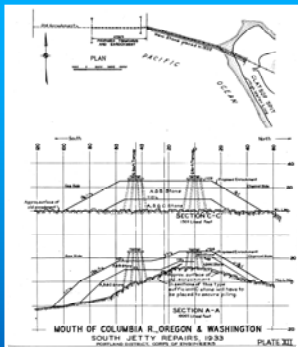
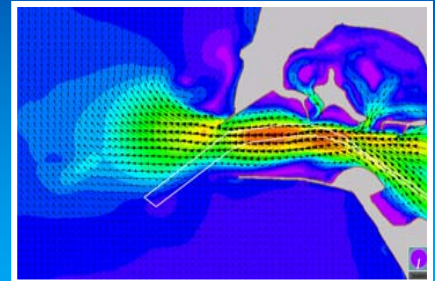
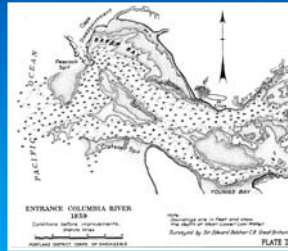
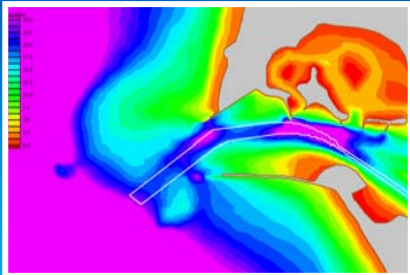




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# Regional Sediment Management Mouth of the Columbia River, OR and WA



Oregon and Washington, USA



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# Upcoming RSM Meeting

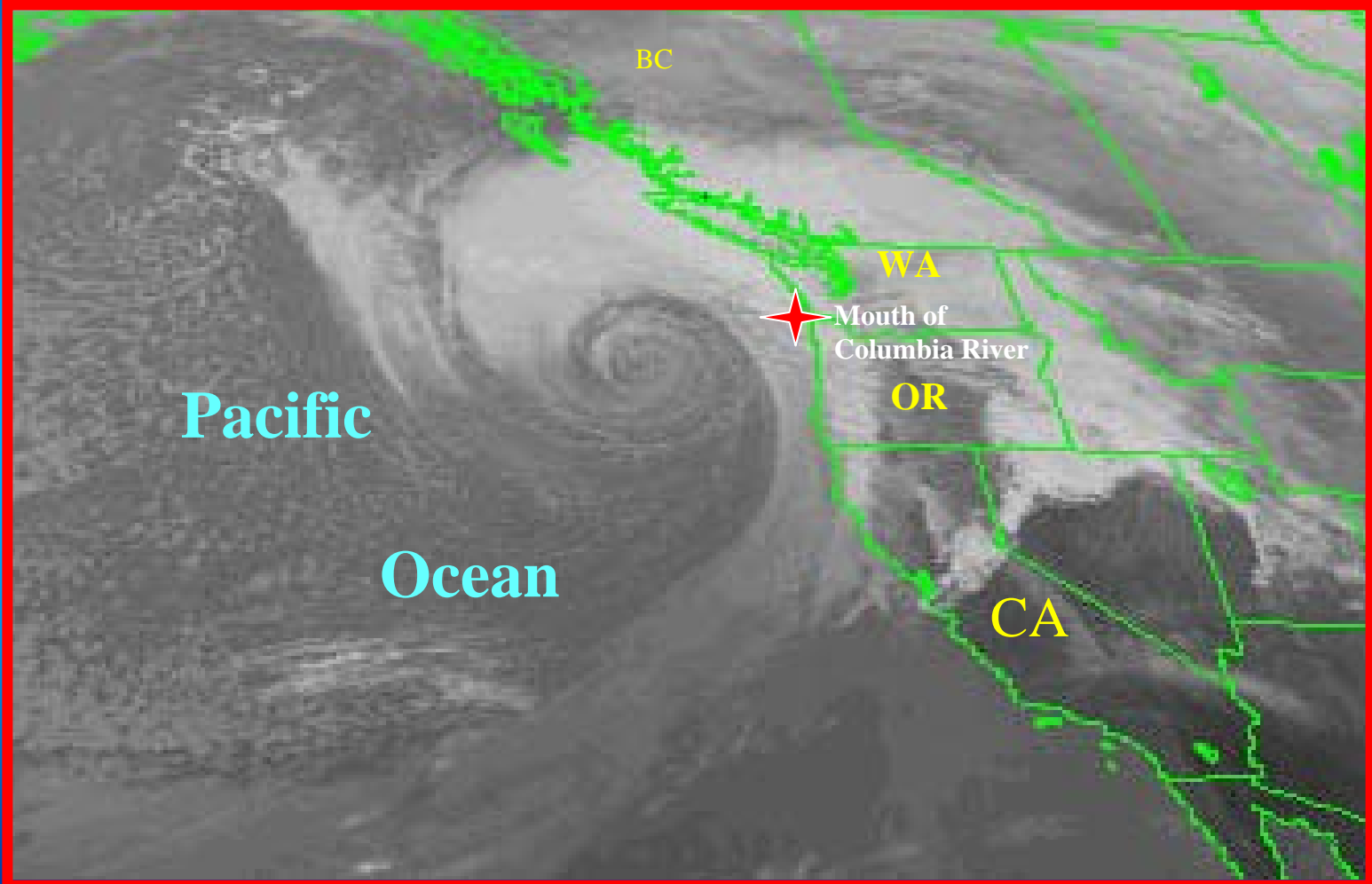
- **March 21, 2006**
- **10:00-2:30**
- **Port of Portland Commission Room**
- **121 NW Everett Street**
  - ◆ **Presentations by USGS, Corps, NWRA, ODLCD, PIE and the National RSM Program Director**



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# Pacific Coast of United States

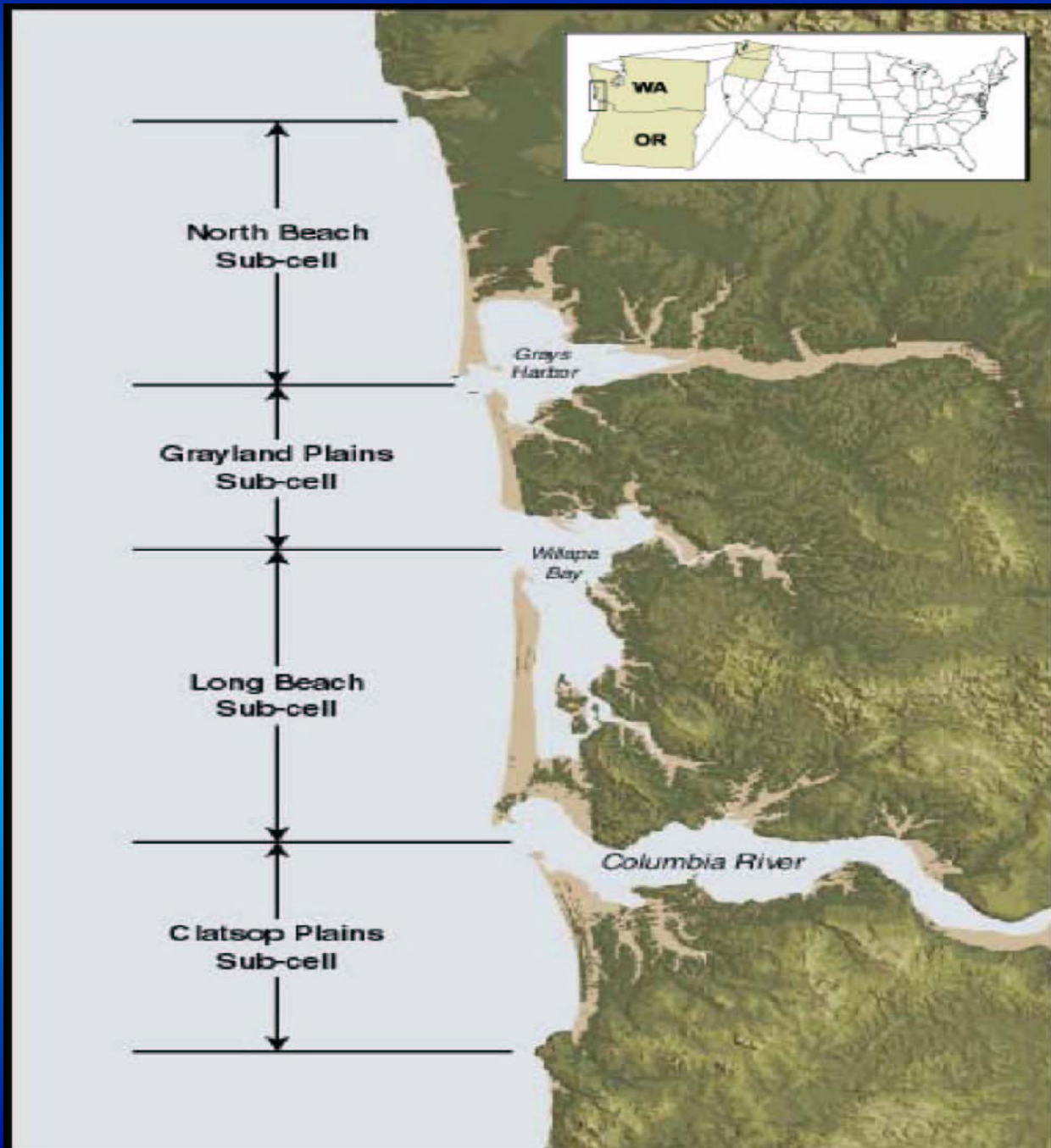
image courtesy of NOAA





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# MCR Littoral Cell off the Oregon and Washington Coasts





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# Stakeholder Forums

- Lower Col. River Estuary Partnership (LCREP)
- ESA Executive Committee
- Lower Columbia Solutions Group
- SW Coastal Communities
- Columbia River Estuary Study Taskforce (CREST)
- Regional Dredging Team
- Regional Sediment Evaluation Team
- Ports and Waterways Safety Committee
- EPA
- *Project Specific Working Groups*



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# Lower Columbia Solutions Group

- **Purpose:** To explore opportunities for beneficial use of dredged material.
  - ◆ Initial niche: commercial and environmental uses
- **Members:**
  - ◆ Corps of Engineers (NWP)
  - ◆ Oregon & Washington Governors' staffs
  - ◆ State agencies
  - ◆ CRCFA, LCREP, CREST
  - ◆ State Agencies
  - ◆ Pacific County
  - ◆ Ports of Astoria, Portland, Vancouver
  - ◆ Salmon for All, Pacific Marine Conservation Council



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# SW Coastal Communities

- **Purpose: Study and Analysis of Coastal Processes along the SW Washington Coast**
- **Members:**
  - ◆ **Counties – Pacific, Grays Harbor**
  - ◆ **Cities of Westport, Long Beach, Ocean Shores, Ilwaco**
  - ◆ **Ports of Willapa, Peninsula, Ilwaco, Grays Harbor**

View to the Northwest

North Head (ARGUS)

Peacock

Shoreline before north jetty construction - 1912

Spit

SWS ODMDS

Densu Beach

NJ Site CWA 404

NORTH JETTY

Dredge Sugar Island

Dredge Essayons

MCR Channel

6 miles long  
2,640 ft wide  
55 /48 ft deep

Clatsop

MCR channel requires 4-5 Mcy/yr of dredging. Two hopper dredges are required to perform work during summer

Spit

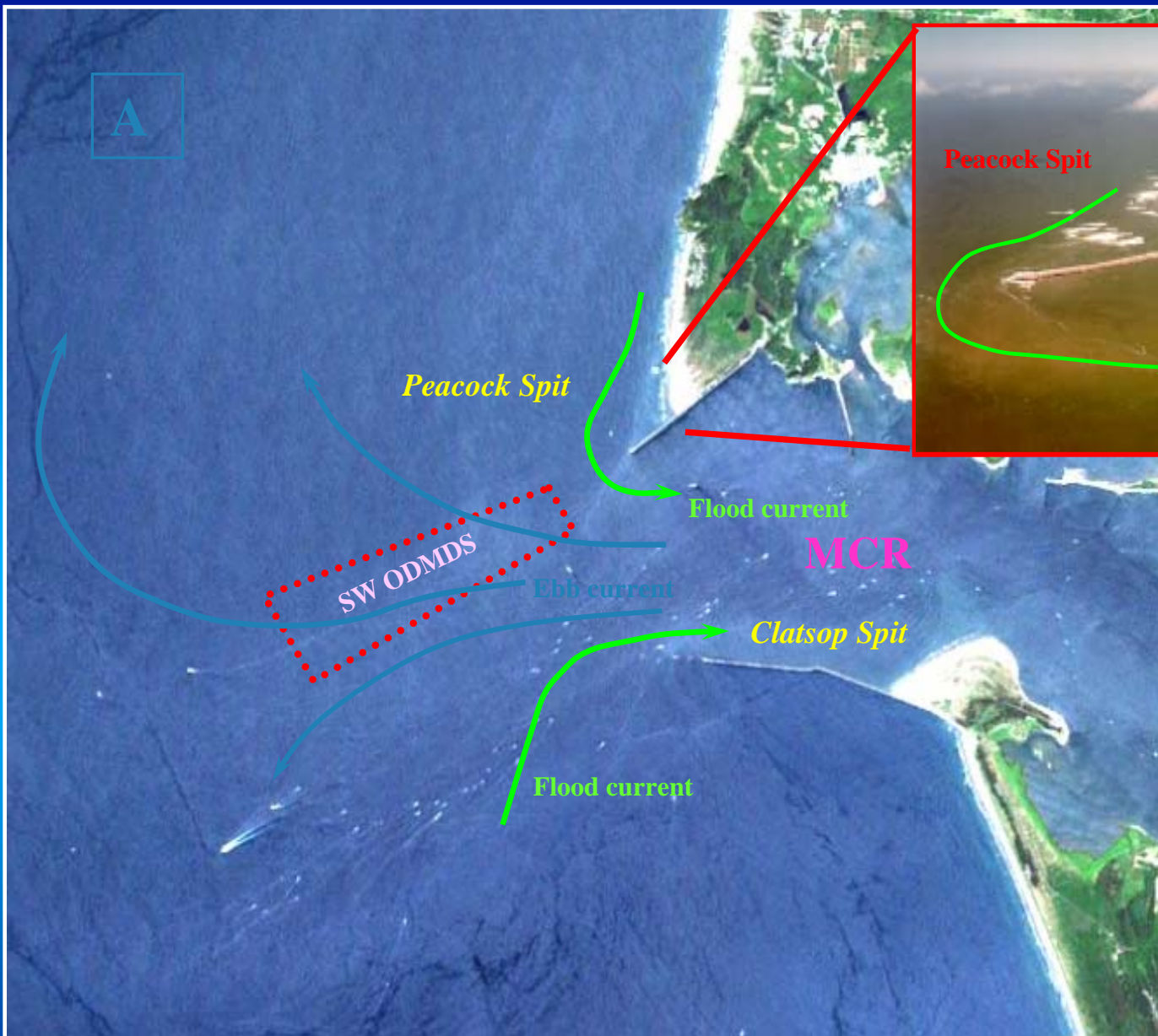
Since 1997, 75% of MCR dredged sand has been placed in SWS or NJ Site

SOUTH JETTY

Since 1997 23 mcy has been placed in SWS; less than 10% remains

Distance from tip of south jetty to tip of north jetty is 2 miles





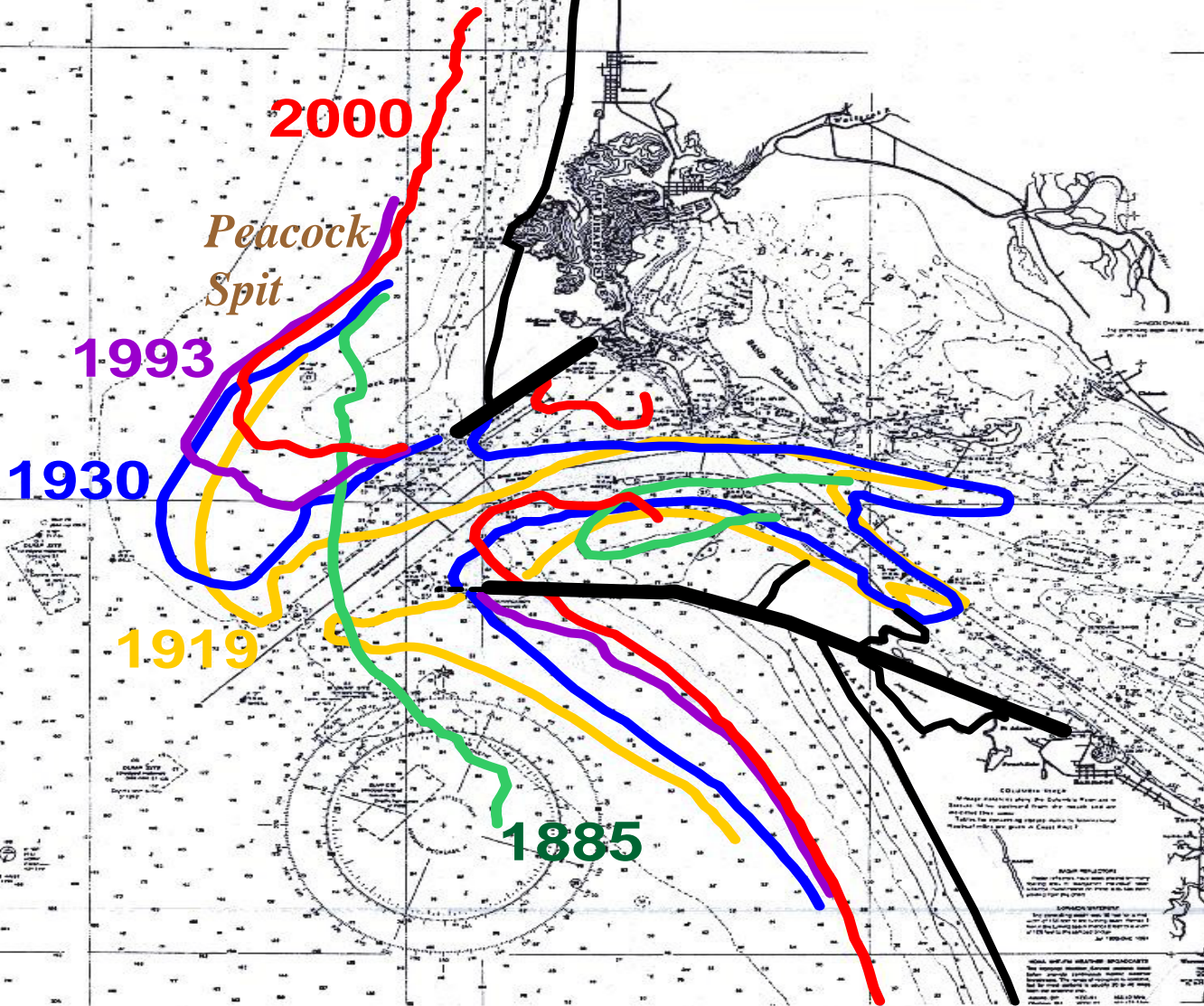
Dominant tidal current patterns for the mouth of the Columbia River. Caption "A" shows typical ebb and flood current patterns. Flood currents (green) concentrate around the ends of jetties. Ebb currents (white) concentrate near the center of the entrance. Caption "B" shows detail of flood current carrying sand into the entrance, between the north jetty and the SW ODMDS.

COLUMBIA RIVER  
PACIFIC OCEAN TO HARRINGTON POINT

Scale: Projected  
Scale 1:25,000 at Lat. 46°12'

North American Datum of 1983  
(World Geodetic System 1984)

BOUNDINGS AND CLEARANCES OF BRIDGES  
AND OVERHEAD CABLES IN FEET  
AT MEAN LOWERS LOW WATER



During 1993 to 2000, the 40 ft contour on Peacock Spit receded landward at a rate 7x faster than during 1930 to 1993.

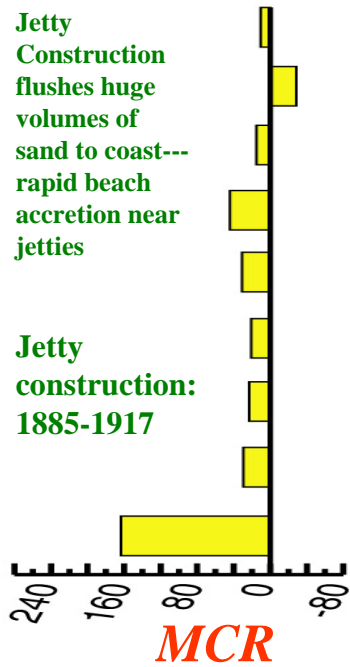
As the offshore shoals recede, the wave climate will change

MCR jetties were built on tidal shoals 1885-1917 that are now eroding.

**1878 - 1926**

Jetty  
Construction  
flushes huge  
volumes of  
sand to coast---  
rapid beach  
accretion near  
jetties

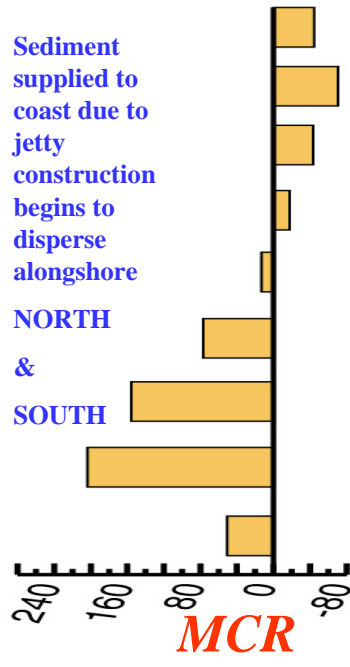
Jetty  
construction:  
1885-1917



**1926 - 1950s**

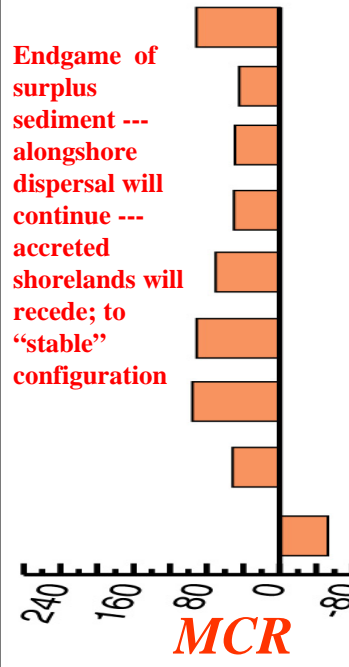
Sediment  
supplied to  
coast due to  
jetty  
construction  
begins to  
disperse  
alongshore

NORTH  
&  
SOUTH

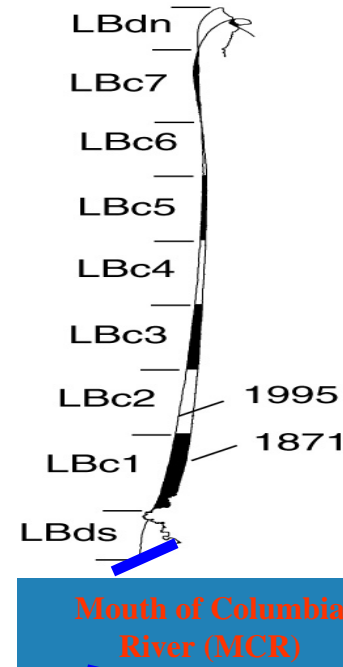


**1950s - 1995**

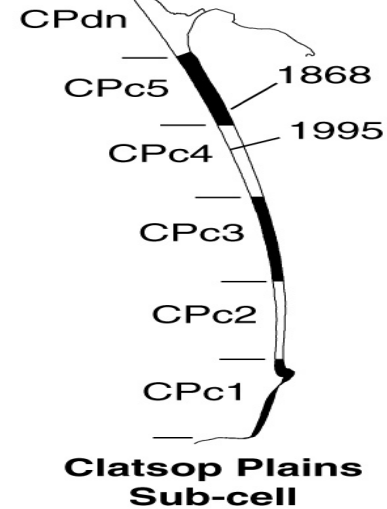
Endgame of  
surplus  
sediment ---  
alongshore  
dispersal will  
continue ---  
accreted  
shorelands will  
recede; to  
"stable"  
configuration



**Long Beach  
Sub-cell**



Mouth of Columbia  
River (MCR)



**Clatsop Plains  
Sub-cell**

Graphs  
show unit  
volume rate  
of sediment  
deposition  
(+) or  
erosion (-);  
for 3 time  
periods at  
MCR



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# Regional Sediment Management Activities

- **MCR Littoral Cell – Mega-transect**
- **SW Washington Littoral Drift Restoration (Benson Beach)**
- **Nearshore Beneficial Use Site South of the South Jetty (LCSG)**



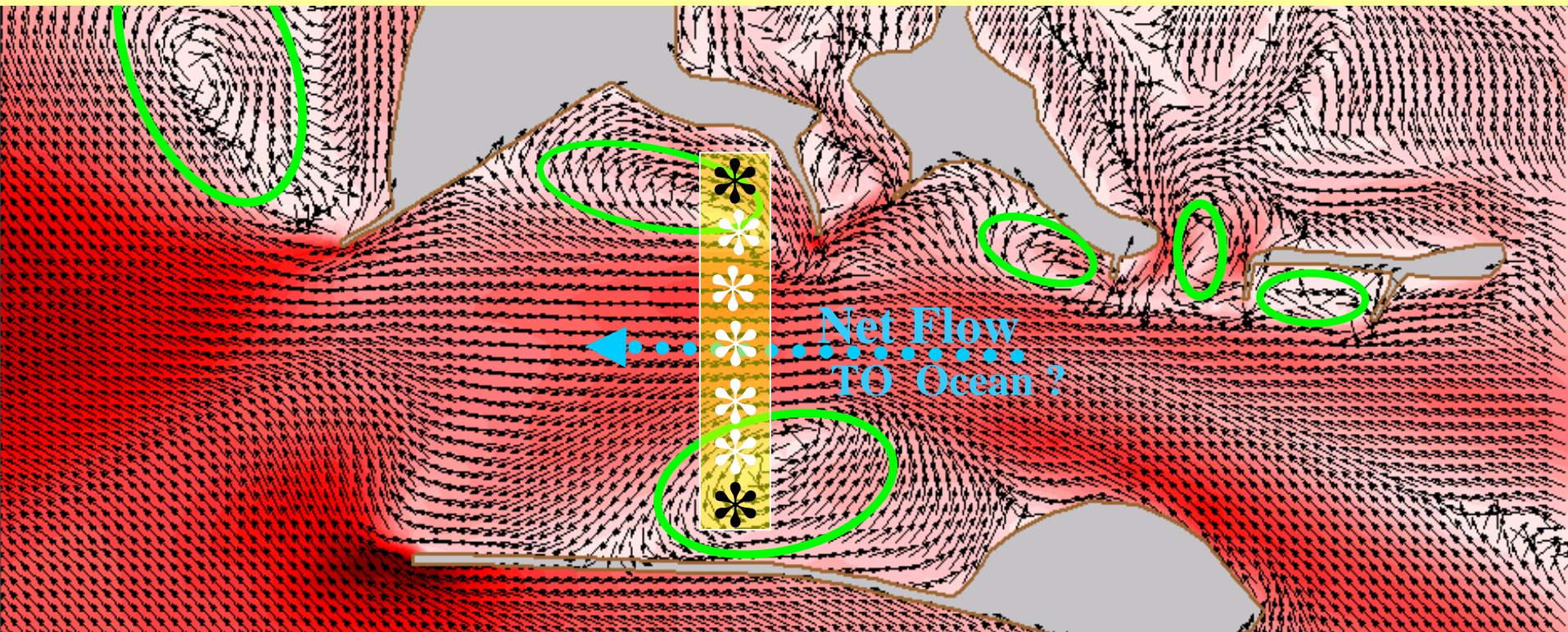
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# MCR LITTORAL CELL RSM MEGA-TRANSECT

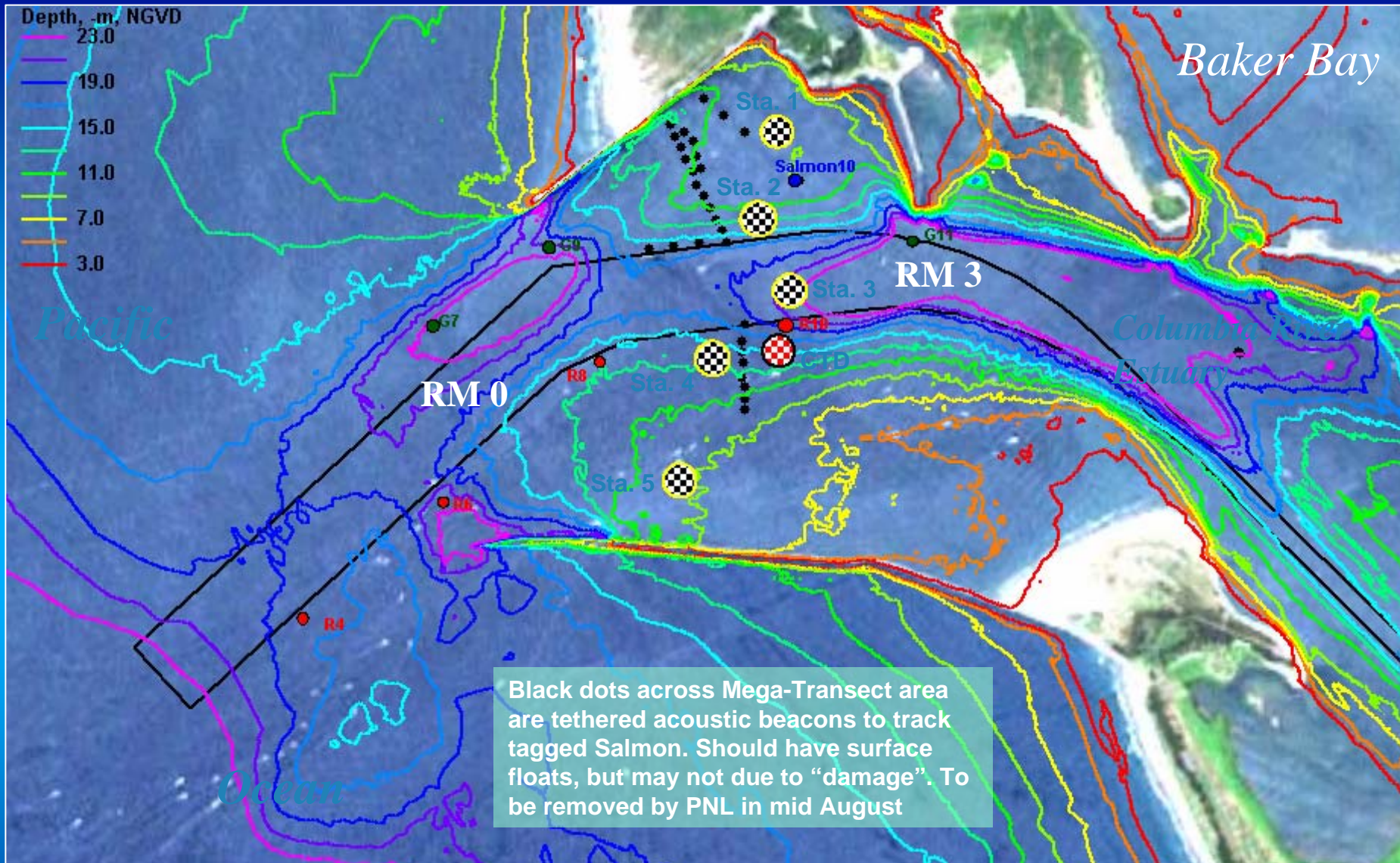
- **Purpose: Collect wave, currents, suspended-bedload sediment, CTD, and tide between the MCR and C&LW**
- **Rod Moritz, Corps Lead**
- **Guy Gelfenbaum, USGS – Menlo Park**
- **ERDC – Nick Krause**
- **Moffatt-Nichol – Russ Boudreau**
- **Evans-Hamilton – Keith Kurrus**



**PROPOSE: Conduct Simultaneous Flow & Sediment Measurements along “Mega-Transect”, across MCR.**



**Deploy 6-8 “tripods” on bottom for 1-3 months and collect DATA**



**Sta. 1:** X=335563, Y=295449, Z=-8.5 m MLLW

2530 meters

**Sta. 4:** X=334927, Y=293260, Z=-13.0 m MLLW

**Sta. 2:** X=335371, Y=294591, Z=-11.5 m MLLW

XY in SPCS, OR N  
meters NAD27

**CTD:** X=335578, Y=293319, Z=-14.0 m MLLW

**Sta. 3:** X=335681, Y=293911, Z=-21.0 m MLLW

**Sta. 5:** X=334616, Y=292047, Z=-9.0 m MLLW



# Cross-Section View Across MCR along Mega-Transect Area

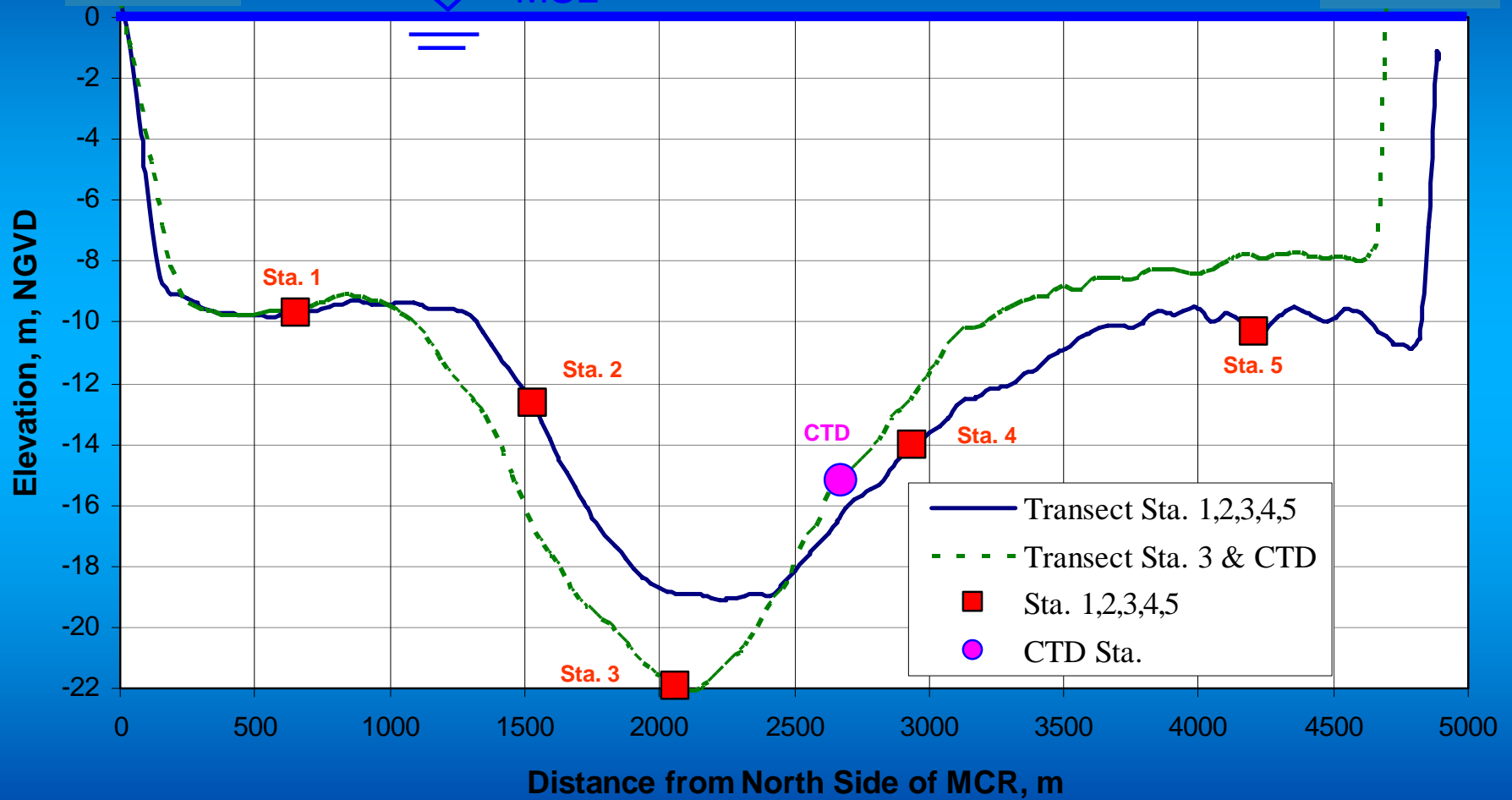
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Portl **North Jetty**

 MSL

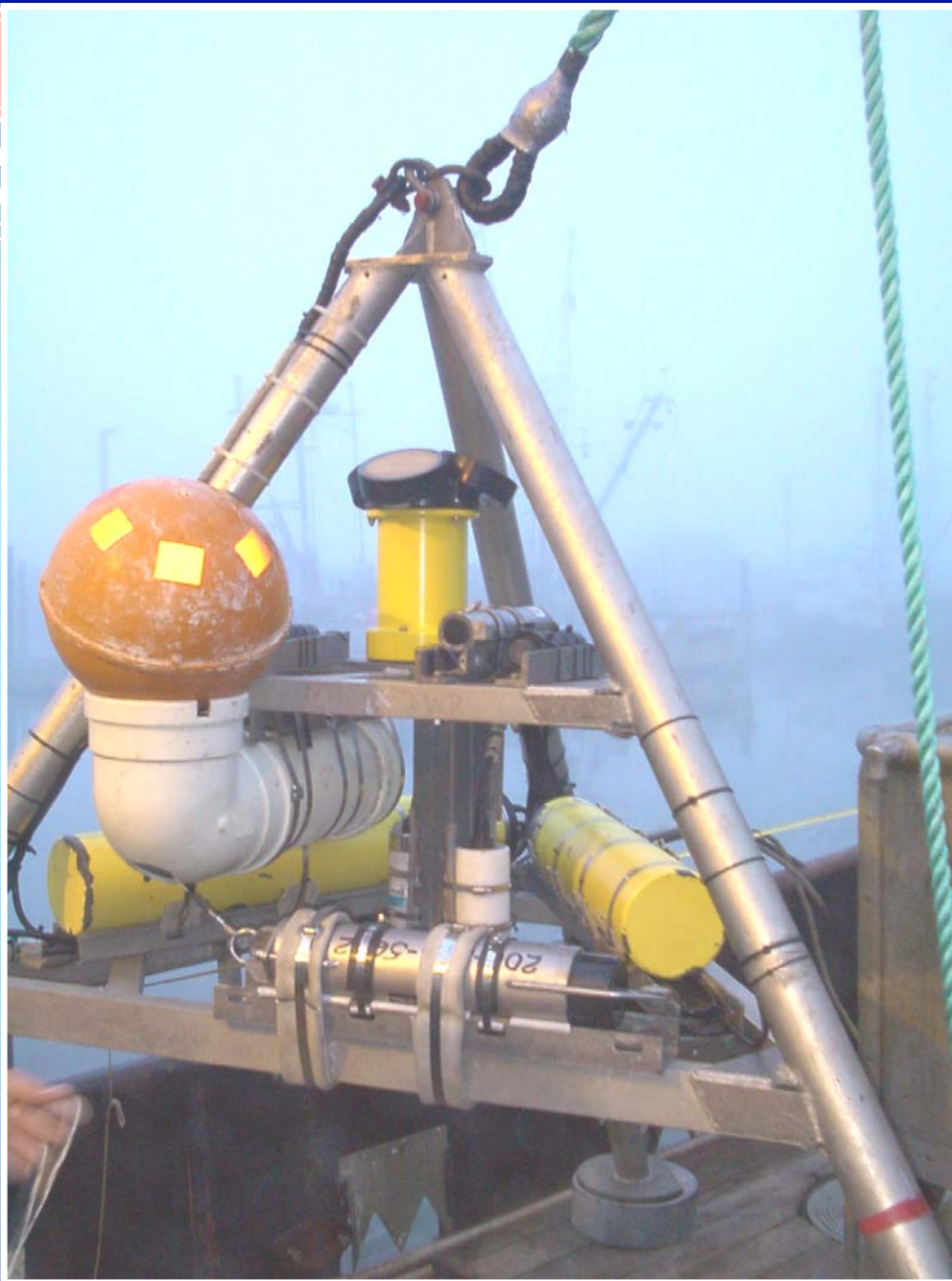
**South Jetty**







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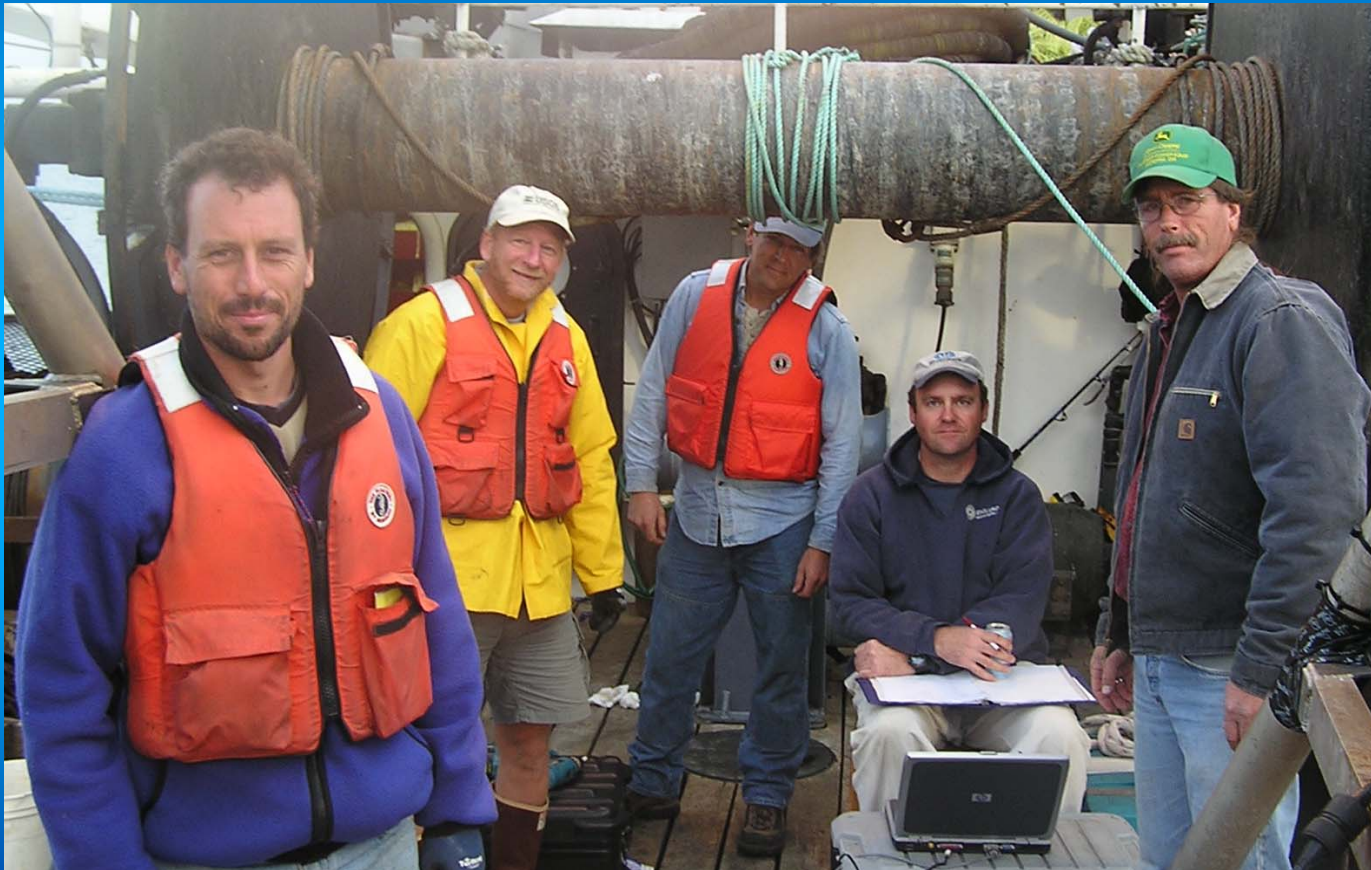
## 8 ft Tripod

Tripod Stations 1,2,4,5 will have surface floats offset from bottom mount via a ground line and anchor. CTD will have surface float. Tripods will have acoustic releases.

Tripod at Sta. 3 (channel) will have no surface expression, and top of tripod will be at or below -60 ft MLLW



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# Littoral Drift Restoration SW WA (Benson Beach)



North Head lighthouse



**ARGUS  
Location**

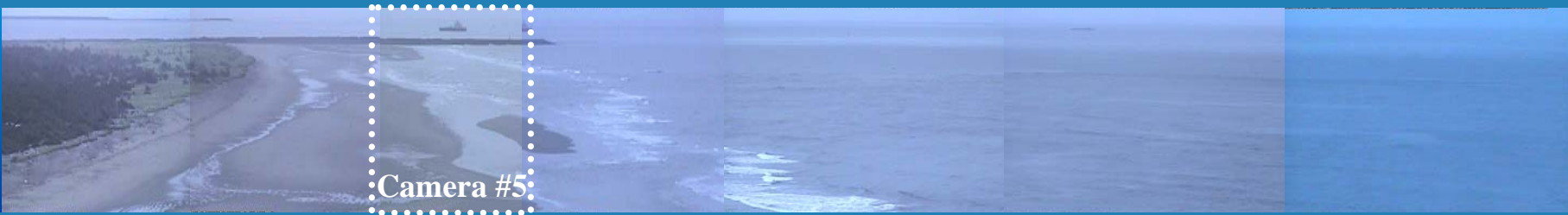
North Head  
Light house



ARGUS field  
of view



Camera #5:



South Jetty

North Jetty, 25 ft high

*Benson Beach*

beach combers

Low Tide

25 ft wave



High Tide

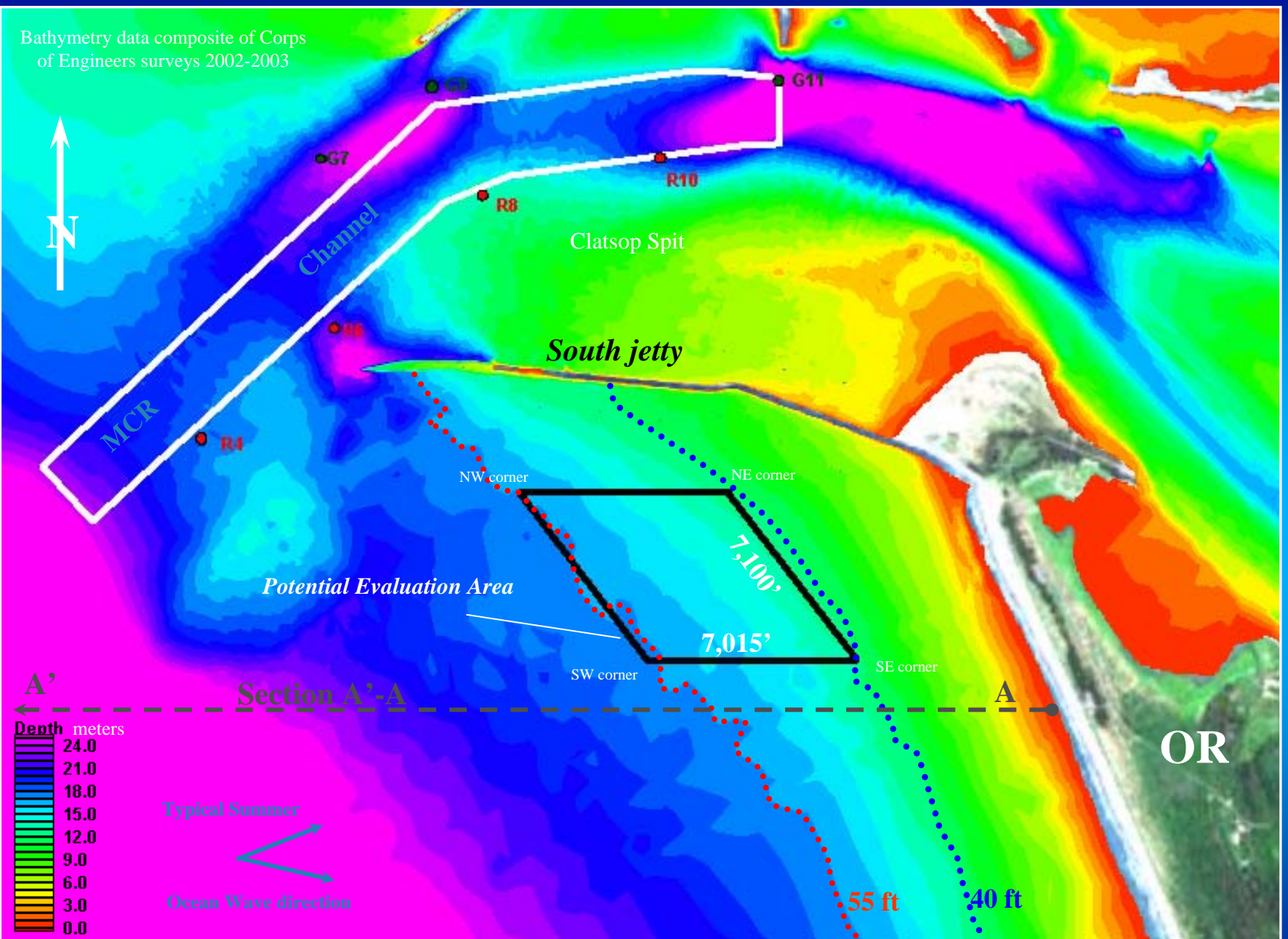


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# Columbia Nearshore Beneficial Use Site – South of the South Jetty - Contributors to Monitoring

- Port of Astoria
- OR DLCD
- OR DSL
- OR DOGAMI
- Columbia River Channel Coalition
- Corps - RSM
- Port of Portland
- Port of Longview
- Port of Vancouver
- Port of Kalama
- Oregon Sea Grant

Bathymetry data composite of Corps of Engineers surveys 2002-2003



# “Nearshore Beneficial Use South Jetty Site”





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# Placement

- **EPA Research Permit Issued September 13, 2005 to Port of Astoria**
- **Dale Blanton, ODLCD, & Doris McKillip boarded the Dredge Essayons Sep. 13**
- **Dredged Material Placed by the Essayons in 6 lines on Sep. 14 and 15**
- **Monitoring by SAIC and Parametrics**
- **Final Report Feb. 24, 2006**

South jetty

# Conduct 6 TEST DUMPS and Measure Bottom Deposition

Overall test site boundary based on area needed to perform six (6) non-overlapping test dumps. Various test dump scenarios are estimated to be 500 feet wide x 6,000 ft long, as shown by screened boxes.

A 500-ft buffer would be needed to prevent encroachment effects from neighboring test dumps.

*Potential Deposition Area for Enhanced Placement – Maximum length of each disposal run is to be 6,000 ft. Actual length of test dump disposal runs may be less than 6,000 ft; depending upon behavior of the material during disposal and natural variation in conditions that can effect the hopper dredge during disposal. The deposition rate of dredged material on the seabed will be reduced during the test dumps, by reducing the rate at which dredged material leaves the hopper dredge and/or by increasing vessel speed during disposal.*

6,000 ft placement run - maximum length

Placement length may vary; less than 6,000 ft

~ 7,000 ft

60 ft

~ 7,000 ft

40 ft

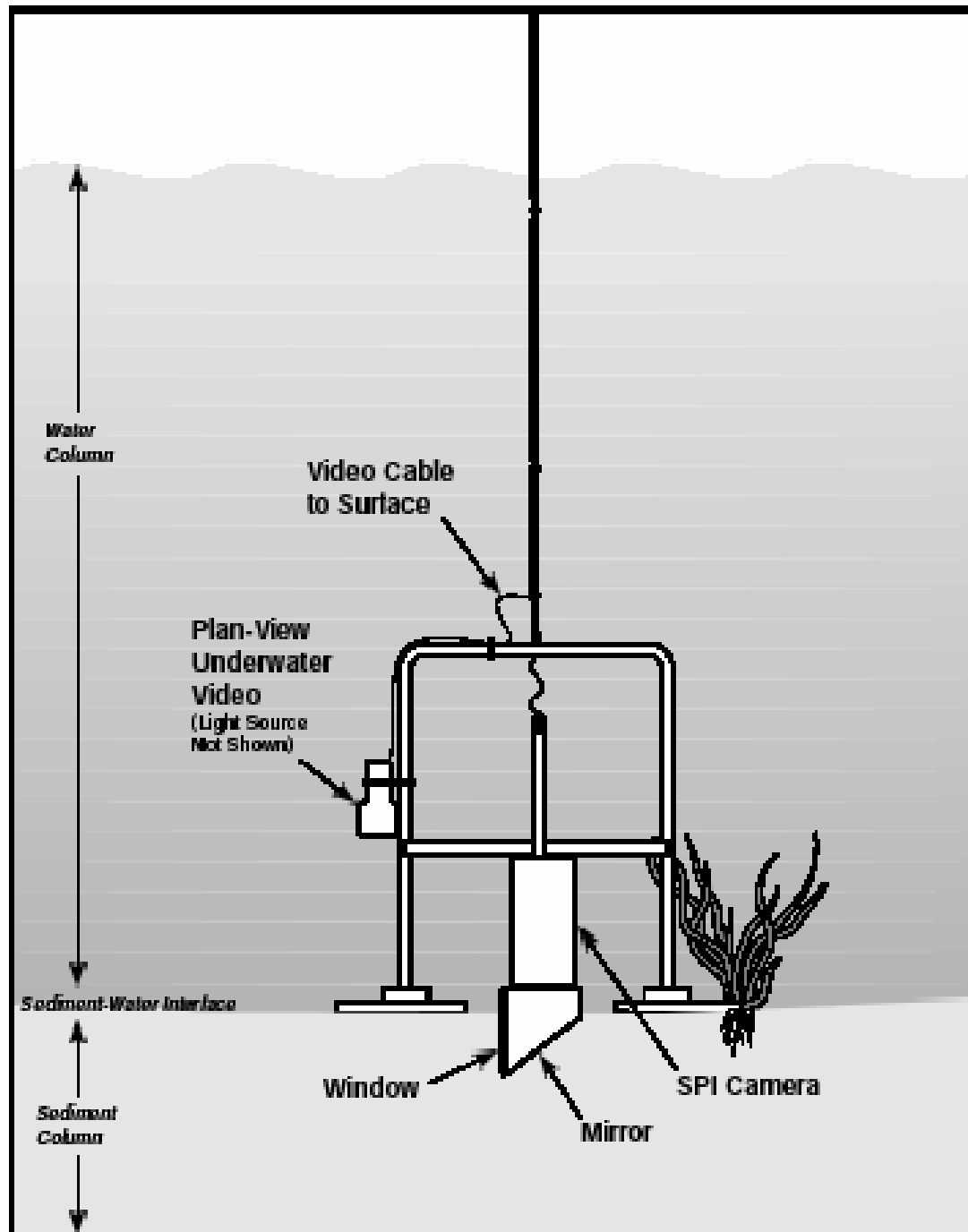


Test dumps would need to be run in East-West direction based on the need for the hopper dredge to maintain heading based on wave approach (hopper dredge typically needs to head into or follow the waves)

Figure 3



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