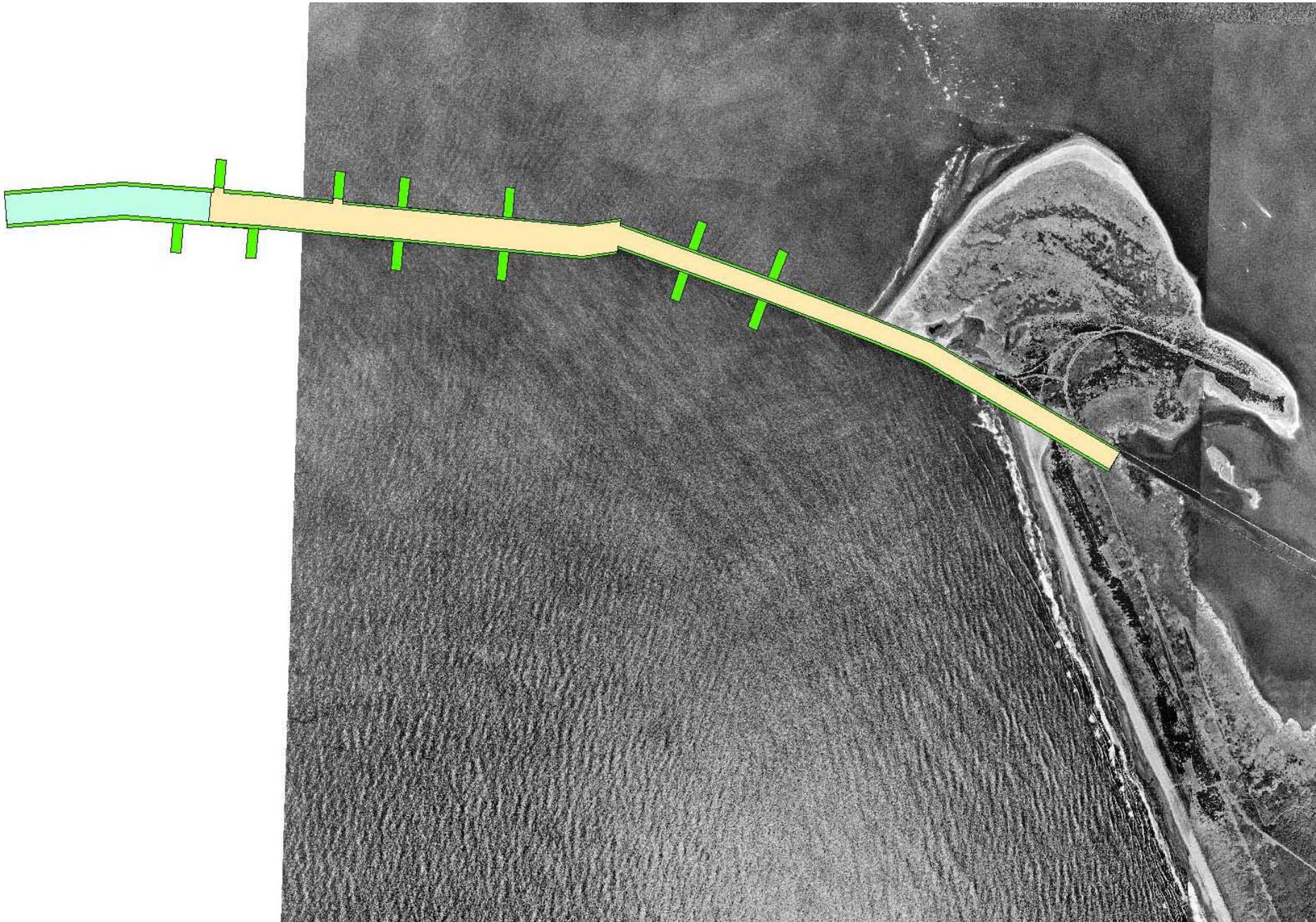








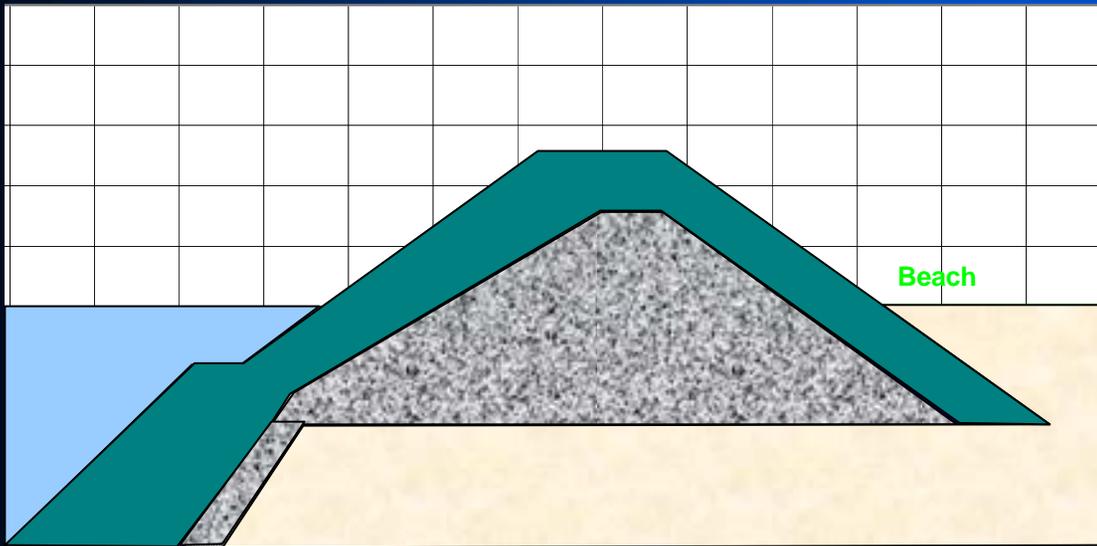
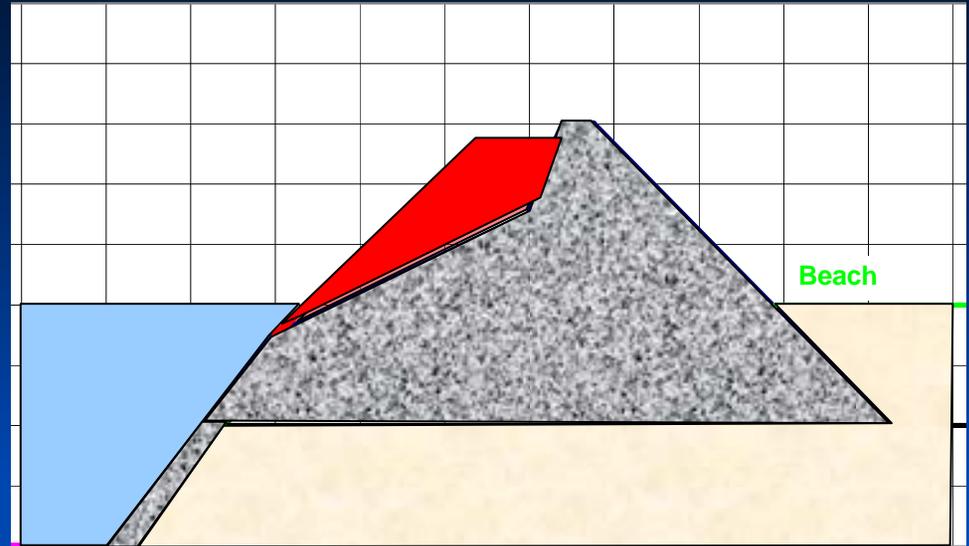






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Interim Repair Template



Major Rehabilitation Template



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Project Alternatives

Jetty Stone Considerations

- Large quantity of stone required may need more than one quarry source
 - Quarry Investigations: Oregon, Washington, California and Canada
 - Concrete Armor Units
- Transportation Route: Land and/or water
- Barge off-loading
 - Commercial Site in Ilwaco
 - Commercial Site in Warrenton
 - Contractor Provided near South Jetty



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Next Steps

- Comment Period Closes 4 Aug 06
- Preliminary Model Results Sep 06
- Decision on EA vs EIS Nov 06



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Project Schedule

if the decision is made to continue with an

Environmental Assessment

Phase 1

- Public Review of Final EA Dec 06
- Submit Major Rehab Report Mar 07
- Phase 1 Design Documentation Report Mar 08
- Plans and Specs Jan 09
- Construction Start Feb 09

Phase 2

- Submit Major Rehab Report Mar 08
- Phase 2 Design Documentation Report Mar 09
- Plans and Specs Jan 10
- Construction Start Feb 10



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Project Schedule

if the decision is made to prepare an **Environmental Impact Statement**

- Public Involvement Jan 07
- Submit Major Rehab Report Phases 1 & 2 Mar 08
- Phase 1 & 2 Design Documentation Report Mar 09
- Plans and Specs Phase 1 Jan 10
- Construction Start Phase 1 Feb 10
- Plans and Specs Phase 2 TBD
- Construction Start Phase 2 TBD



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Technical Overview

Heidi Moritz



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Technical Overview

- Project Description and Background
- Project Functions
- Existing Condition / Need for Rehab
- Design Development

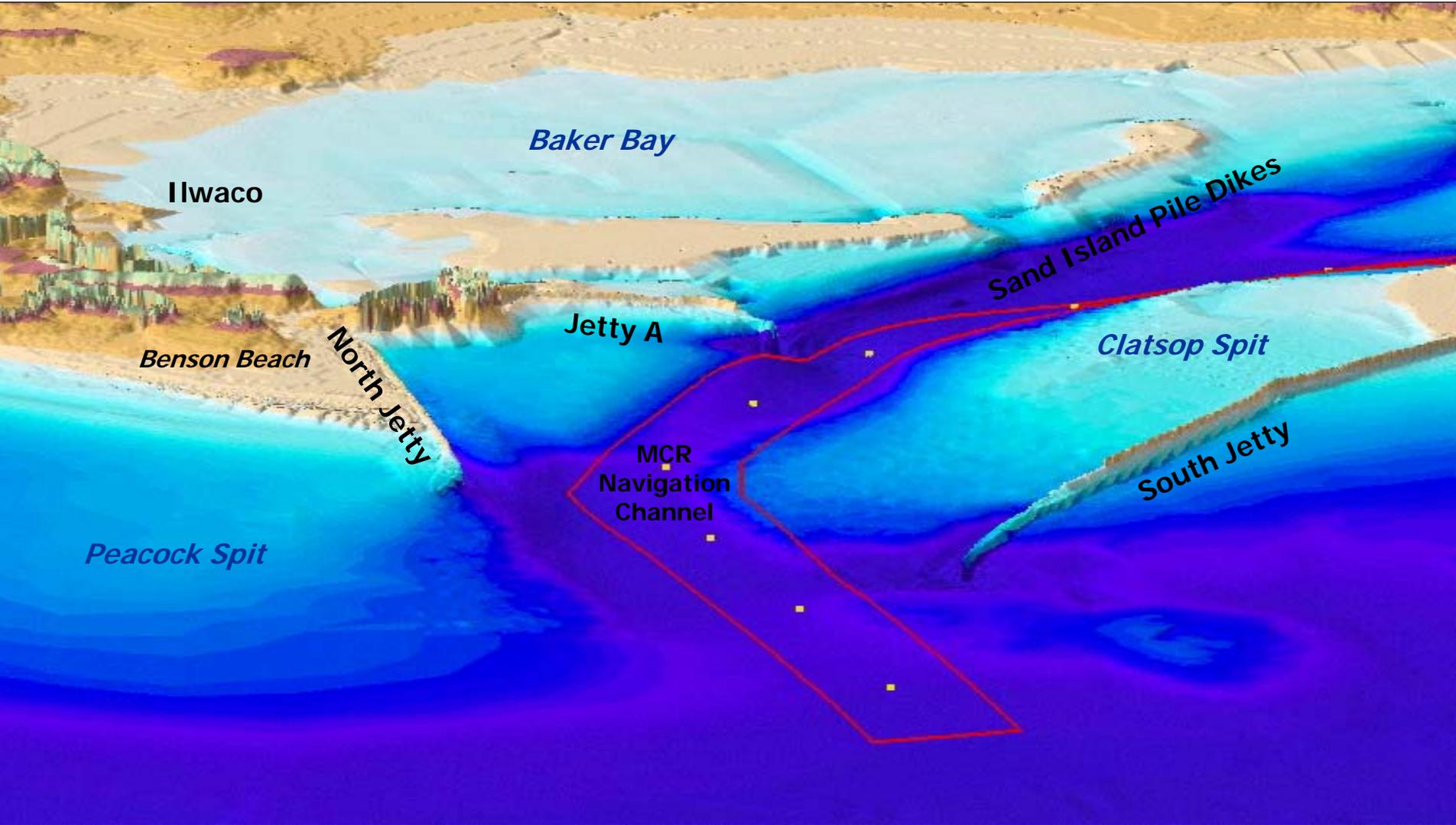


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Project Description and Background

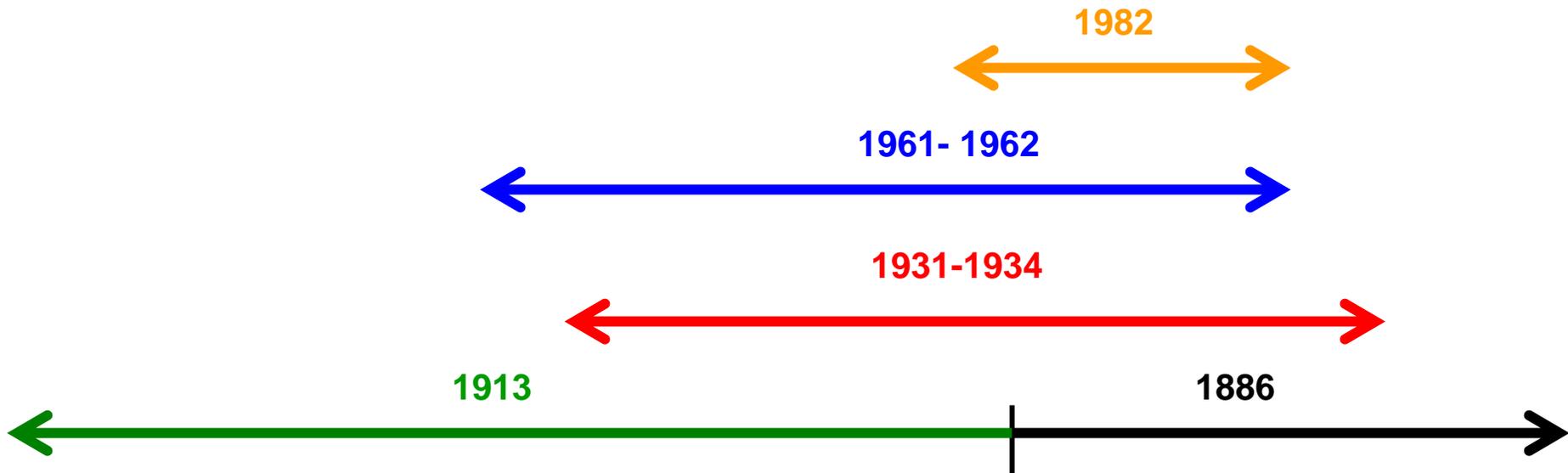
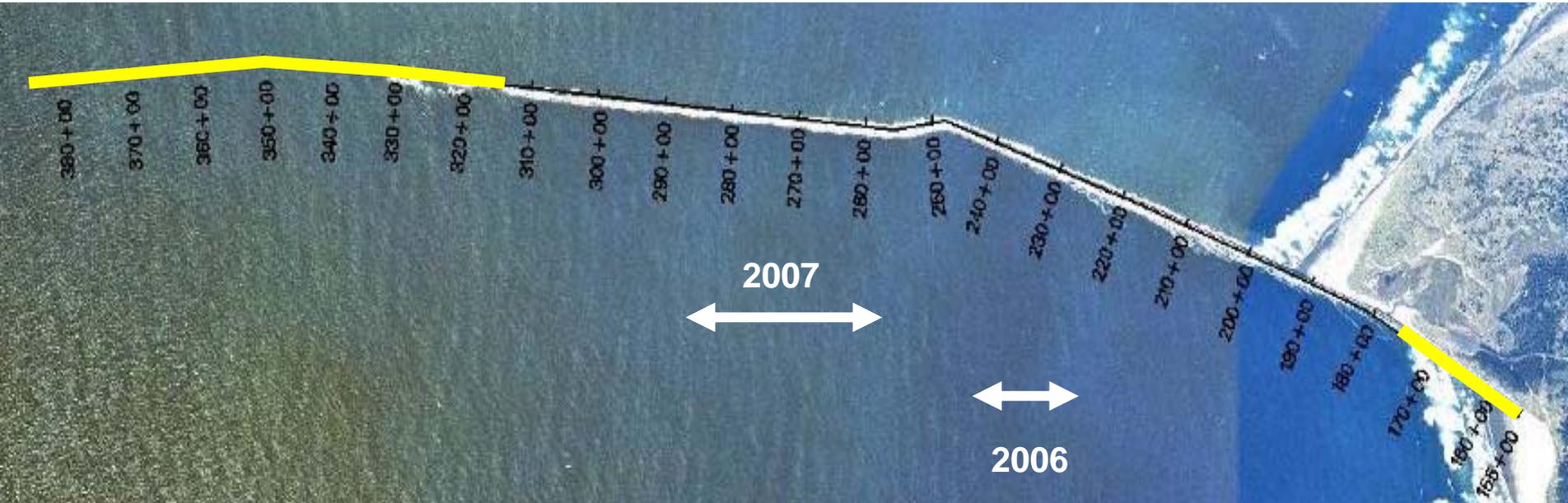
MCR Bathymetry Showing Location of Shoals & Jetties

Excessive Erosion of Shoals Can Lead to Loss of Jetty Foundation = Loss of Jetty



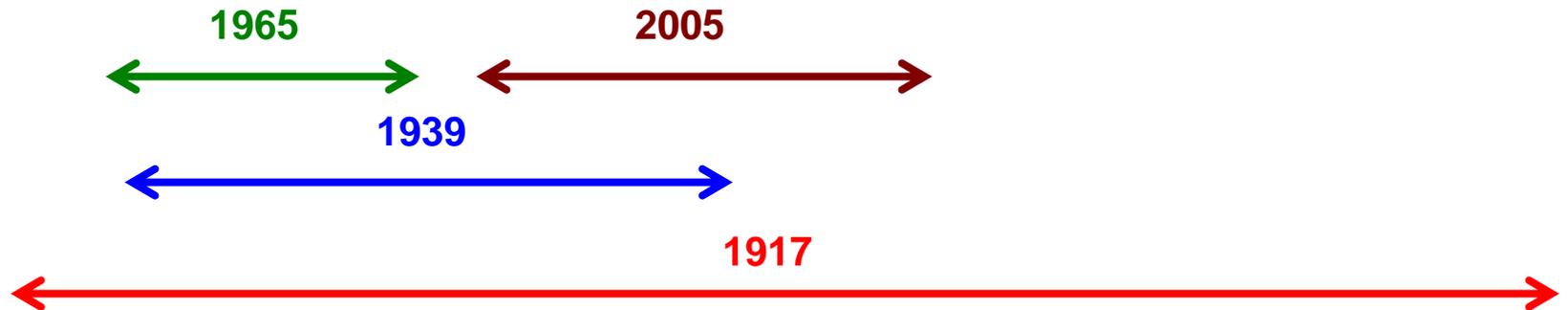
MCR South Jetty - Construction and Repair History

(Receded approximately 5000' in length since 1885 - 1913.)



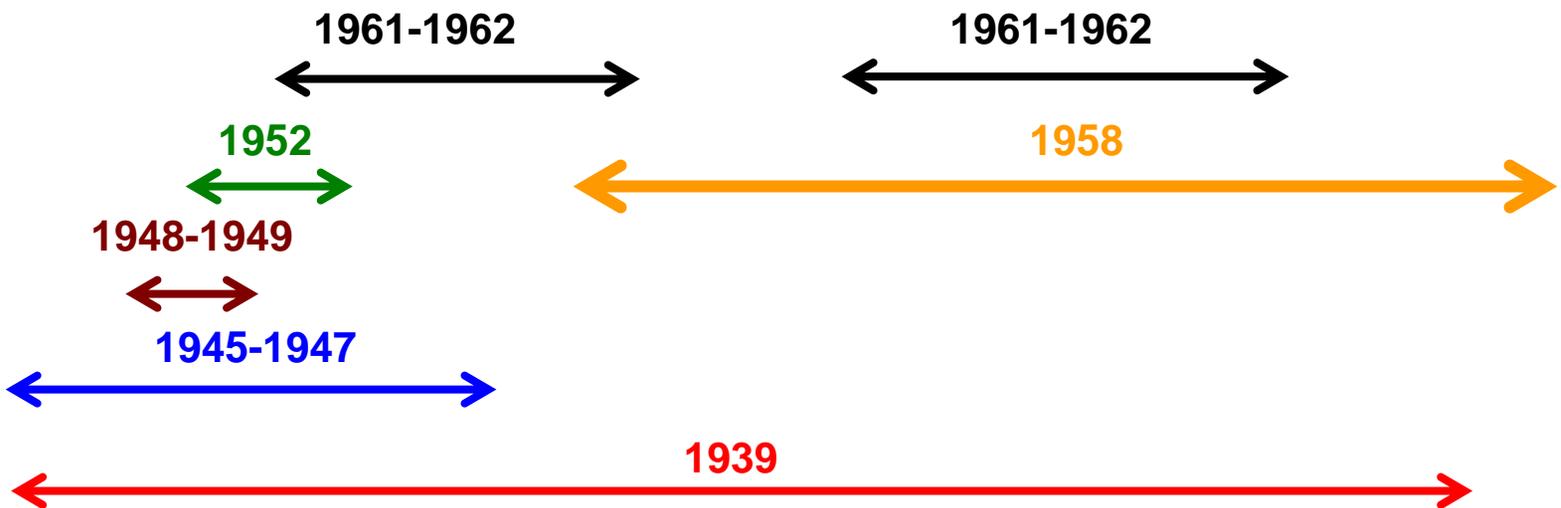
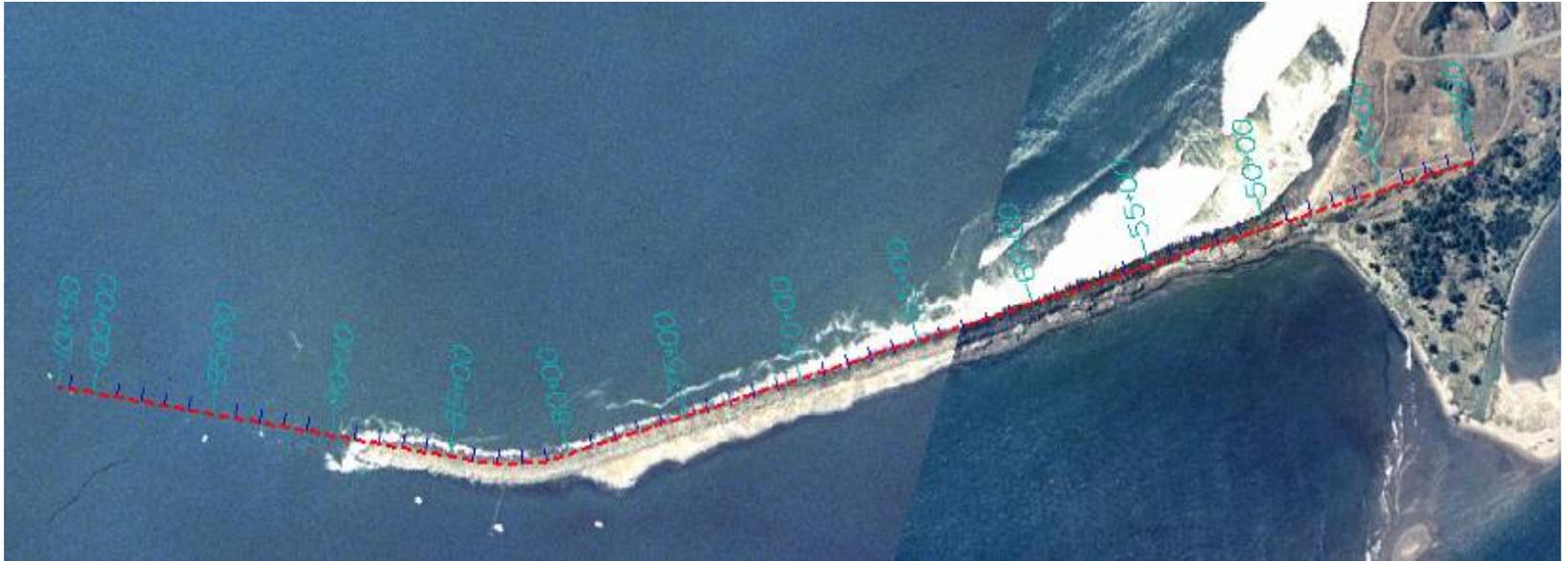
MCR North Jetty - Construction and Repair History

(Receded approximately 1800' in length since 1916.)

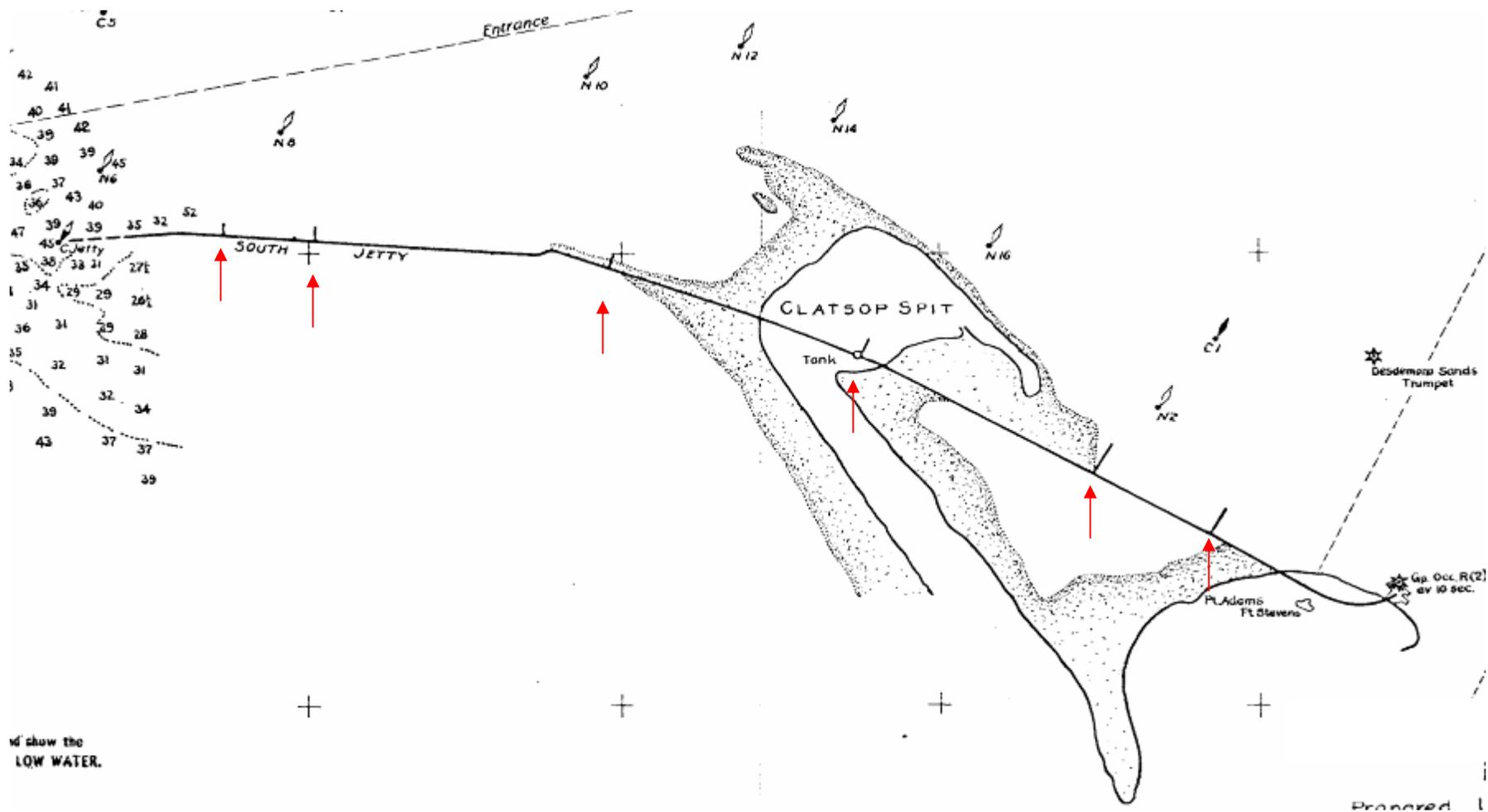


MCR Jetty A - Construction and Repair History

(Receded approximately 890' in length since 1939.)



Spur Groin Construction Along Channel Side of South Jetty





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Project Functions

- Stabilize navigation channel for ships
- Provide protection from waves for commercial fishing and recreational vessels
- Minimize dredging requirements of channel
- Minimize structure repair magnitude and maximize repair cycle



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Existing Condition/Need for Rehab



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Life-cycle Considerations: (How did we get here?)

- 9+ miles of jetties at MCR - expensive to maintain
- Construction to-date used stone that would be considered under-designed by today's standards (state-of-art at the time, construction technique)
- Question regarding optimum length of jetties
- Increased Pacific Ocean wave climate
- Erosion of underwater shoals making situation worse
- Normal wear and tear on 100+ year old structures.

North Jetty

← STA 73

**Damaged Areas
along Trunk**

**Damaged Areas
along Root**

**Transition to Unrepaired
Landward Half of North Jetty**

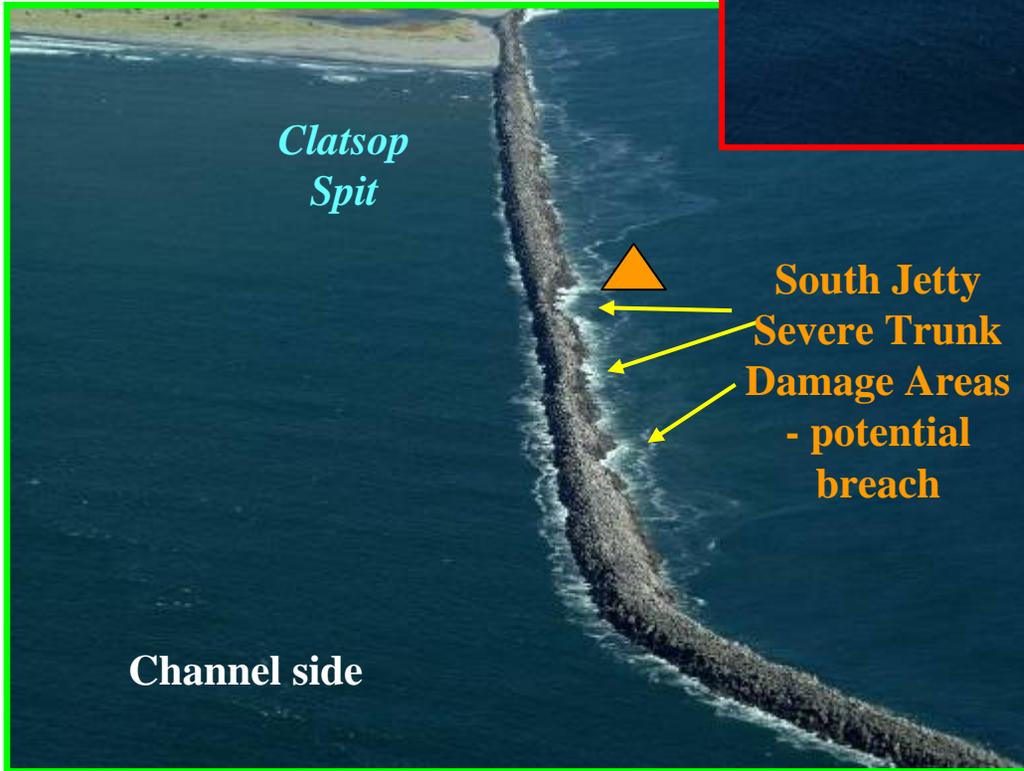
*Benson
Beach*

← STA 73

← STA 62



South jetty severe damage areas

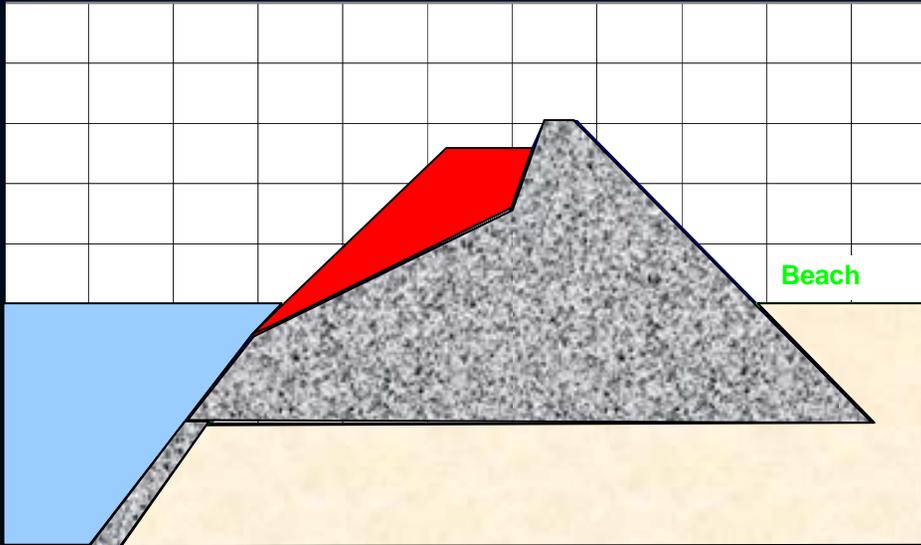


South Jetty 2002



Interim Repair in Vulnerable Areas



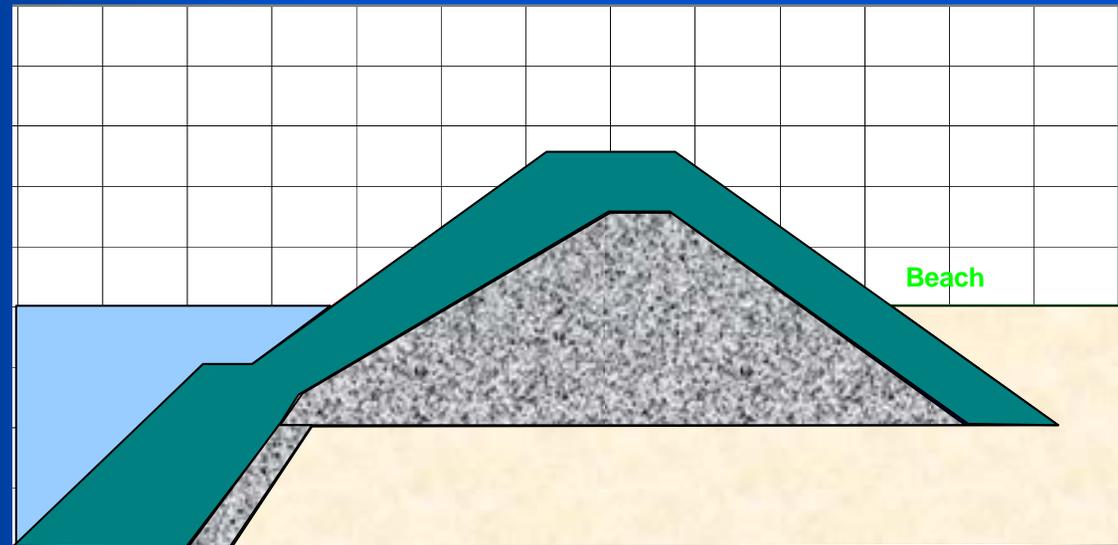


**Example:
Interim Repair Template**

**Design Basis: 10-Yr Wave
Potential for Design Event: 10%/yr**

**Example:
Major Rehabilitation Template**

**Design Basis: 50-Yr Wave
Potential for Design Event: 2%/yr**



Jetty Breach Produces Accelerated Damages to Weakened Structure And Loss of Sediment Through the Structure

**High tide flow through
jetty root transports ~
50,000 cubic yards of
sand into channel.**

**Coos Bay Jetty Breach
2002**



North Jetty at Mouth of Columbia River

WA

Example
Jetty Breach
Area

North Jetty



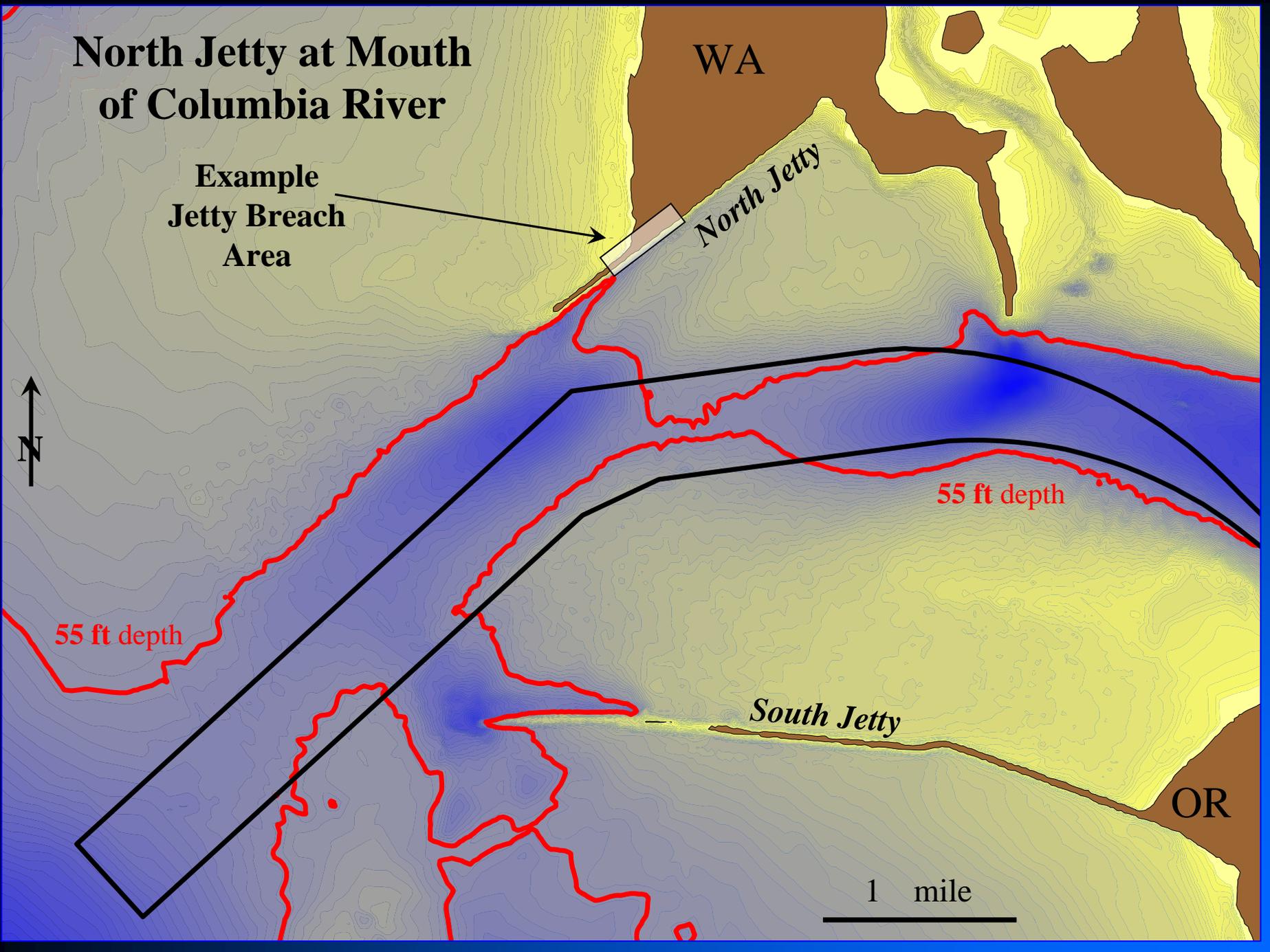
55 ft depth

55 ft depth

South Jetty

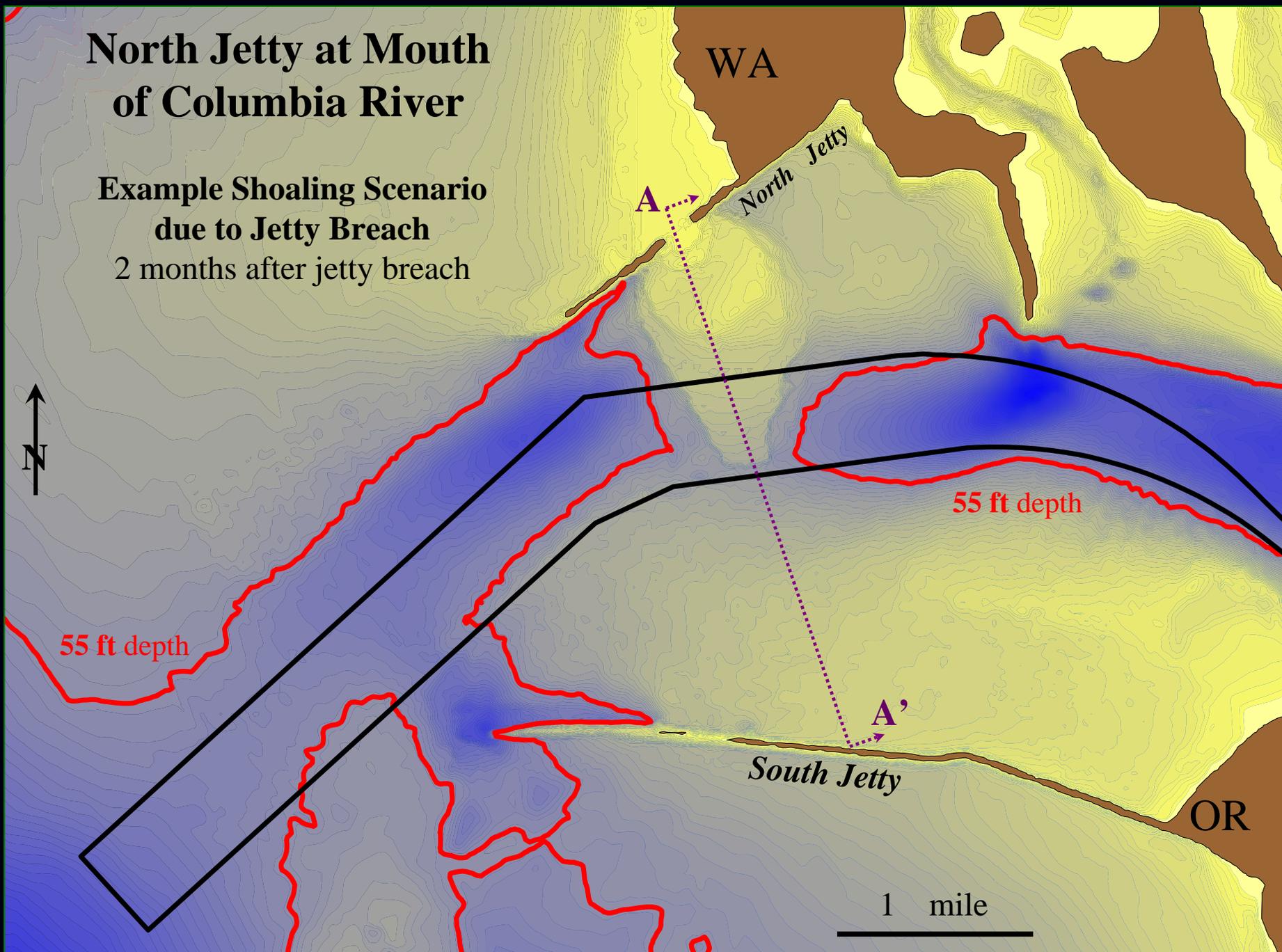
OR

1 mile



North Jetty at Mouth of Columbia River

Example Shoaling Scenario
due to Jetty Breach
2 months after jetty breach





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Design Development



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Design Development

- **Least cost, most reliable repair, environmentally acceptable.**
- **Jetty cross section options:**
 - **Dimensions: crest elevation, crestwidth, sideslope**
 - **Material types: stone, concrete, combination**
- **Due to the variability in design climate and repair history, design applications will vary:**
 - **Between the three structures**
 - **Along the length of each structure.**
- **Both physical and numerical modeling will be used to assess and finetune the designs.**



Dolosse at Humboldt Bay, California



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Incompatibility Challenges Between Concrete Armor Unit and Quarry Stone



Concrete armor units also perform differently on heavily overtopped structures.



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Coastal Model Options

- **Numerical**
 - Wave transformation from deepwater to structure
 - 2-D Hydrodynamics at entrance and in estuary (tidal, waves)
 - Morphology Change – linking wave, hydrodynamic, and sediment transport models
- **Physical**
 - 2-Dimensional – Wave flume – armor stability, cross section design
 - 3-Dimensional – Structure stability, Oblique wave attack at structure head
 - 3-Dimensional – Harbor protection, Wave transformation /interaction at entrance

2-Dimensional Wave Flume Physical Model – Front View



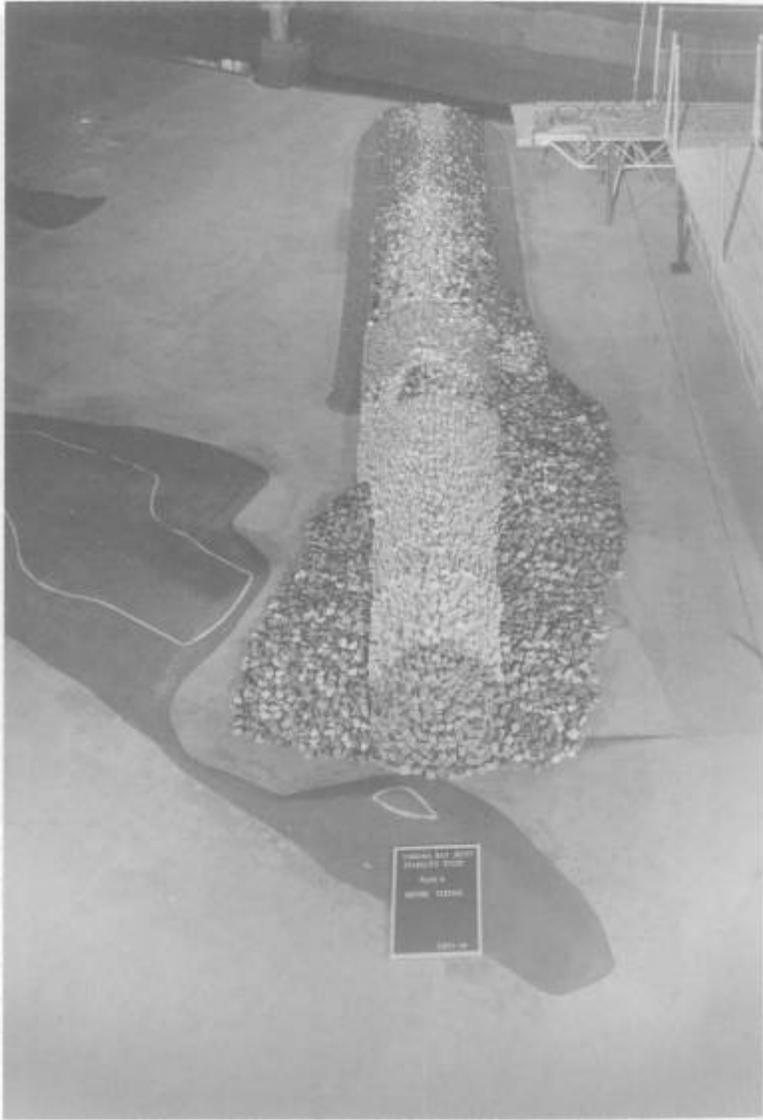


Photo 1. Overhead view of structure before testing with 1969 storm; swl = +10.0 ft; direction of wave attack = west-southwest

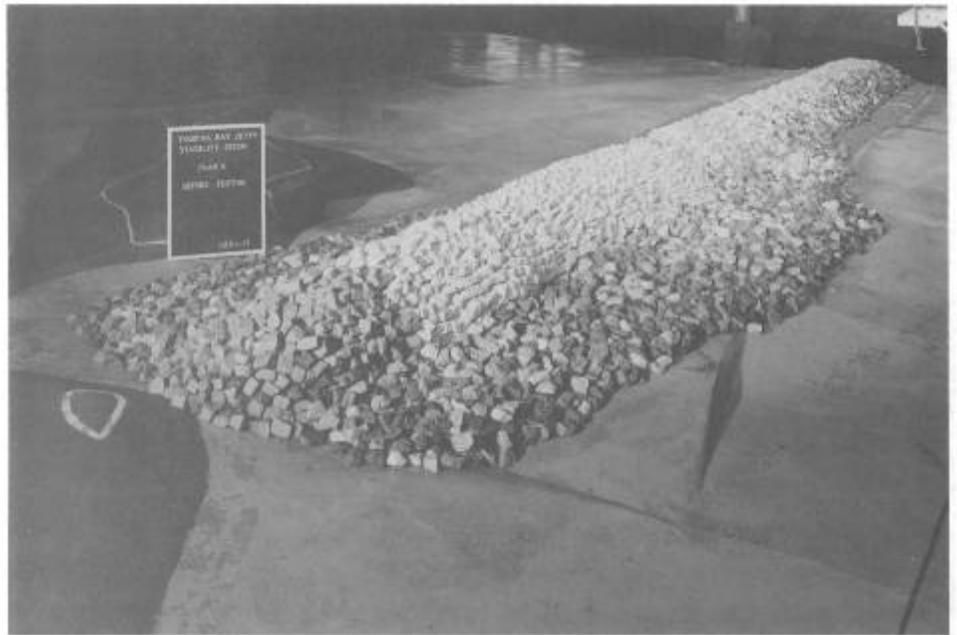
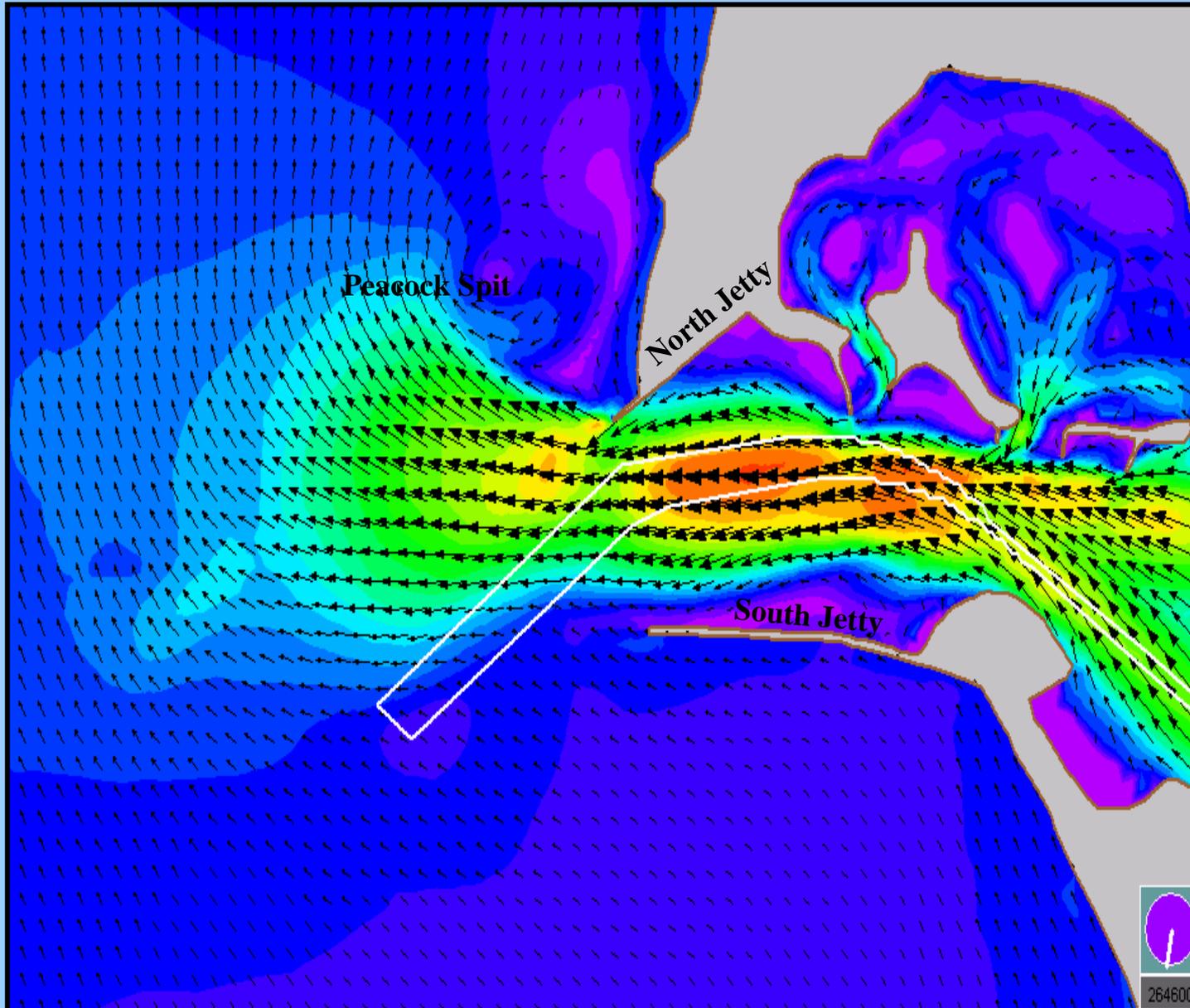


Photo 4. Channel-side view of structure before testing with 1969 storm; swl = +10.0 ft; direction of wave attack = west-southwest

3-Dimensional Physical Model

ADCIRC 2 -D Hydrodynamic Model



Simulation of ebb-flow currents (when tide level is almost at low) during 6 Oct 1997, (**orange**) peak flow is 2.5 m/s

Results are 2-D: depth averaged, laterally varying and constant over depth



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Spur Groin History

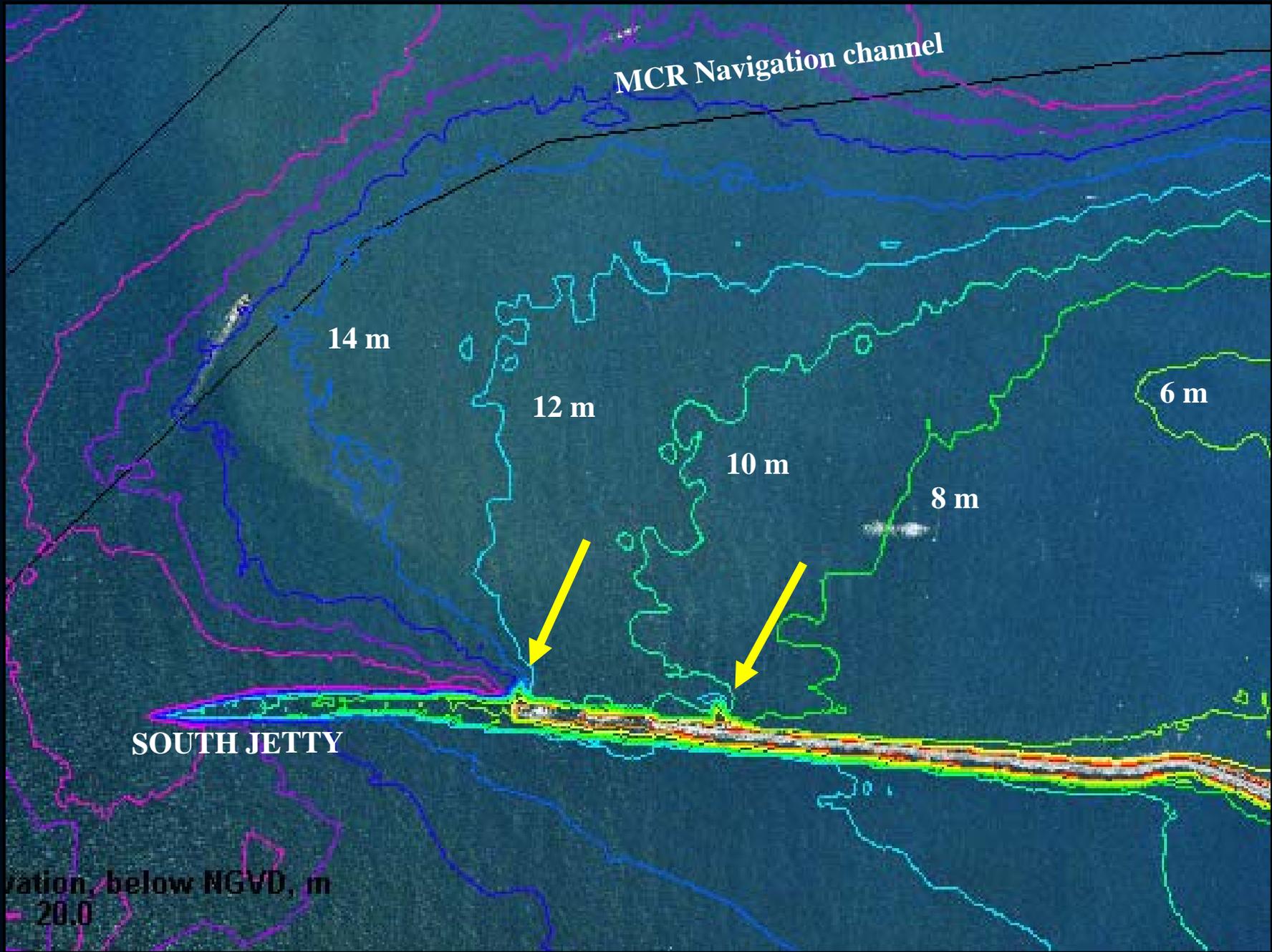
- **Quotes from Original Design Documents:**
 - The jetty is a long, thin, narrow backbone of solid material, resting upon a very doubtful foundation, against which the forces in action at the locality have accumulated large quantities of the shifting sands. (USACE, 1903).
 - These shoals in turn have been able to break the force of the waves and protect the jetty from destruction. Jetty integrity and the permanence of the present favorable condition of channel over the bar depend upon the amount of this sand that can be accumulated.” (USACE, 1903).



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Spur Groin Concepts

- **Since foundation stability is essential to obtaining a reliable long-term repair, spur groins perpendicular to the jetties will be evaluated.**
- **General expected groin configuration:**
 - Up to 600 ft long (likely to be less)
 - Crest elevation 20 feet below water surface.
- **Modeling will show how conditions in the MCR, such as current directions and velocities and sand movement, would be altered with a variety of construction scenarios.**



MCR Navigation channel

14 m

12 m

10 m

8 m

6 m

SOUTH JETTY

levation, below NGVD, m
- 20.0

MCR SOUTH JETTY

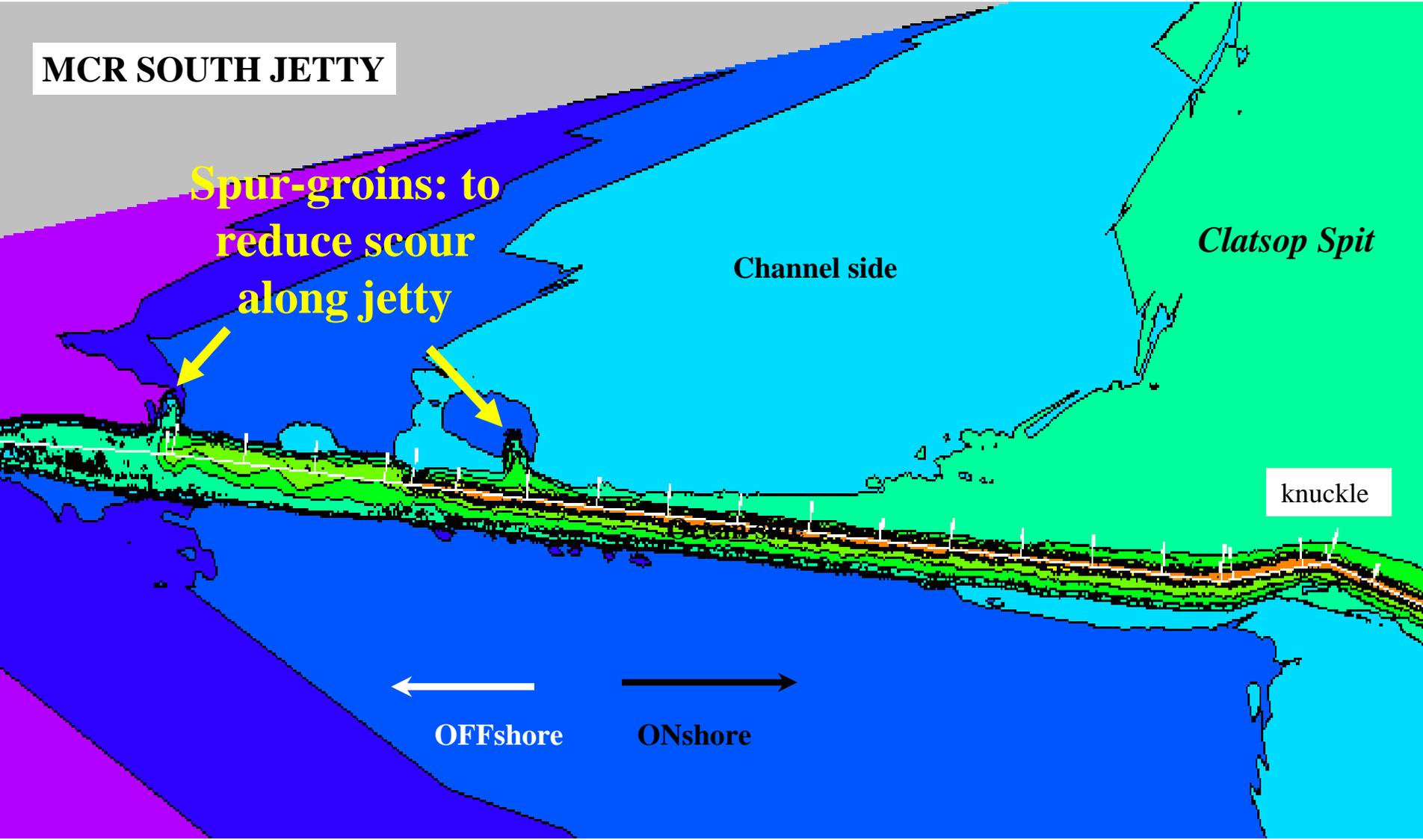
**Spur-groins: to
reduce scour
along jetty**

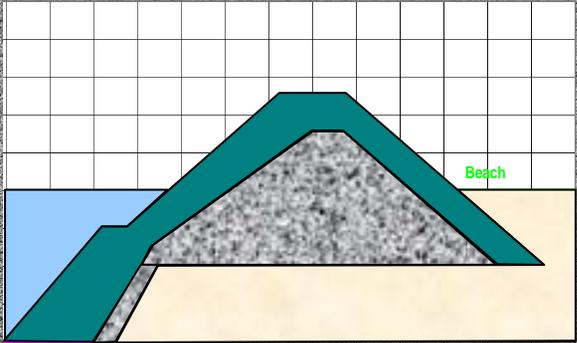
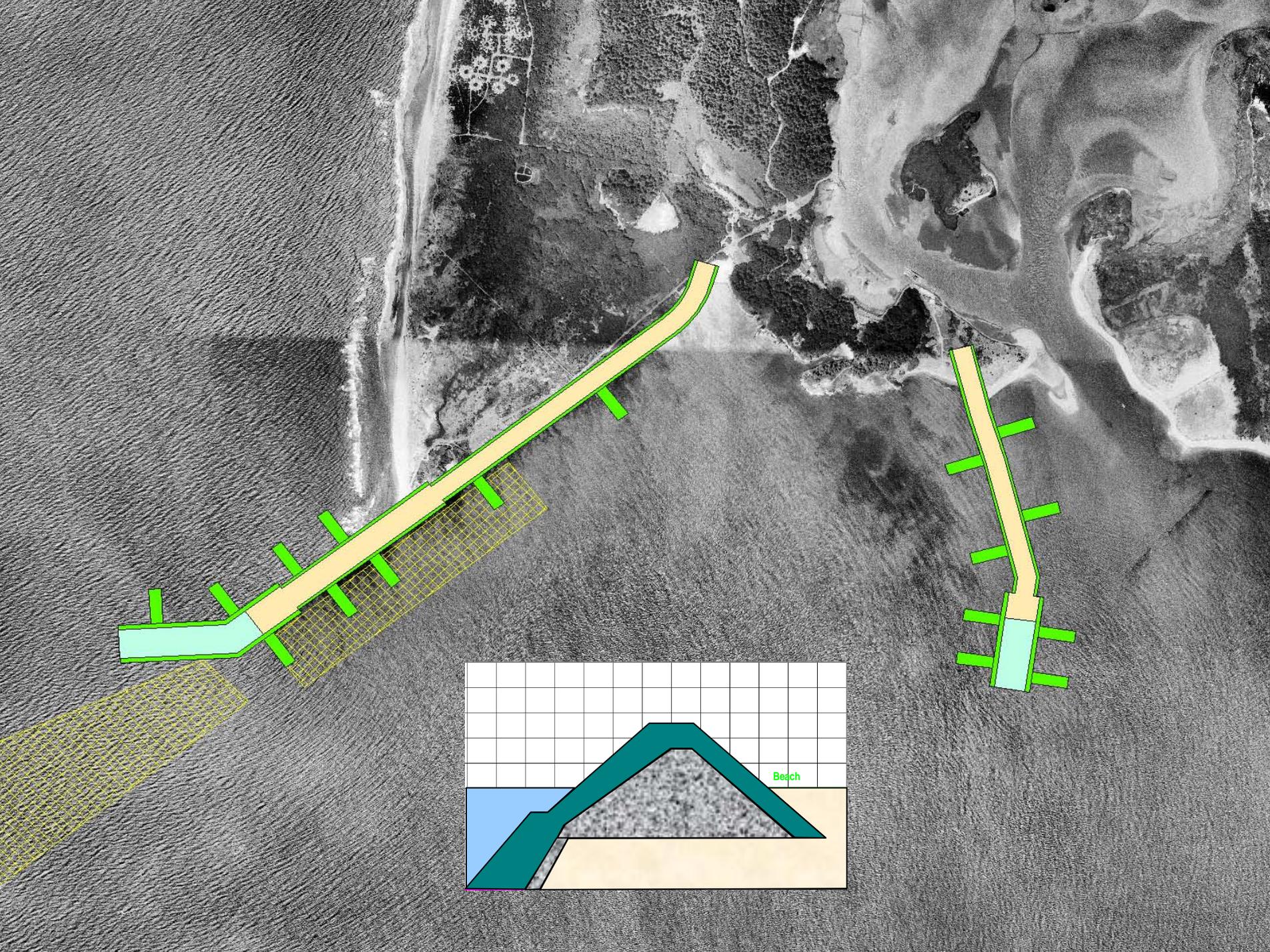
Channel side

Clatsop Spit

knuckle

← OFFshore ONshore →







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Environmental Overview

Steve Helm



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Environmental Overview

- Environmental Laws
- Endangered Species
- Potential Impacts



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Applicable Environmental Laws

- NEPA (National Environmental Policy Act)
 - Environmental Assessment
 - Environmental Impact Statement
- CWA (Clean Water Act)
- CZMA (Coastal Zone Management Act)
- ESA (Endangered Species Act)
 - Biological Assessment
 - Biological Opinion
- Marine Mammal Protection Act
- Magnuson-Stevens Act



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ESA Species in Project Vicinity

13 Runs of Salmonids

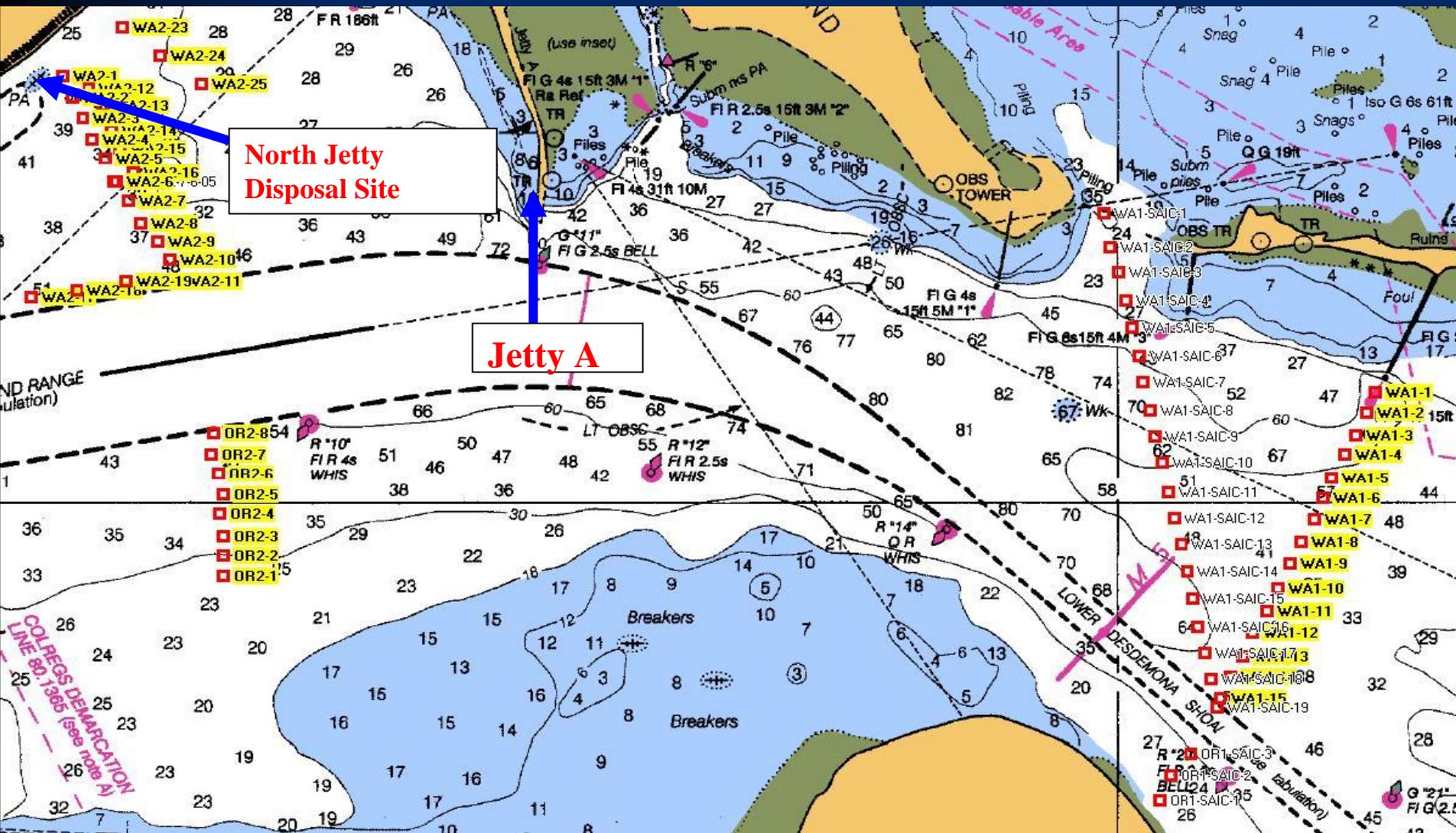


Chinook Salmon



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Juvenile Fish Studies





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ESA Species in Project Vicinity

Pelagic Mammals and Turtles



Right Whale



Green Sea Turtle



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ESA Species in Project Vicinity

Birds (Pelican, Eagle, Murrelet, Plover)



Pelican



Eagle



Murrelet



Plover



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ESA Species in Project Vicinity

Steller Sea Lions



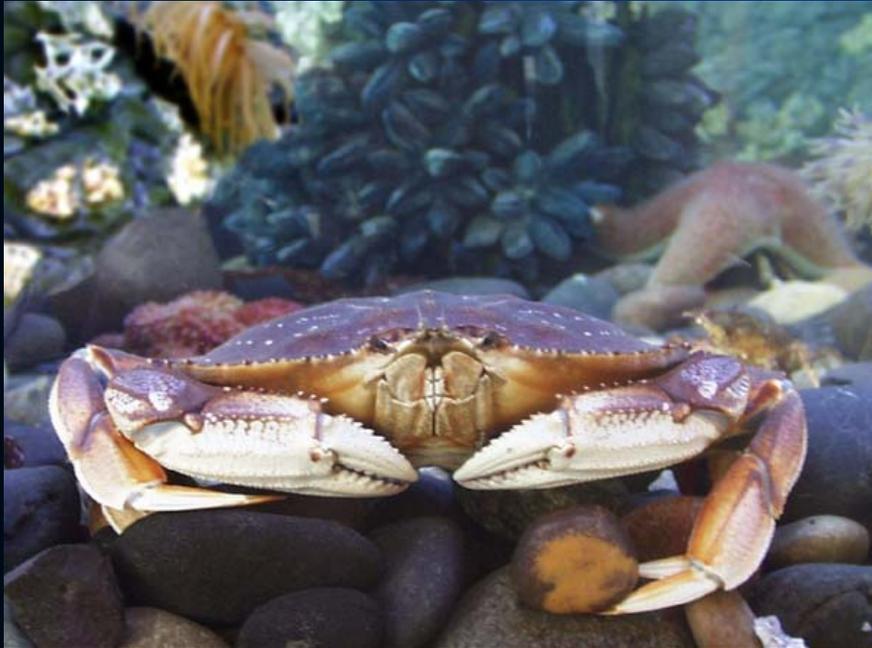






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Other Species of Concern



Dungeness Crab



California Sea Lion

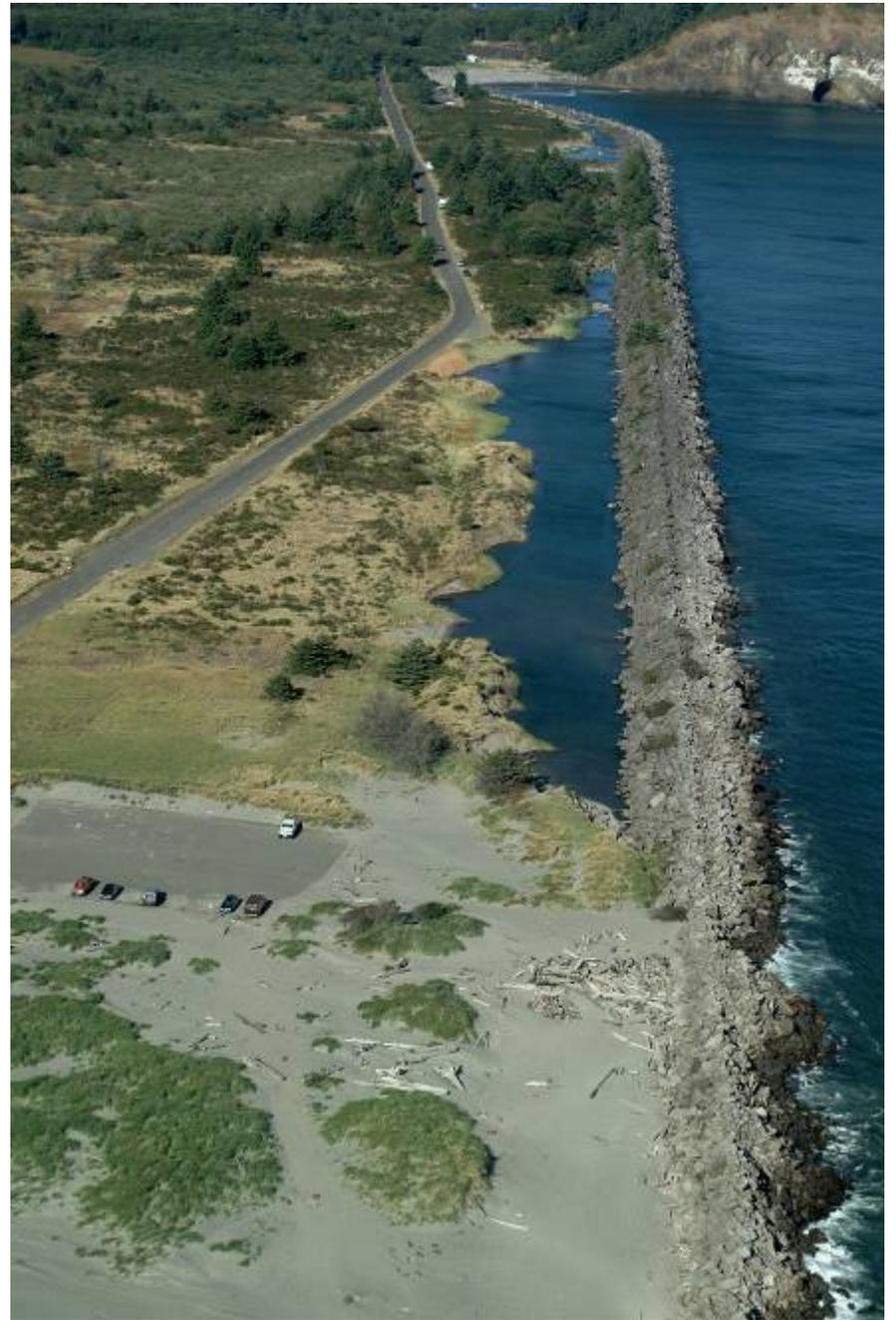


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Potential Impacts

- Listed Species and Critical Habitat
- Impacts to Aquatic Organisms
- Impacts to Commercial and Recreational Fisheries
- Essential Fish Habitat
- Cultural Resources
- Socio-Economic
- Section 404 Waters and Wetlands









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Contact Information for Public Notice/EA Comments

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Portland, OR 97208-2946
steve.r.helm@usace.army.mil
503-808-4778



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Thank you for coming!

- A copy of this presentation will be available on the Corps webpage at:
<https://www.nwp.usace.army.mil/issues/jetty/home.asp>
- Index cards are available showing the internet address of where the draft EA can be viewed and downloaded
- Copies of the draft EA are available tonight, please ask one of the Corps representatives for a copy