

# Overview of the Historical and Ongoing Changes around the North and South Jetties at the Mouth of the Columbia River



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Photo: Dale Blanton



**MCR Channel RM -3 to 3: 6 miles long**





US Army Corps  
of Engineers  
Portland District

# MOUTH OF THE COLUMBIA RIVER

- **BEFORE JETTIES**
- **AFTER JETTIES**
- **CURRENT CONDITIONS**
- **OPPORTUNITIES**

- *6 YEARS Before MCR Jetty Construction:*  
1879, **Major Gillespie**: “the building of a breakwater in open sea, to cover so wide a harbor entrance, and resting upon such an unstable foundation and exposed to such terrific seas, is an undertaking which any engineer may well hesitate to recommend and tremble to undertake.”
  
- *Immediately After North Jetty Completion:*  
1917, **Colonel Zinn**: “the two jetties made it possible for the largest of vessels operating on the Pacific Coast to enter and leave at all normal stages of tide and in any weather except during the most severe storms.” The twin jetty system proved to be the most effective from of harbor protection on the Pacific Coast.

Natural Inlet





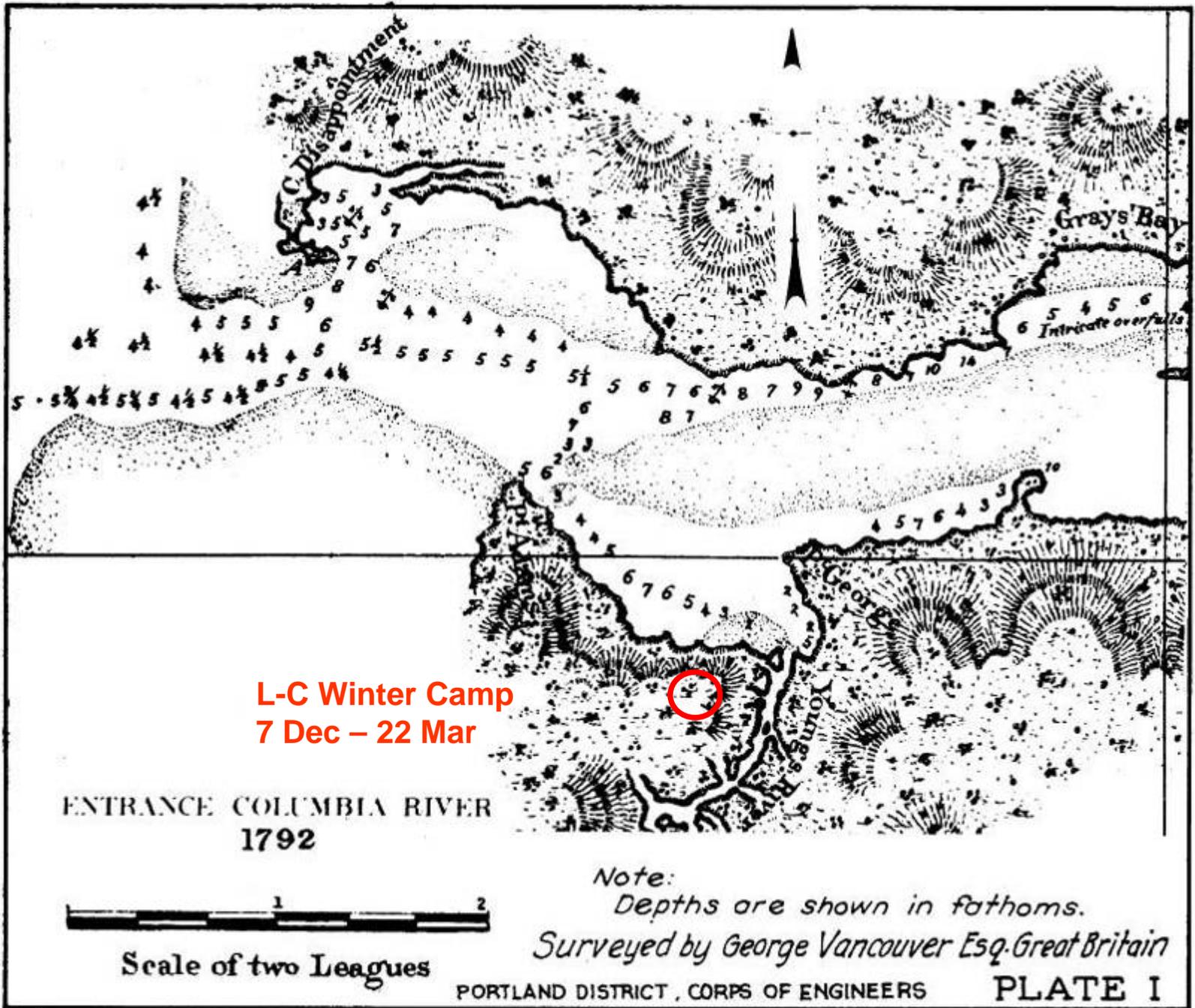
**Engineered Inlet**

# **Jetty Construction & Inlet Evolution**

**1839 – 1950**

**and**

**Present**



L-C Winter Camp  
7 Dec - 22 Mar

ENTRANCE COLUMBIA RIVER  
1792



Scale of two Leagues

Note:  
Depths are shown in fathoms.

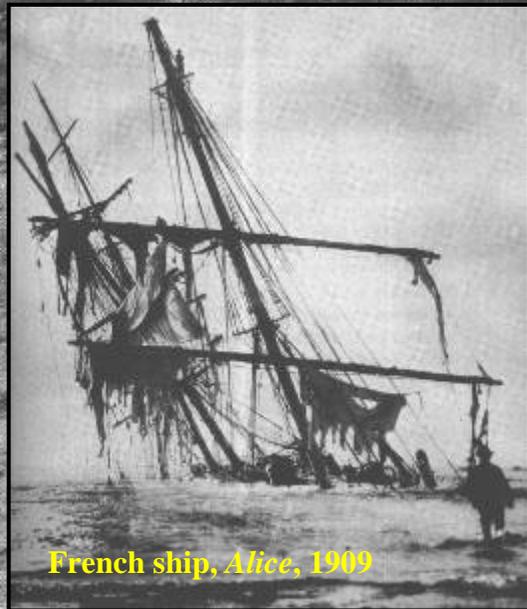
Surveyed by George Vancouver Esq. Great Britain

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PLATE I



Russian freighter, *Vazlav Vorovsky*, 1941

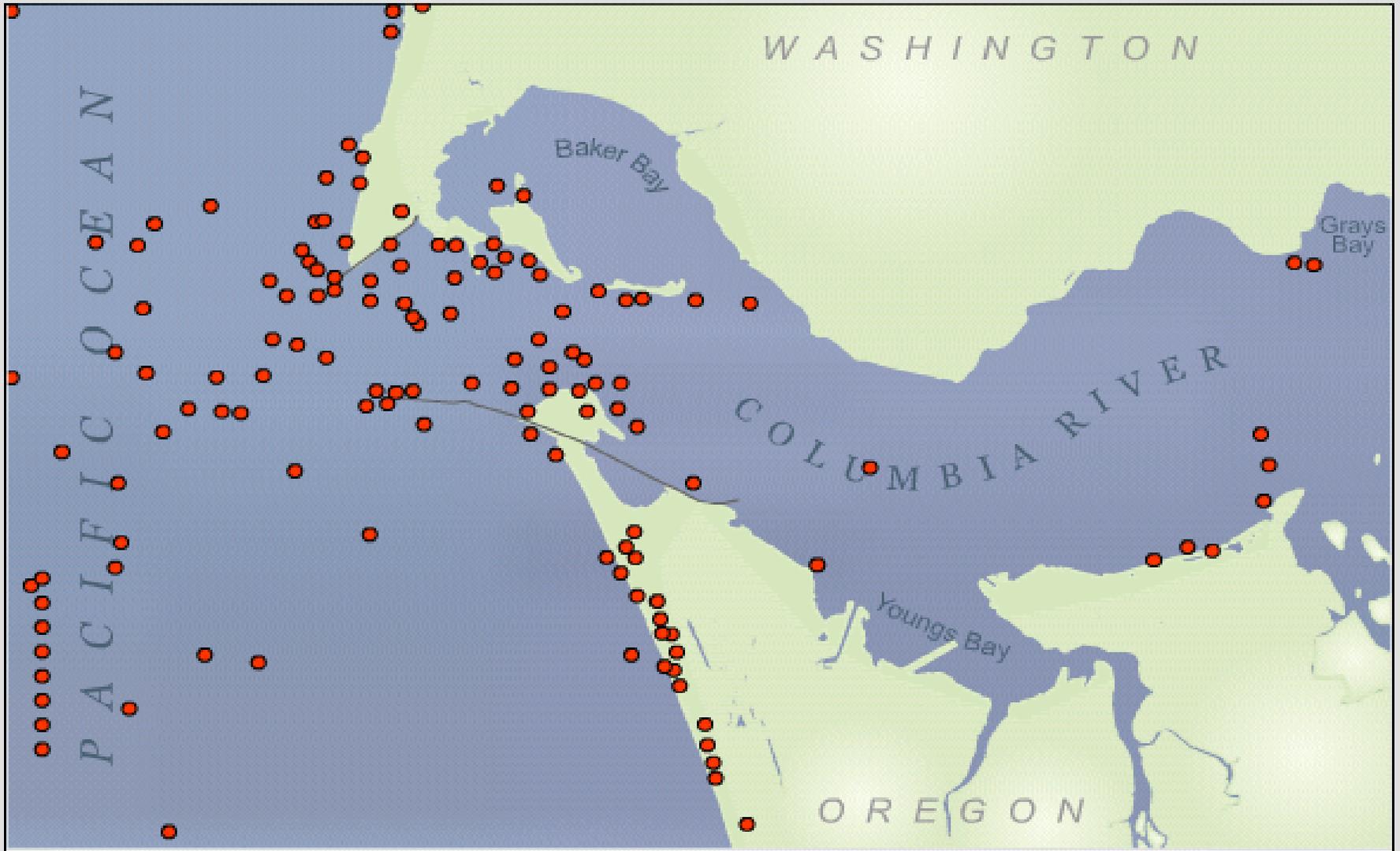


French ship, *Alice*, 1909

French bark, *Colonel de Villebois Mareuil*, turn of the century



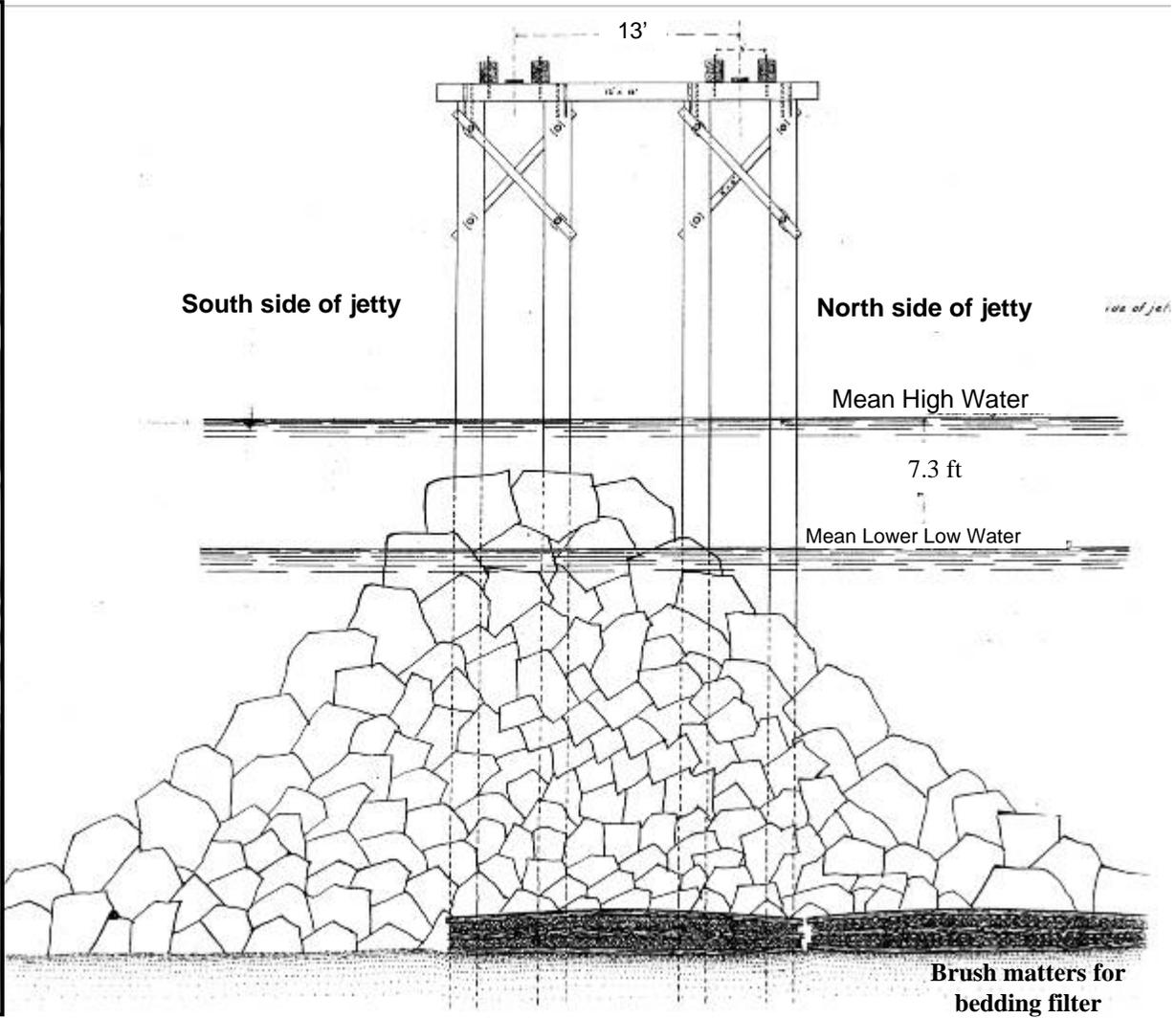
# SHIPWRECKS AT THE MOUTH OF THE COLUMBIA



1800 1850 1900 1950 2000



Click for chart from >> 1987



**Design Section for original Jetty Construction: North/South**

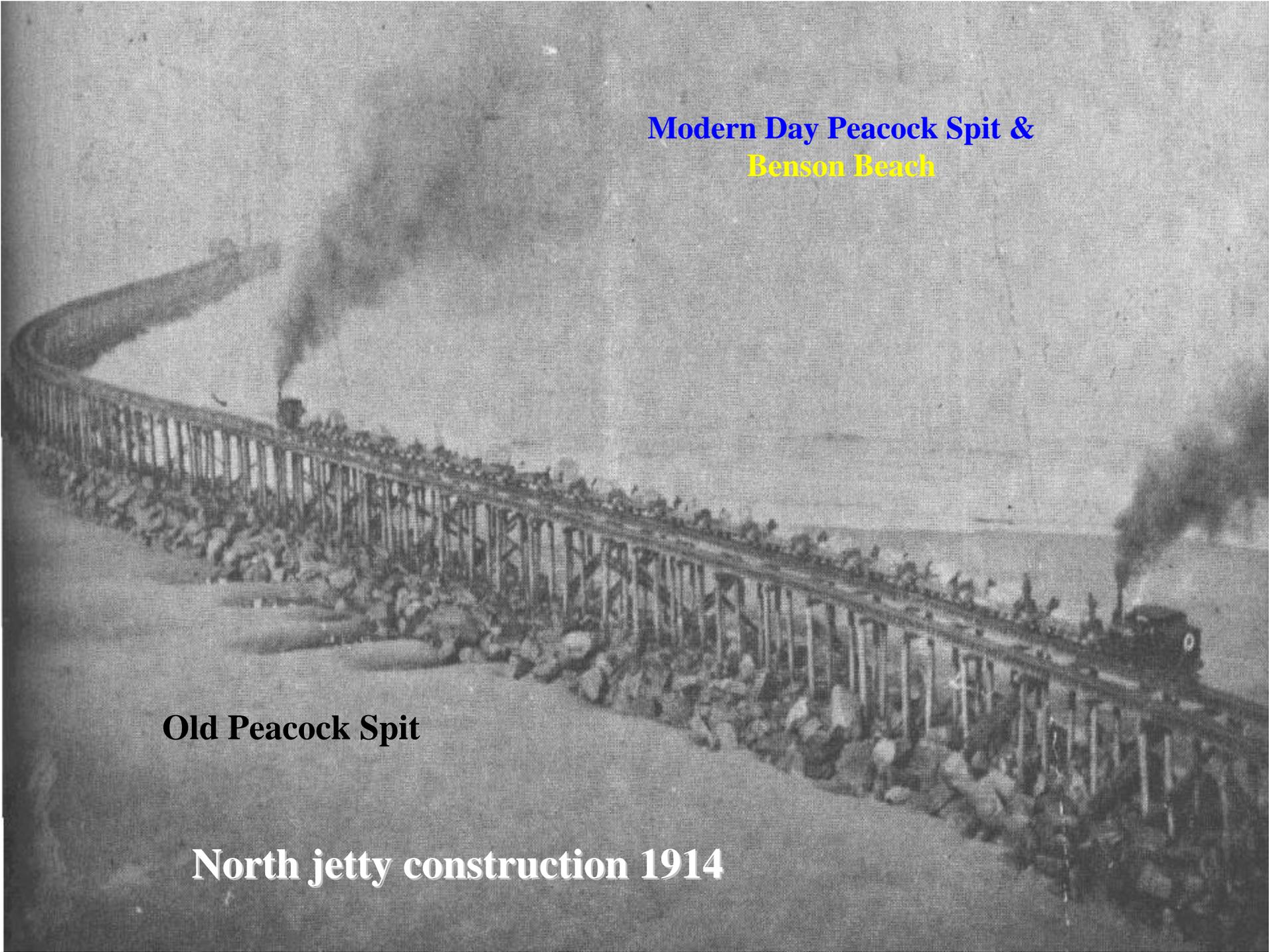


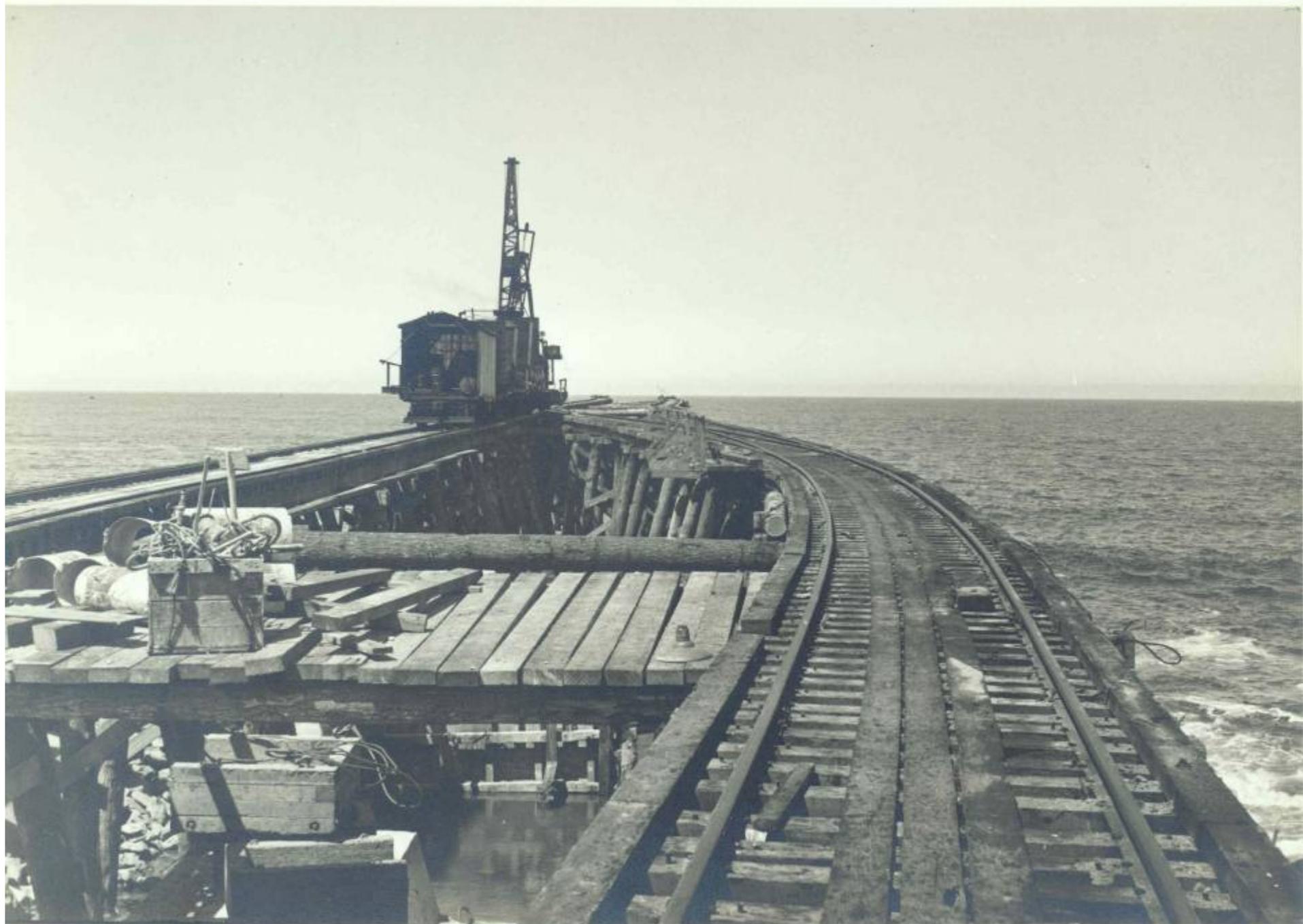


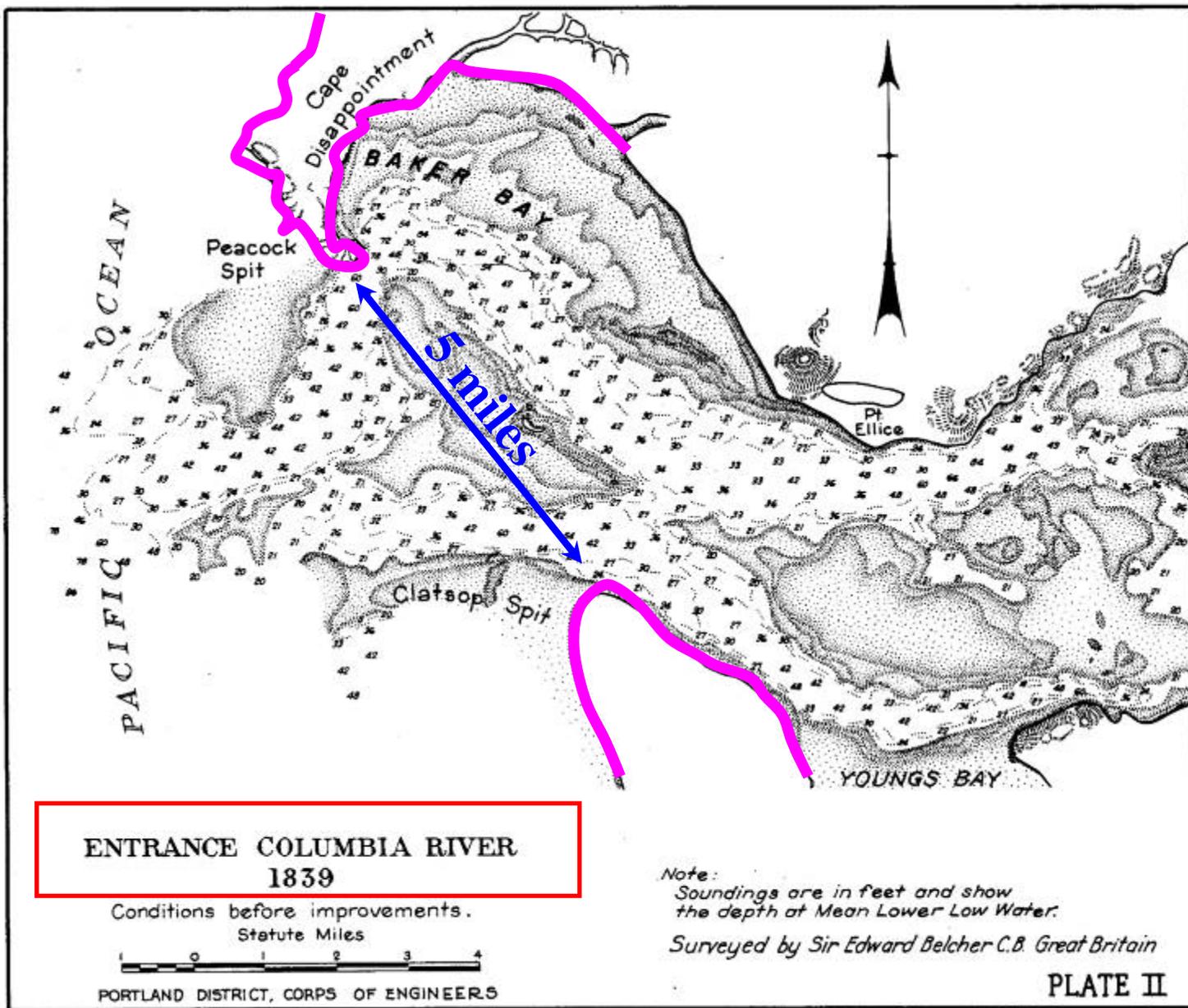
**Modern Day Peacock Spit &  
Benson Beach**

**Old Peacock Spit**

**North jetty construction 1914**

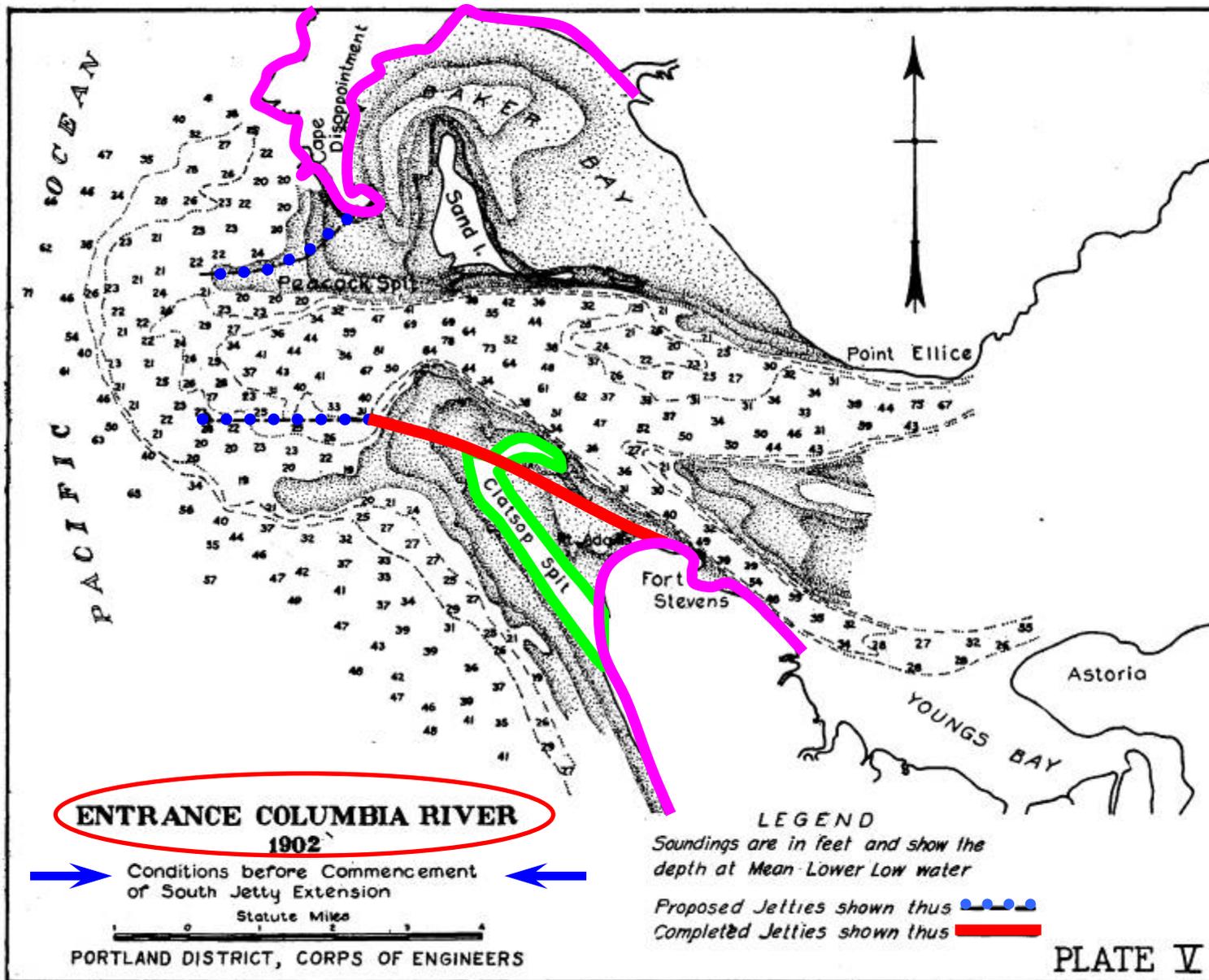


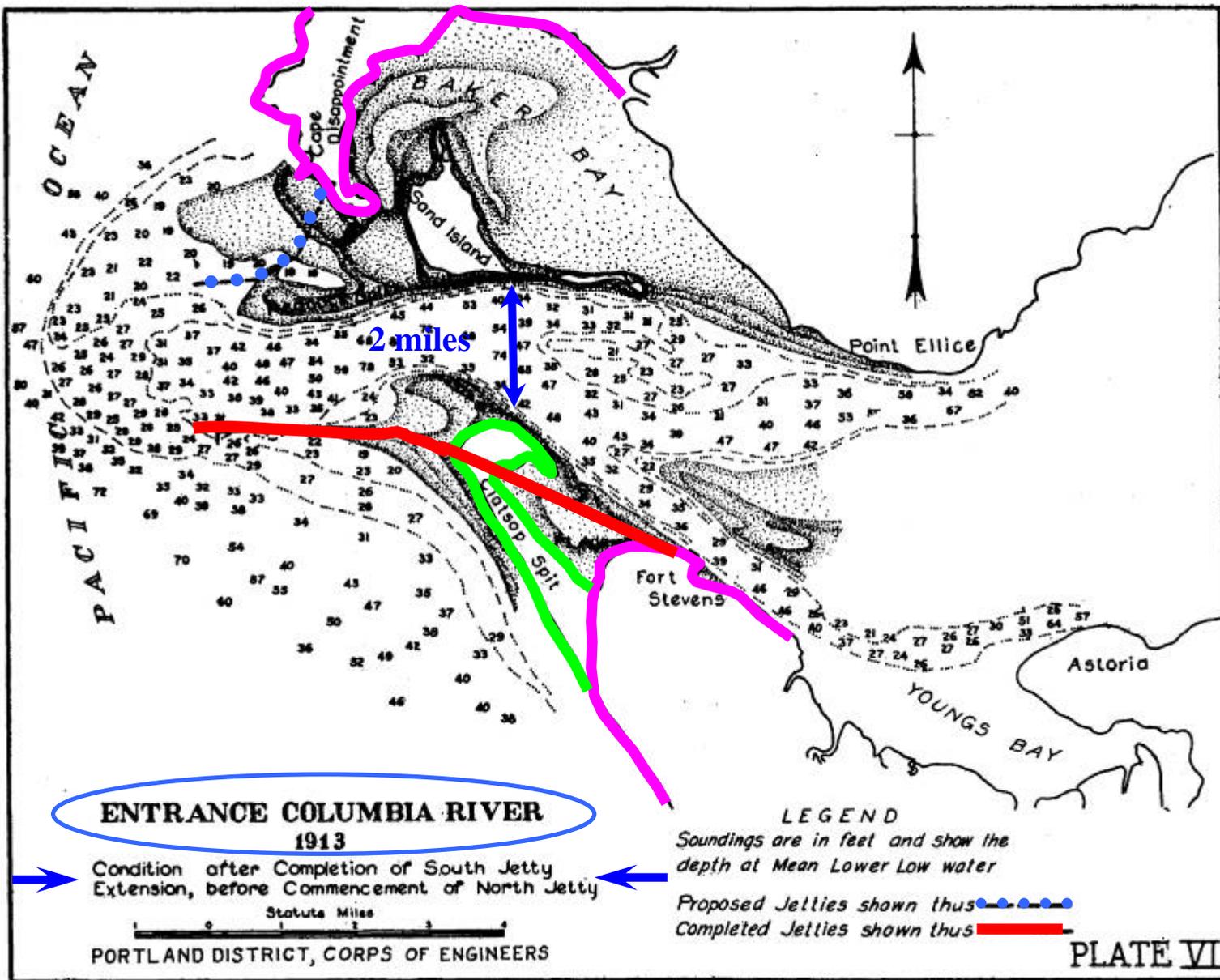




Conditions 46 years before jetties







PACIFIC OCEAN

Cape Disappointment  
BAKER BAY  
Sand Island

2 miles

Point Ellice

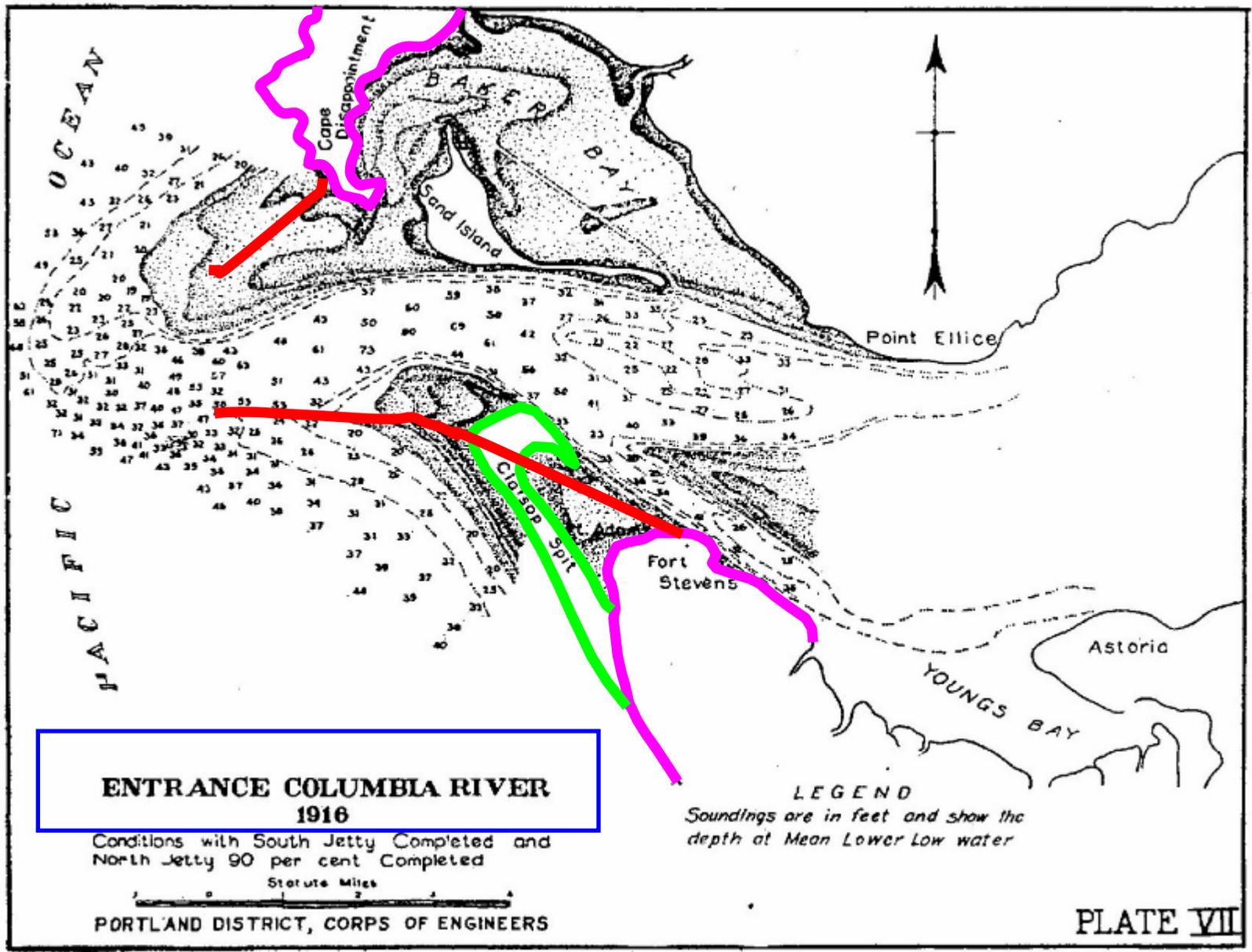
Fort Stevens

Astoria

YOUNGS BAY

Catsop Spit





**ENTRANCE COLUMBLA RIVER  
1916**

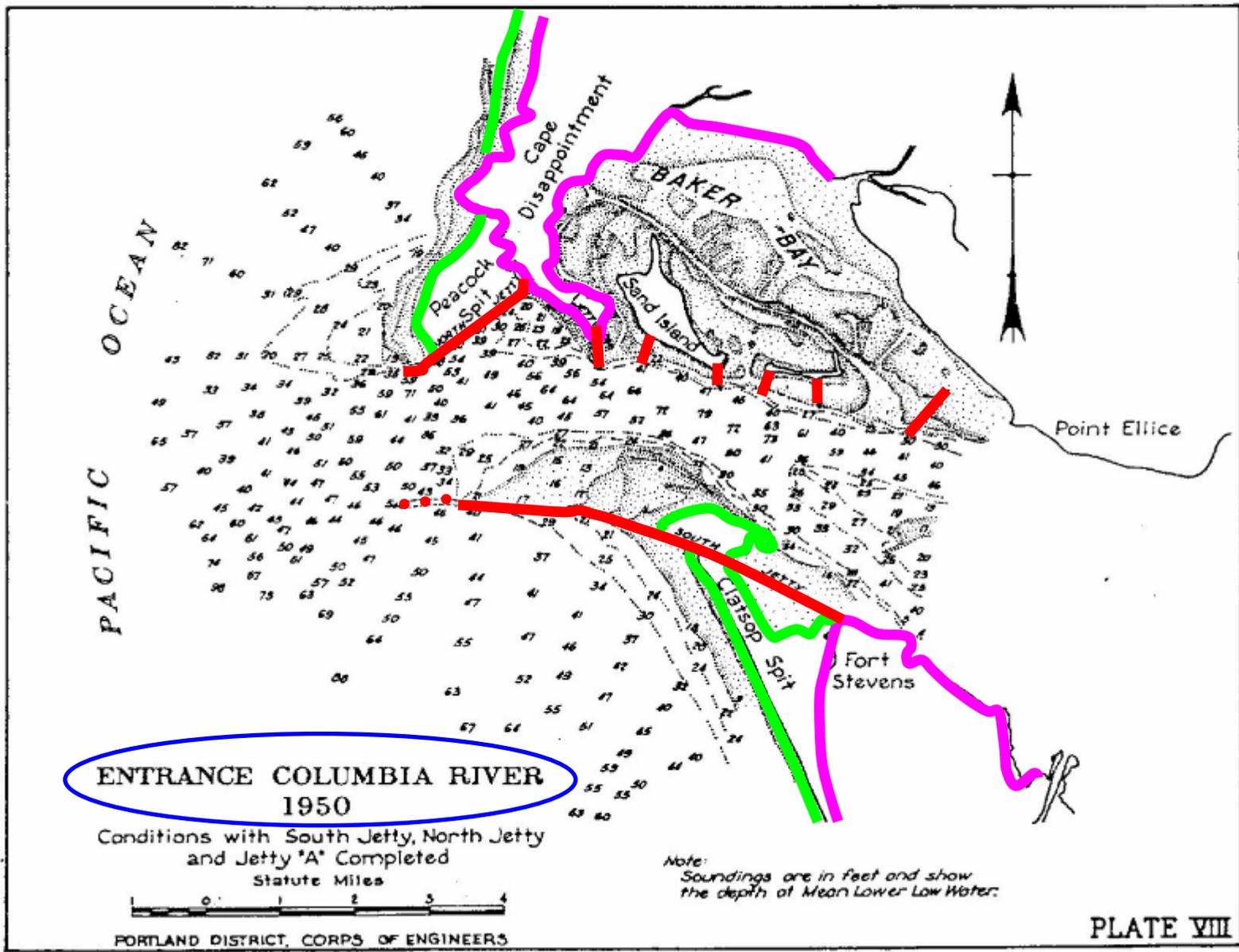
Conditions with South Jetty Completed and  
North Jetty 90 per cent Completed

Statute Miles  
0 1 2 3 4

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**LEGEND**  
Soundings are in feet and show the  
depth at Mean Lower Low water

**PLATE VII**



**ENTRANCE COLUMBIA RIVER  
1950**

Conditions with South Jetty, North Jetty  
and Jetty 'A' Completed  
Statute Miles

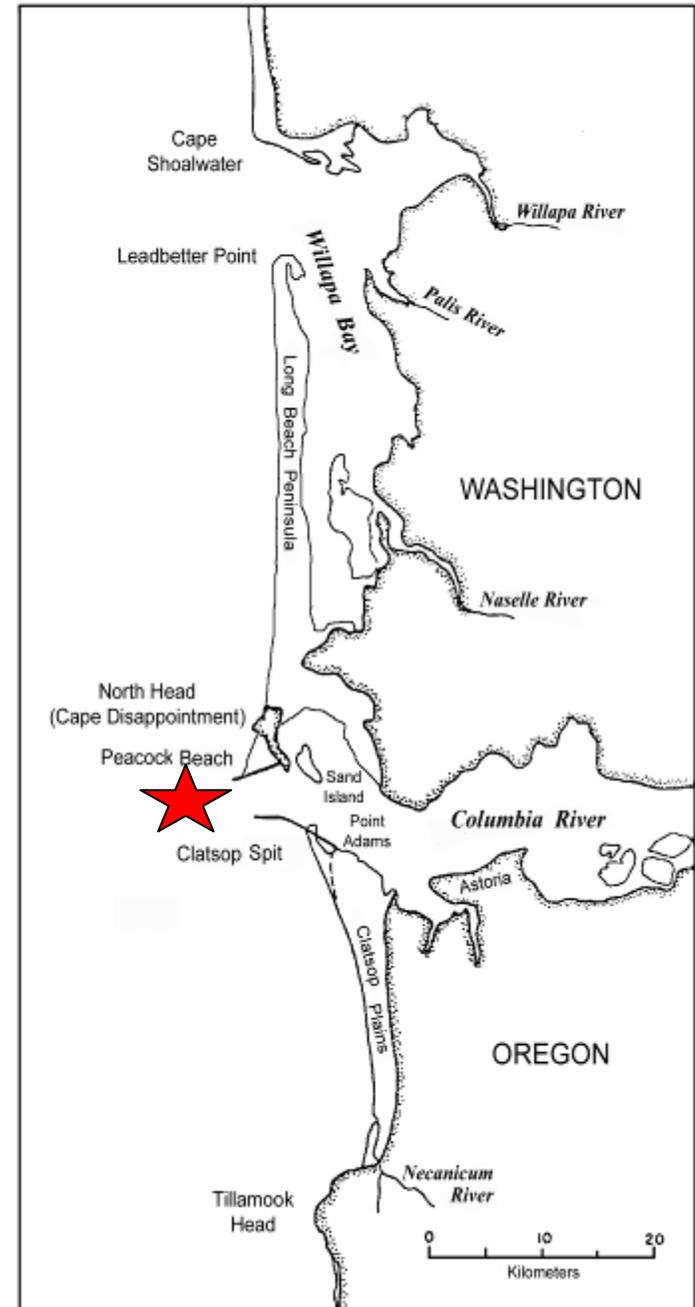
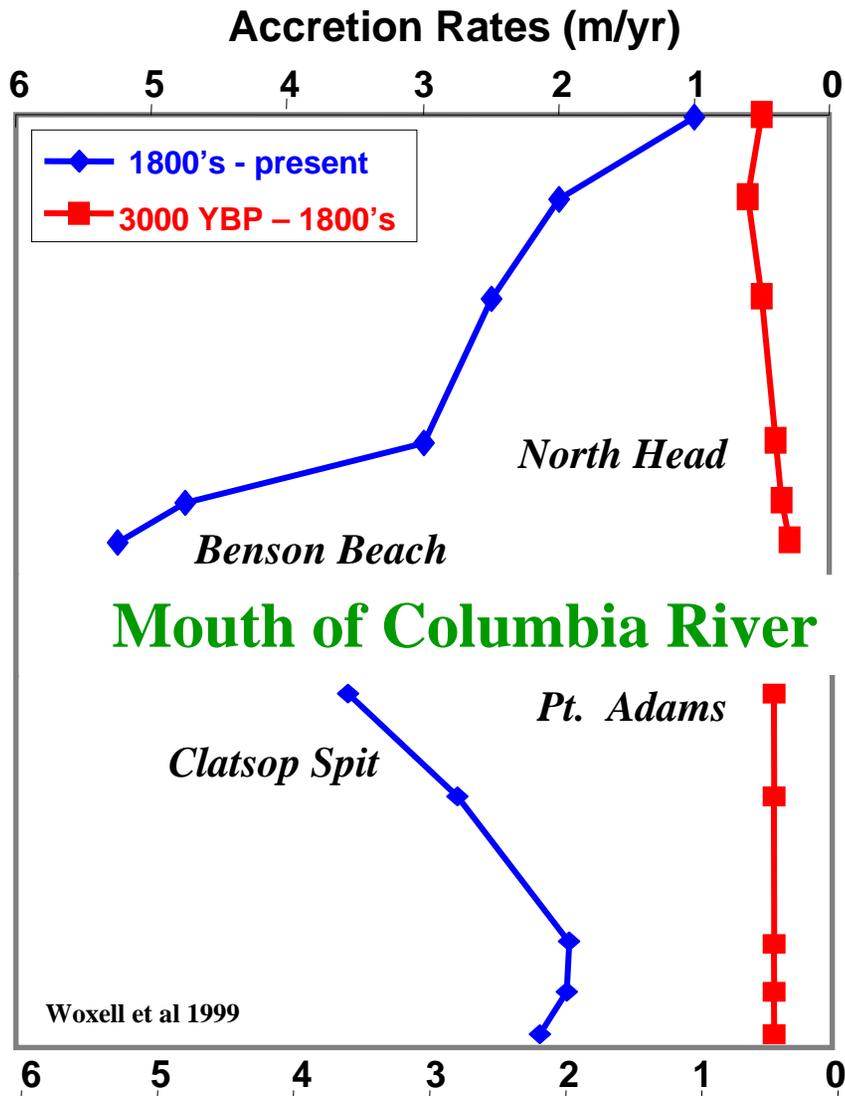


Note:  
Soundings are in feet and show  
the depth at Mean Lower Low Water.

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PLATE VIII

# Shoreline Accretion: North vs South "Baseline Conditions"



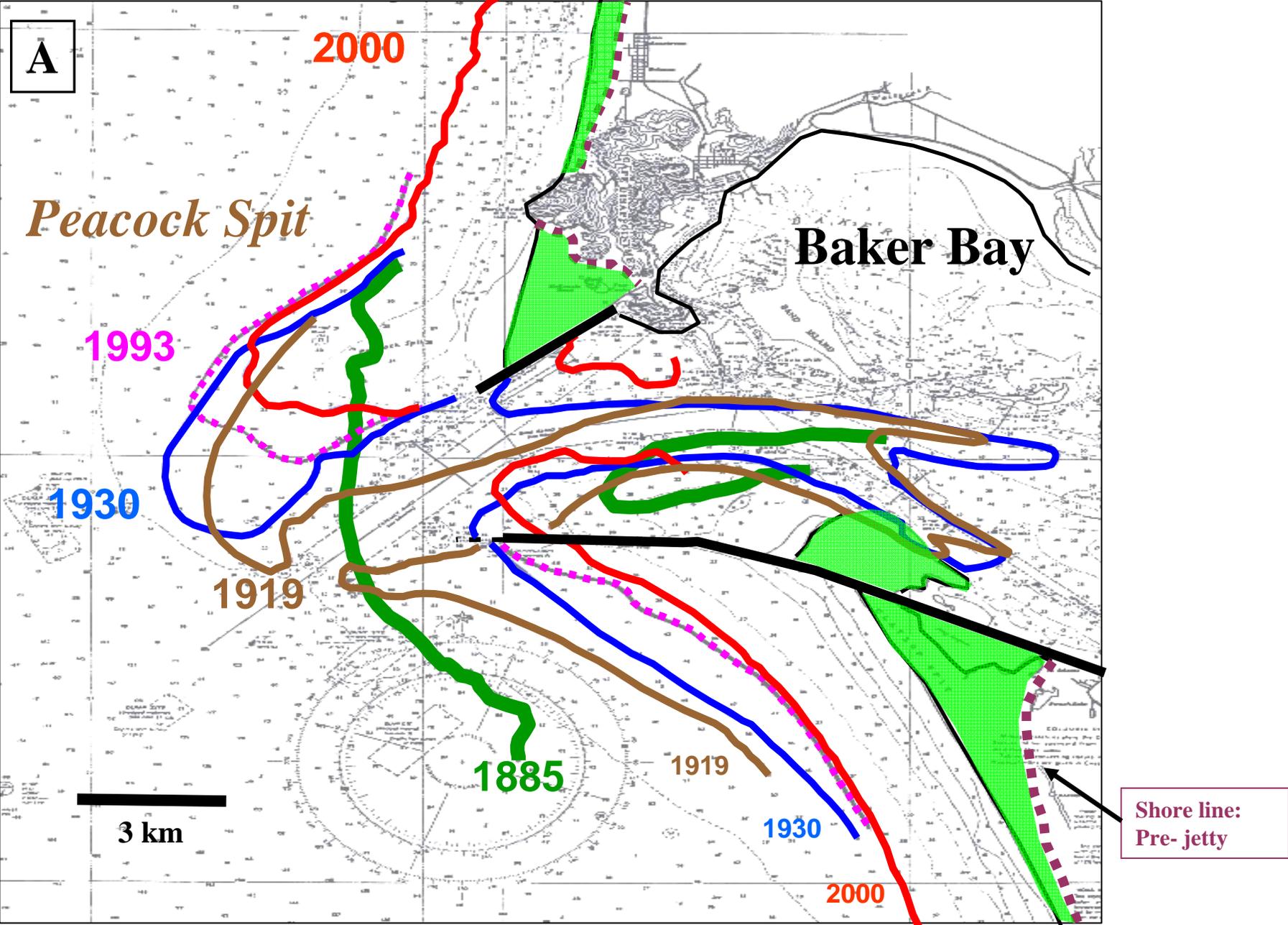


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# Current Condition

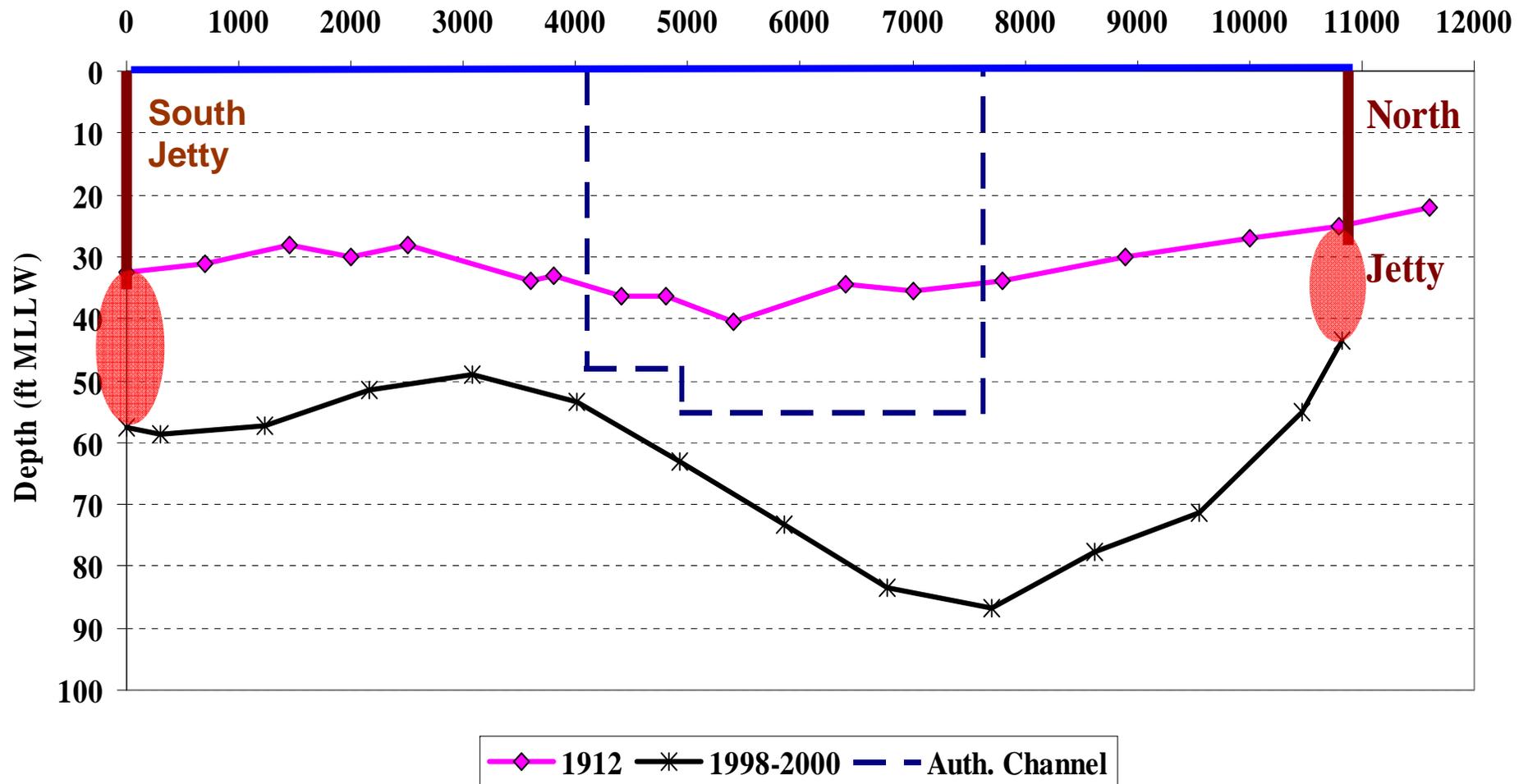
- **The underwater shoals at MCR are receding, affecting the stability of the jetties and the inlet.**
- **The supply of historic littoral material to the North and South coast of MCR is dispersing and the system is continuing to adjust to the building of the jetty system.**

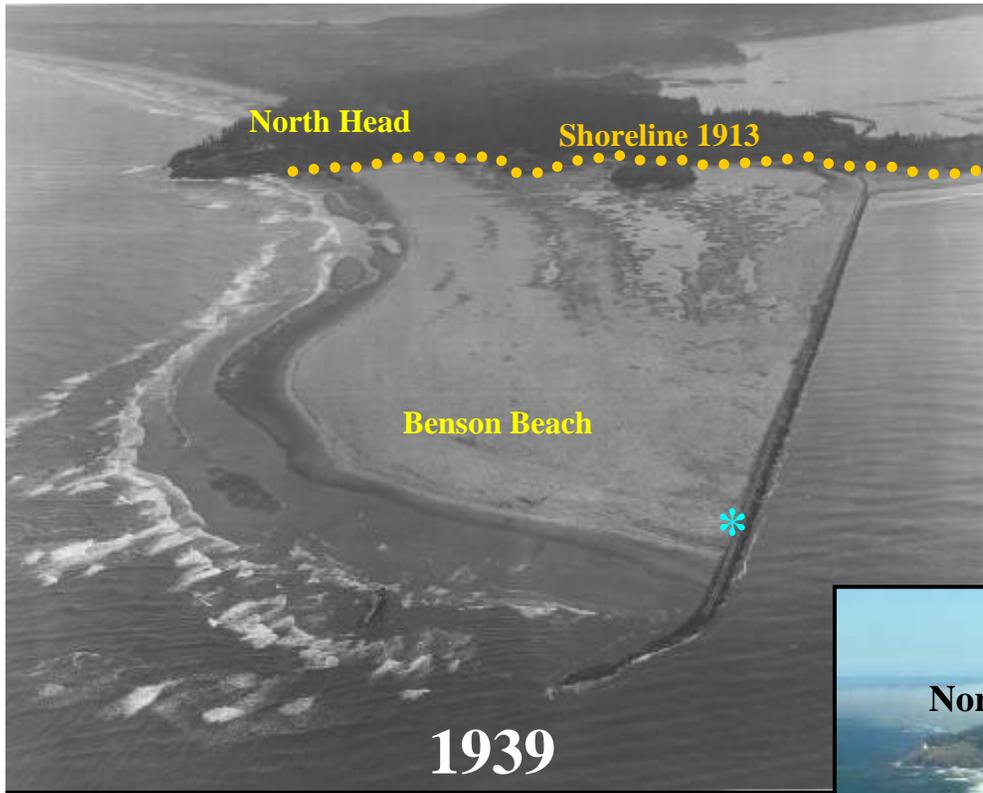
# Change in the 40-ft depth Contour thru Time



# Channel Cross Section – Showing Inlet Deepening over Time and Scour Effects on Jetties

MCR Channel X-Section, Distance *North* from South Jetty (ft), view toward ocean



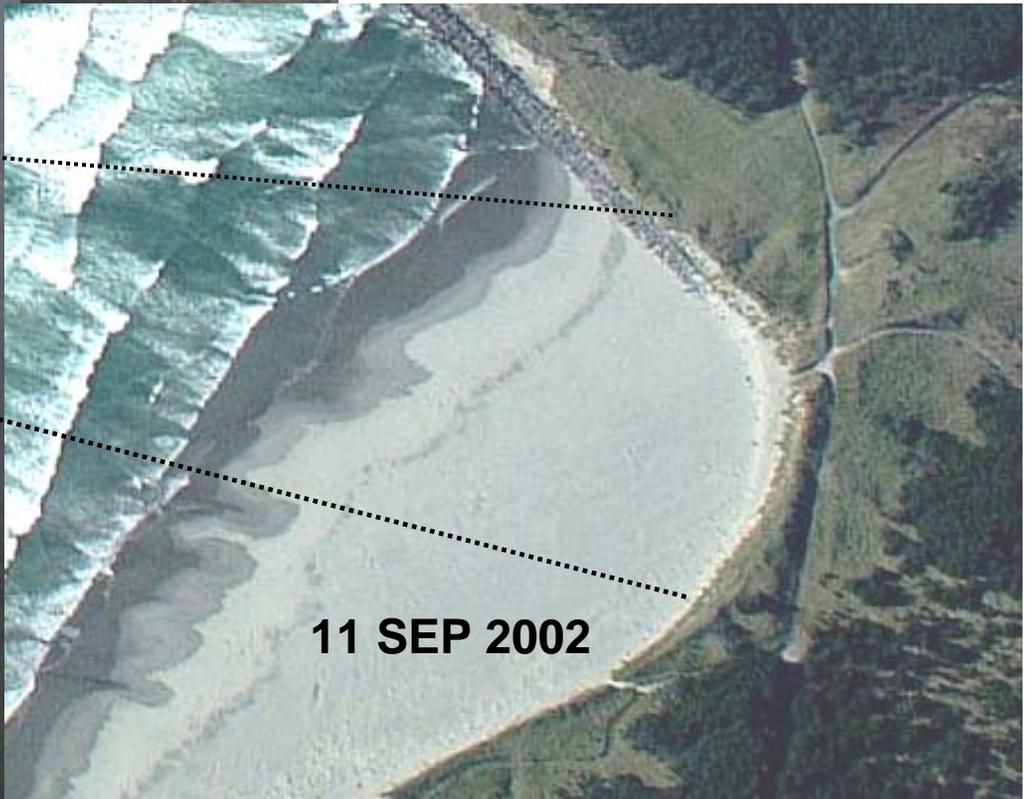
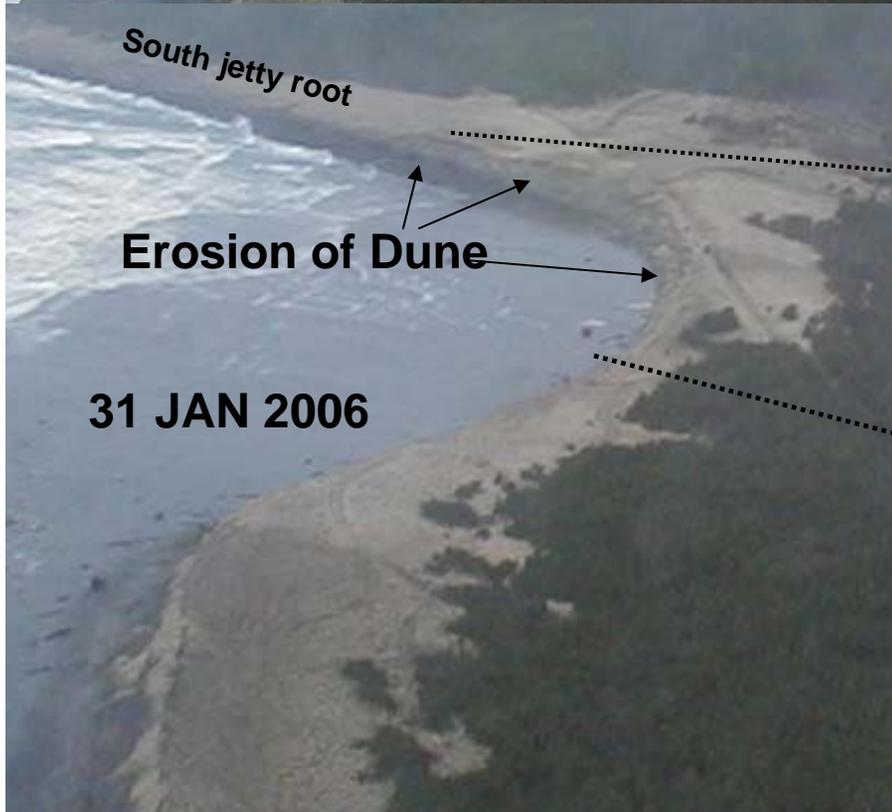




## **MCR South Jetty**

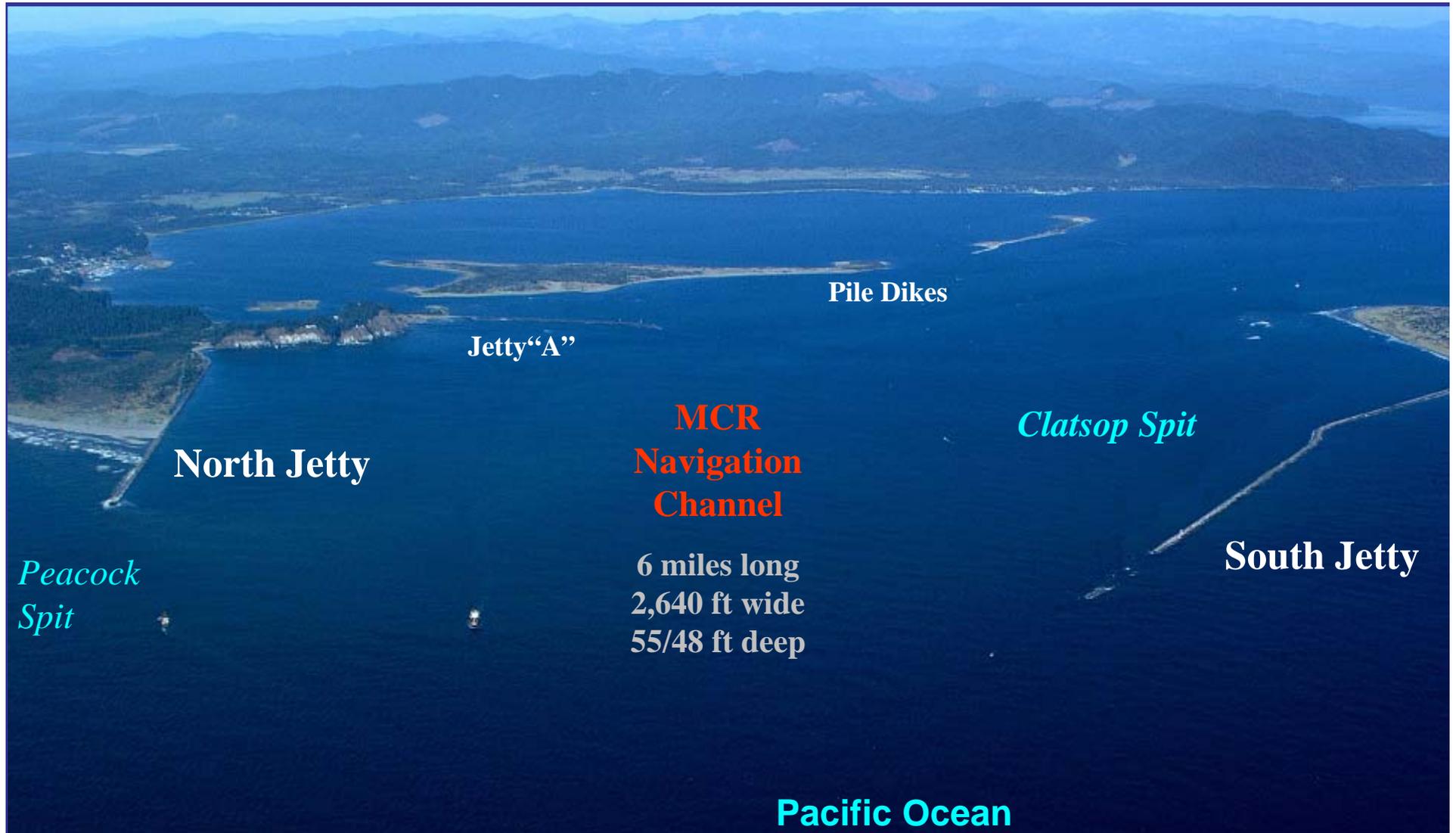
**View to East from Ocean Side of Jetty  
Clatsop Spit in Background**

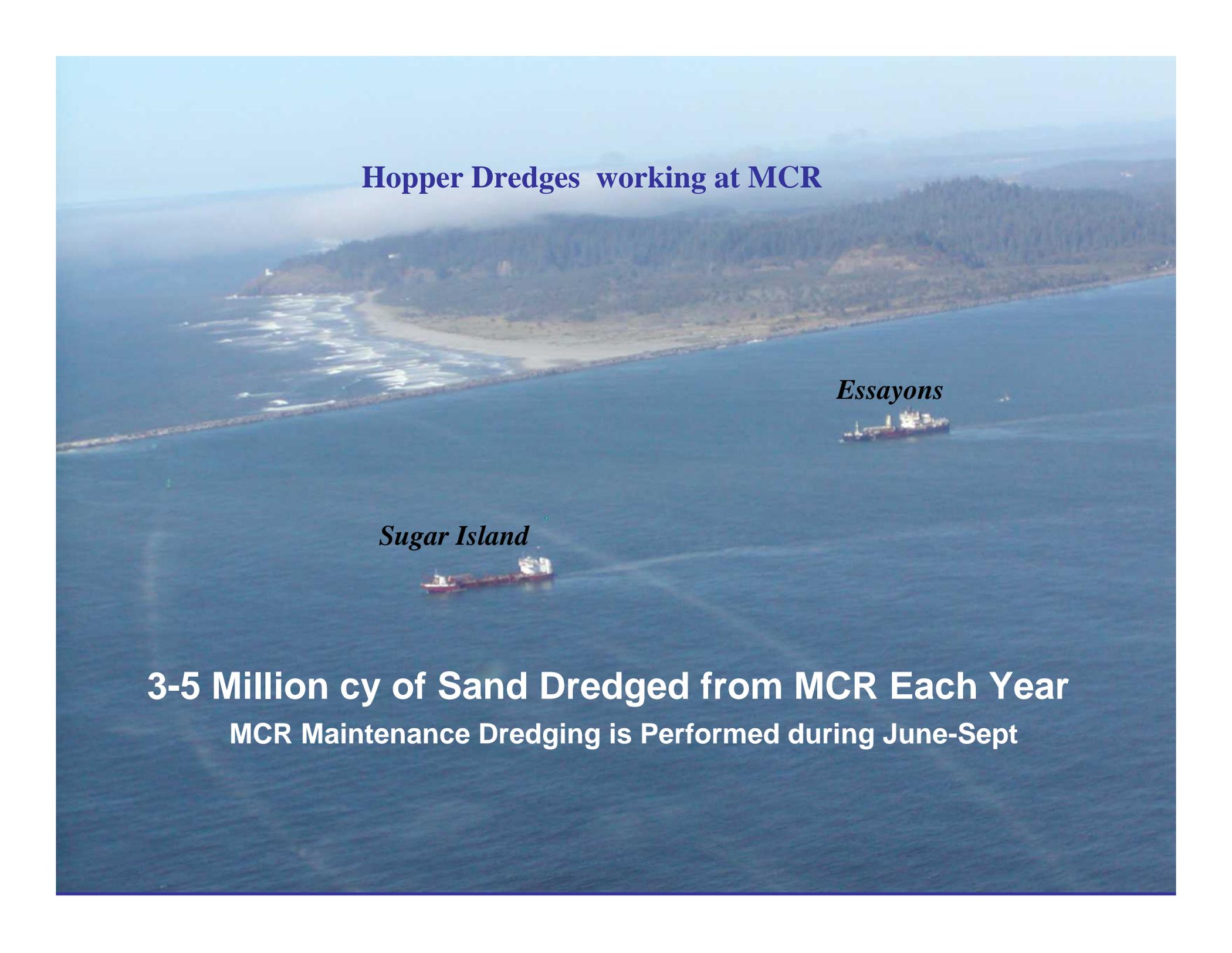
**Columbia River Bar Pilots Photo**



# Mouth of the Columbia River

“CONSTRUCTED” 1885-1917



An aerial photograph showing two hopper dredges, labeled 'Sugar Island' and 'Essayons', operating in a large body of water. The dredges are leaving long, light-colored trails in the dark blue water. In the background, a long, narrow island or peninsula is visible, covered in dense green forest. The sky is clear and blue.

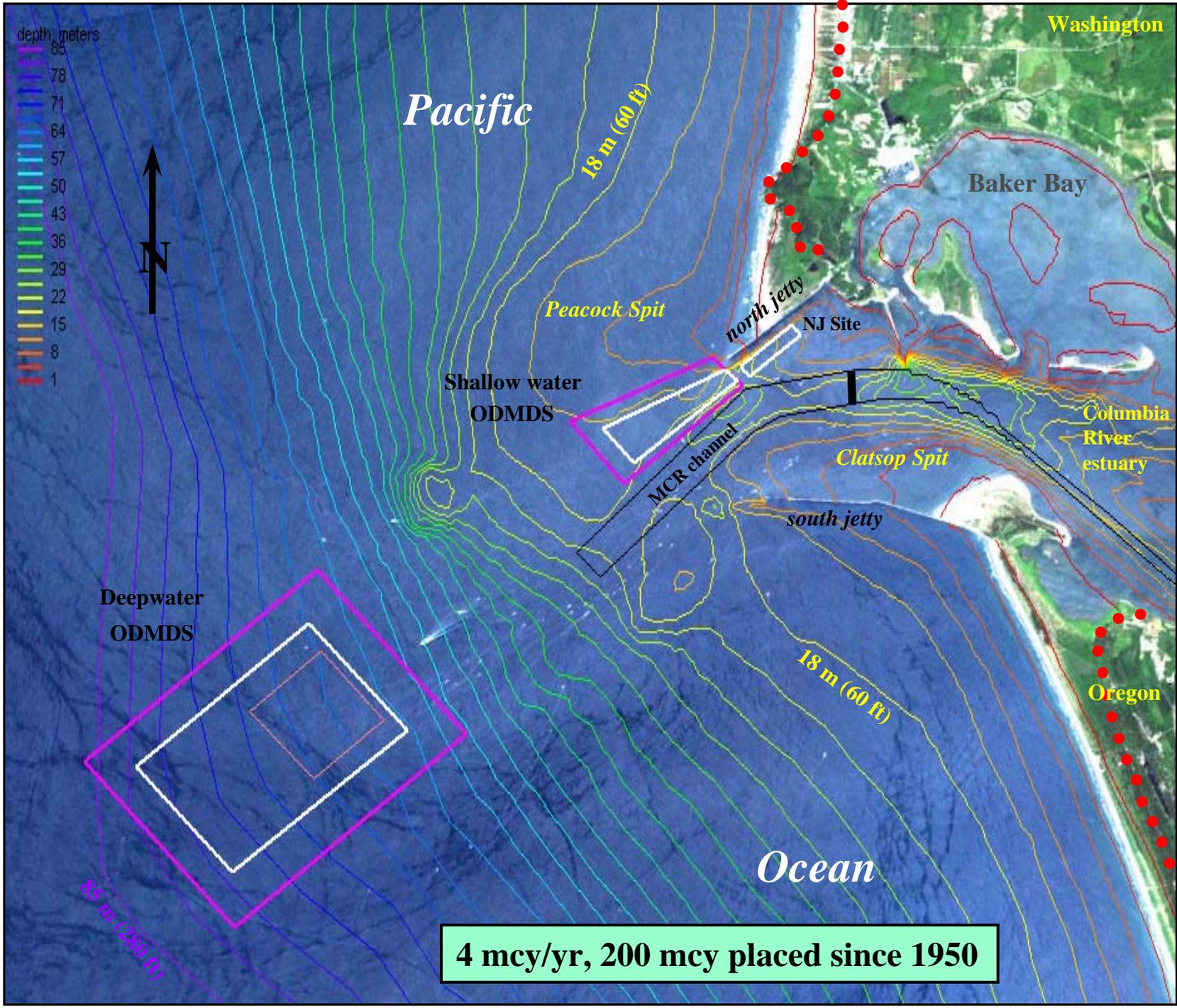
**Hopper Dredges working at MCR**

*Essayons*

*Sugar Island*

**3-5 Million cy of Sand Dredged from MCR Each Year**

**MCR Maintenance Dredging is Performed during June-Sept**



**MCR bathymetry and dredged material disposal sites**

●●●●●●●●●●  
 = Shoreline in 1885, pre jetty

LCR = lower Columbia River

ODMDS = ocean dredged material disposal site

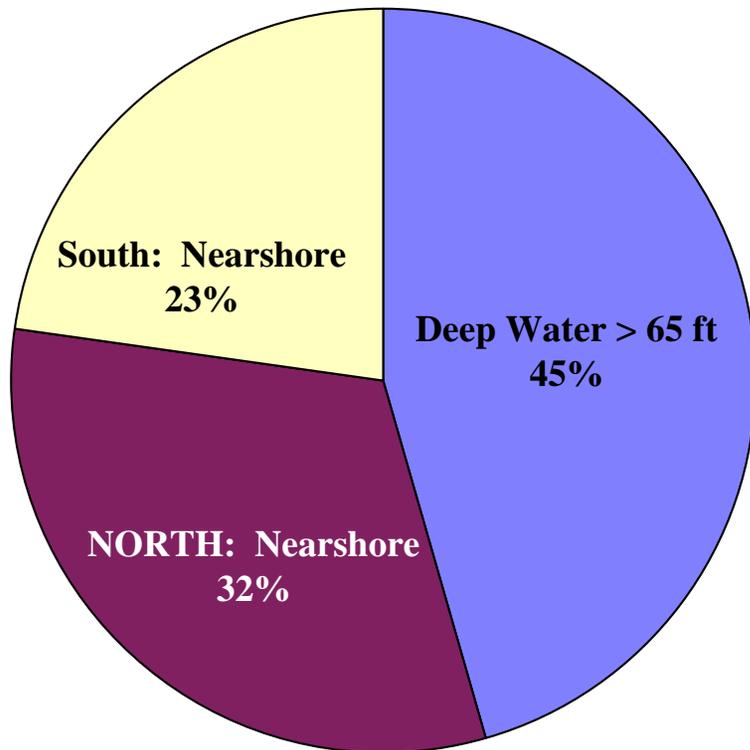
MCR = mouth of Columbia River

2 miles

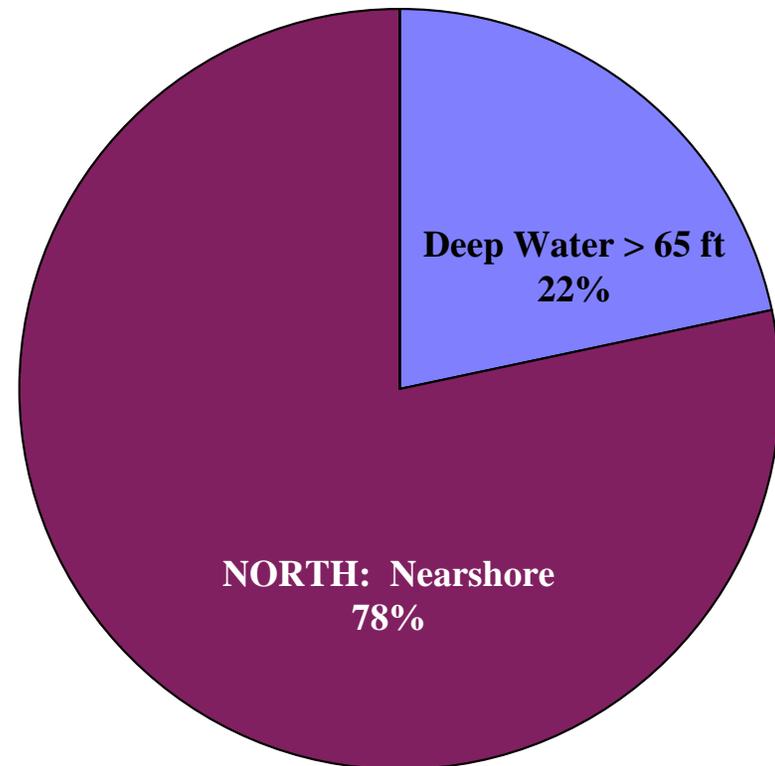
**4 mcY/yr, 200 mcY placed since 1950**

# WHERE Has MCR Dredged Material Been Placed? North vs South vs Deepwater

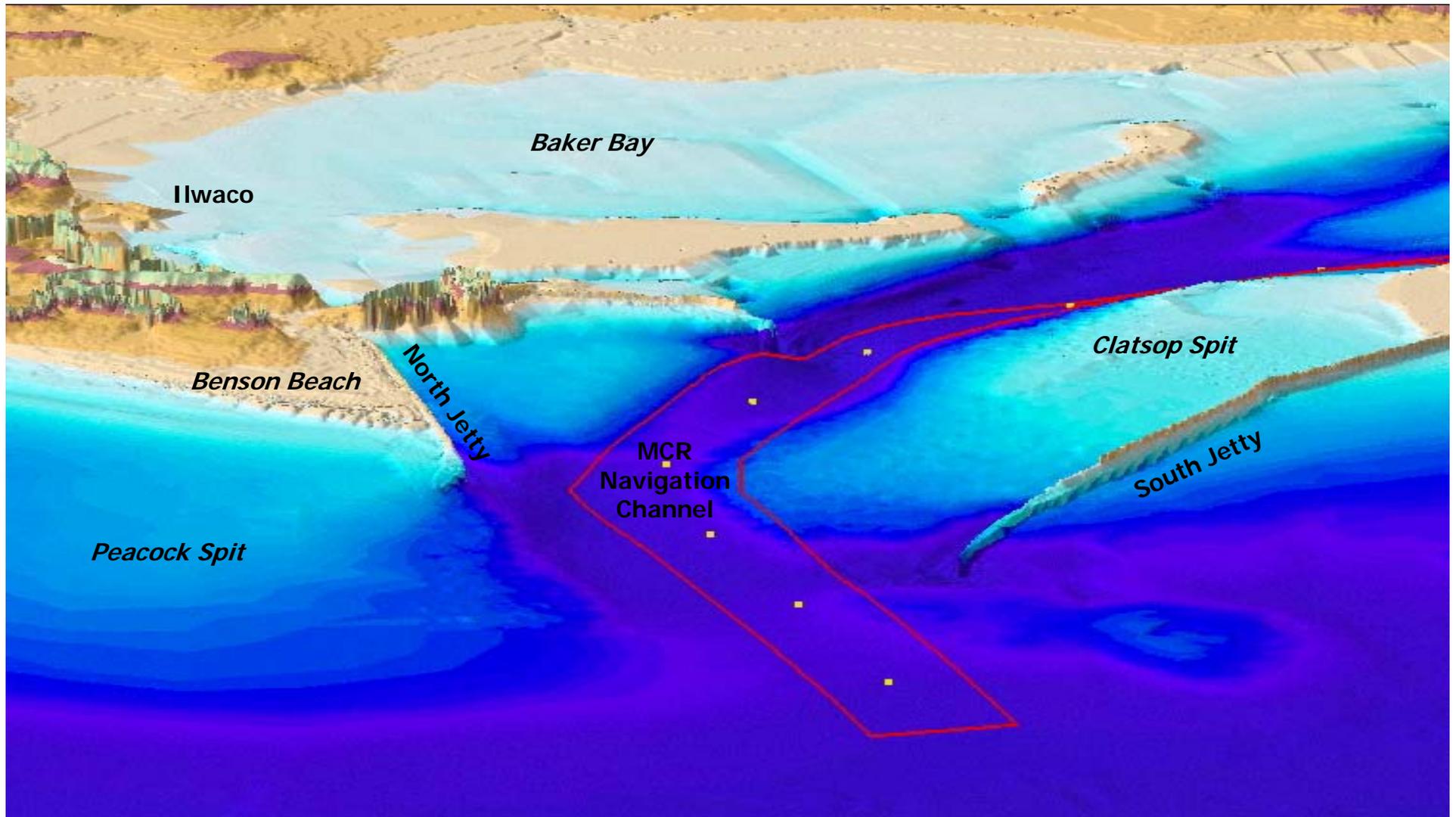
**MCR Ocean Dredging-Disposal 1956-1996**  
181 million cy



**MCR Ocean Dredging-Disposal 1997-2003**  
26 million cy



# Bathymetry Showing Location of Shoals & Jetties



QUESTIONS?

