

ADVANCED MONITORING OF DREDGED MATERIAL PLACEMENT SITES AT THE MOUTH OF THE COLUMBIA RIVER

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Norfolk, VA
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NOTE:
TAINTER GATE

MOUTH OF THE COLUMBIA RIVER— GATEWAY TO THE COLUMBIA-SNAKE RIVER SYSTEM

Columbia River at the Mouth, WA & OR

- Entrance channel 55/48 feet deep, 2640 feet wide, and 6 miles long
- Average annual dredging 3.5 MCY, June-Sept work window
- Support Columbia-Snake River Navigation System
 - 49 million tons of cargo annually, worth \$24B
 - Largest wheat and barley export gateway in the Nation
 - Second largest soy export gateway in the World
 - Over \$930M in commercial investments-to-date because of the deepening
 - Supports 40,000 local jobs
- Wicked problems. Large group of stakeholders, with varying concerns (deposition depth/benthic impacts)
- Focus on the beneficial use of dredged material and Engineering with Nature to prevent 'wasting' clean sediment resources.
- Innovative monitoring program to build stakeholder trust, leverage opportunities, and collect baseline data for the addition of nearshore sites.
- Disposal Mission, responsible use of the placement sites to maximize capacity



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Mouth of the Columbia River Stakeholders

- 1) National Oceanic and Atmospheric Administration (NOAA)
- 2) Environmental Protection Agency (EPA)
- 3) Oregon Governor's Office
- 4) Washington Governor's Office
- 5) WA Department of Ecology (WDOE)
- 6) Columbia River Crab Fishers Association (CRCFA)
- 7) Washington Department of Natural Resources (WDNR)
- 8) Oregon Dept. of Land Conservation and Development (ODLCD)
- 9) Oregon Sea Grant
- 10) Portland State University
- 11) Oregon State University
- 12) Oregon Health Sciences University
- 13) National Policy Consensus Center
- 14) Oregon Department of Environmental Quality (ODEQ)
- 15) Port of Astoria
- 16) Port of Ilwaco
- 17) Port of Chinook
- 18) Pacific County, WA
- 19) Clatsop County, OR
- 20) Oregon Department of State Lands (ODSL)
- 21) US Fish and Wildlife Service (USFWS)
- 22) Oregon Department of Fish and Wildlife (ODFW)
- 23) Washington Department of Fish & Wildlife (WDFW)
- 24) Lower Columbia Solutions Group (LCSG)
- 25) Institute for Natural Resources
- 26) Center for Public Service

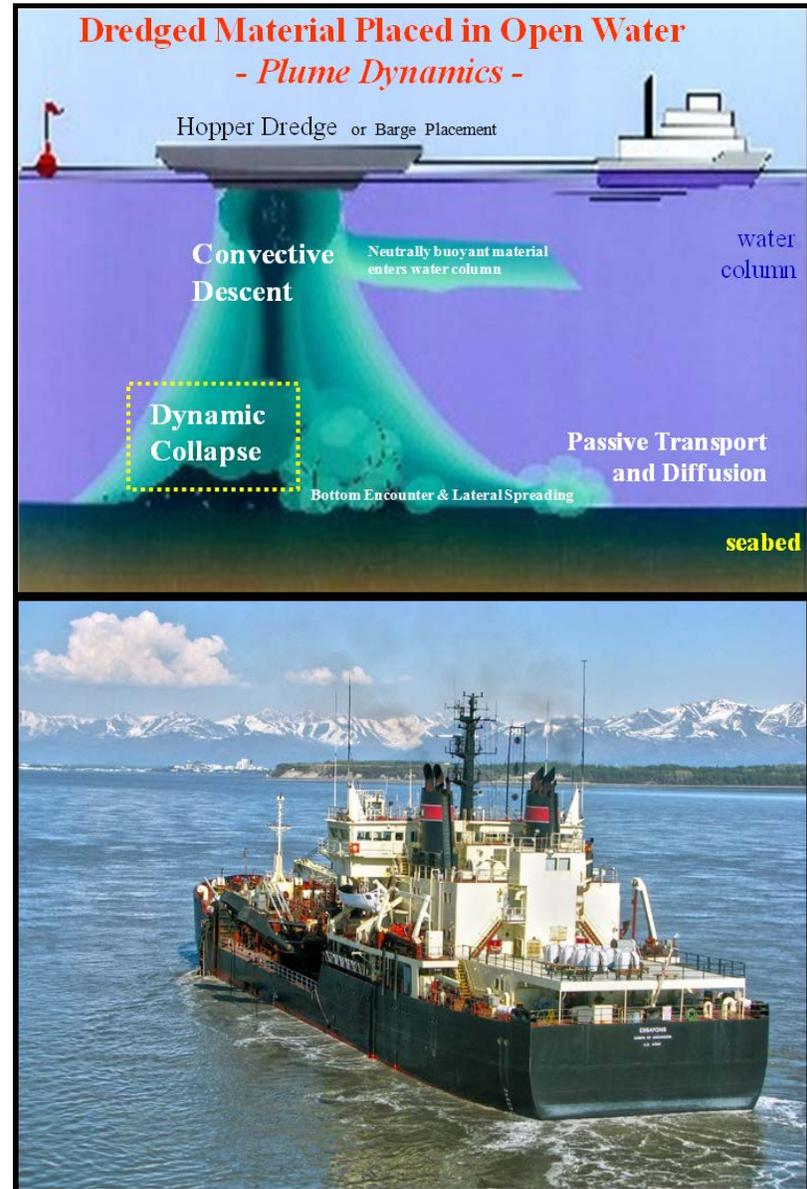


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STAKEHOLDER CONCERNS

- Impacts to Commercially Sensitive Species
 - Dungeness Crab
- Permitting
- Wave Amplification
 - Mounding
 - Safety concerns for fishing fleet
- Historic USACE Relationships
 - Distrust
 - Previous Projects
 - Views of the Federal Government
 - Litigation
- Sediment Quality
 - Place like on like material
- Public Perception
 - Proximity of placement area to the beach
 - Ft. Stevens State Park



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ADDRESSING STAKEHOLDER CONCERNS – SHOW ME!

Methods used to meet concerns

- Thin-layer placement with the Dredge ESSAYONS
- Benthic Video Sled
 - Presence/Absence of species
- Deposition Monitoring Instruments (CamPods)
 - Deposition
 - Acute crab response
- Acoustic Doppler Current Profiler (ADCP)
 - Dredge plume velocity, turbidity, etc
 - Deposition
- Multi-beam surveys
 - Deposition
- Acoustic crab tags
 - Crab mortality
 - Crab motility
 - Cumulative impacts
- Environmental Buoy
 - Real-time conditions to inform monitoring team
 - Provide the public with a tool to monitor the conditions in the site
- Video Annotation and Reference System (VARS)
 - Software to track species ID and abundance
 - Classification and Counting species



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NEARSHORE PLACEMENT PROCESS

2004 – Oregon Nearshore Beneficial Use Project initiated to collaboratively address the depletion of sand in the nearshore environment south of the MCR South Jetty

2005 – First Science-Policy Workshop was held. Additional workshops held in 2007, 2009, 2010, and 2018

2006 – Pilot Placement Project at SJS by the ESSAYONS

2008 – Sediment Tracer Study

2010 – Initiate Environmental Clearances

2011 – RSMP Completed

2012 – Initial Placement at the SJS

2014 – Operational Placement in the SJS

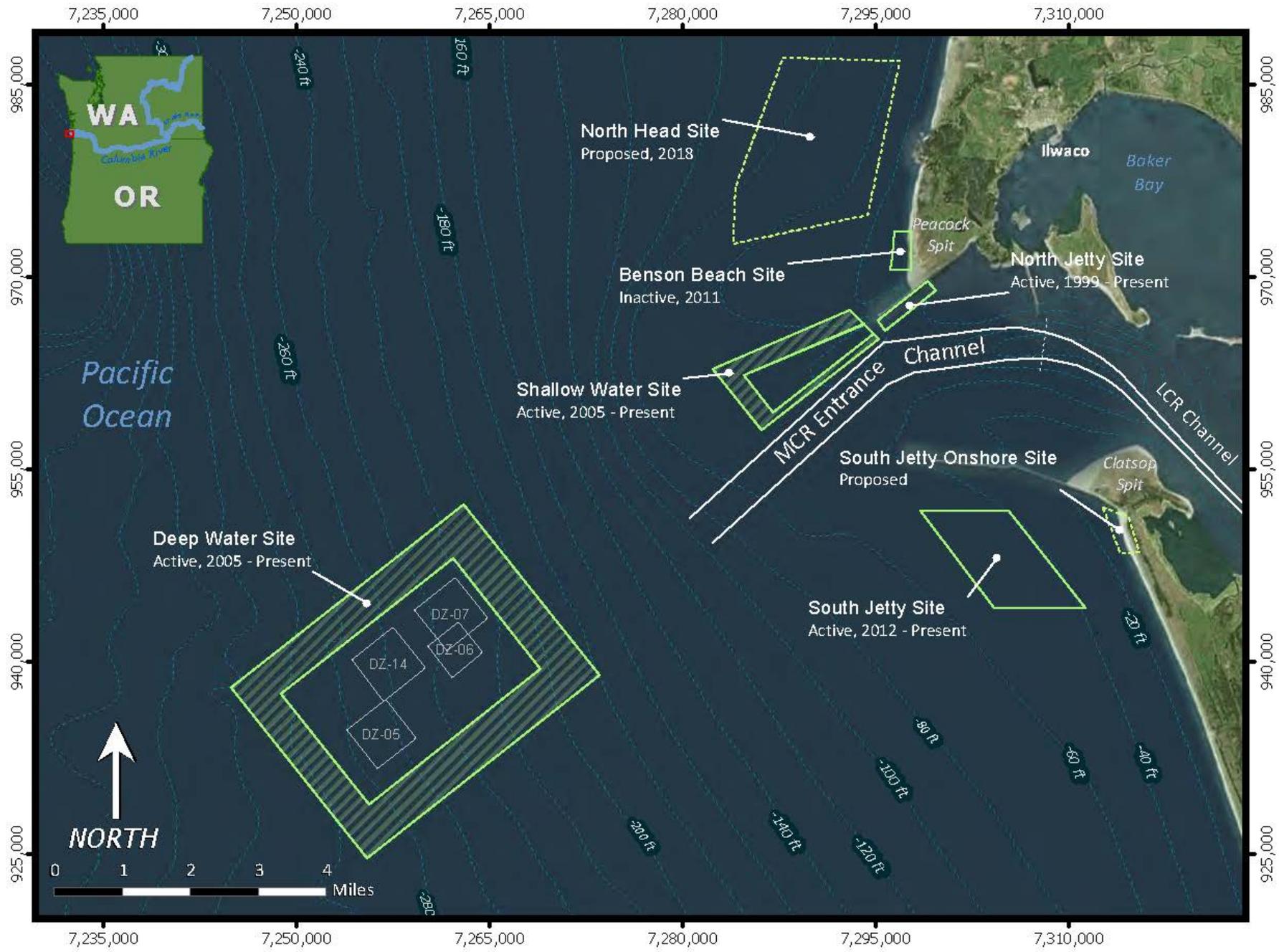
2017 – Benthic Sampling

2018 – Pilot Placement at North Head Site (planned)



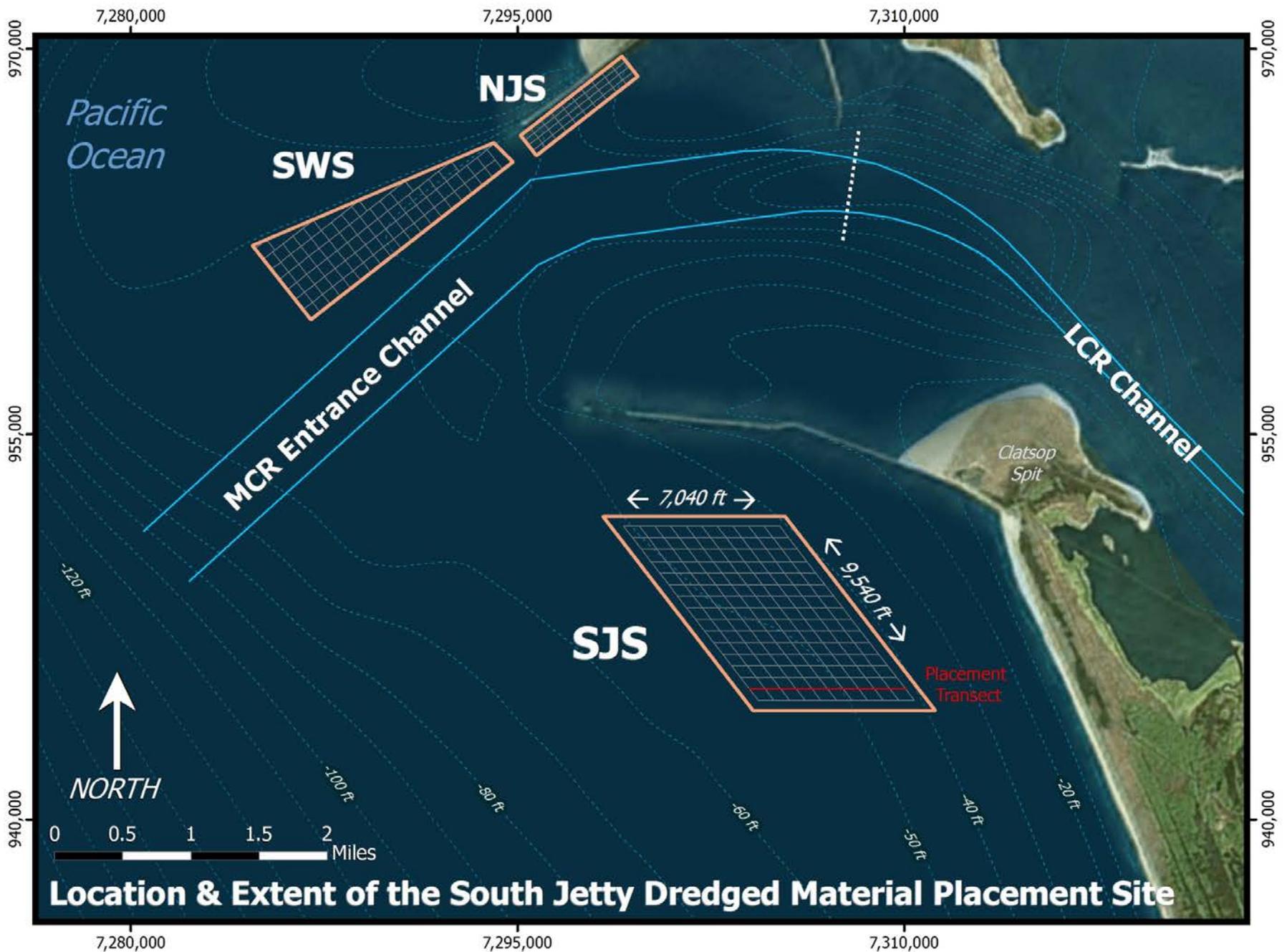
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Location & Extent of the South Jetty Dredged Material Placement Site



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Benthic Video Sled/VARS Software

- Replaces trawls
 - Less invasive than traditional methods, no take
- MBARI/ERDC developing Video Annotation and Reference System (VARS) Software



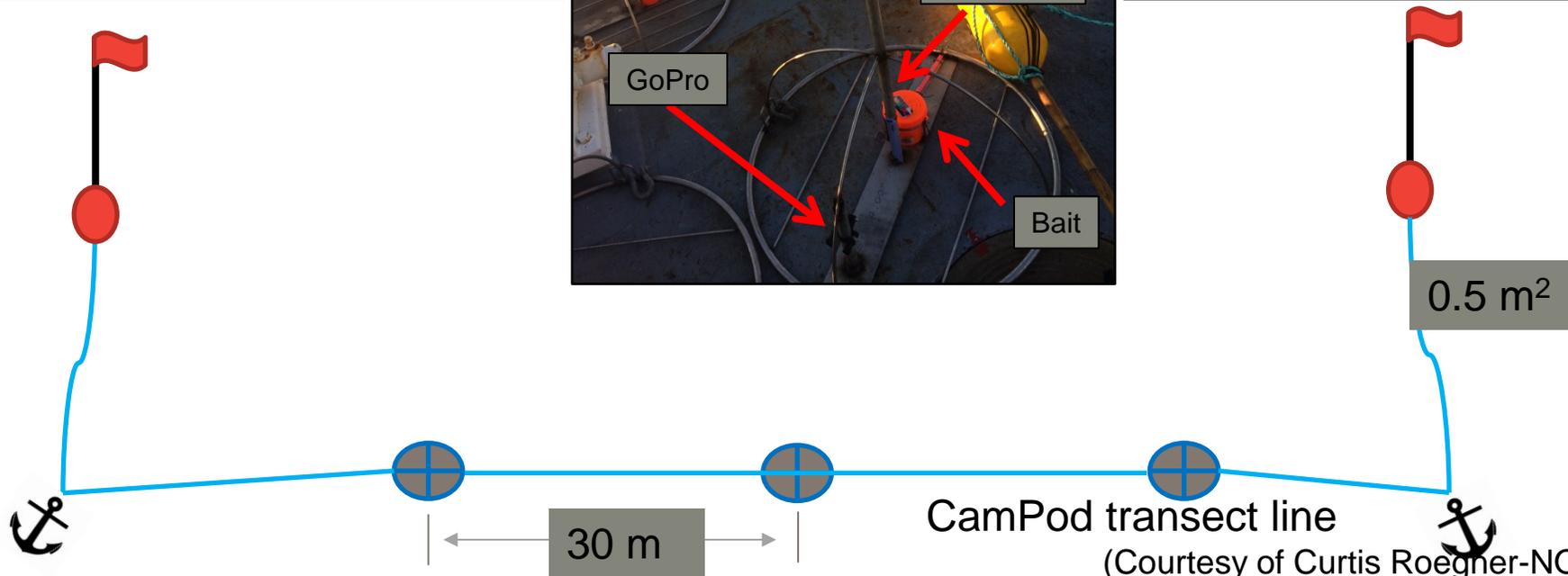
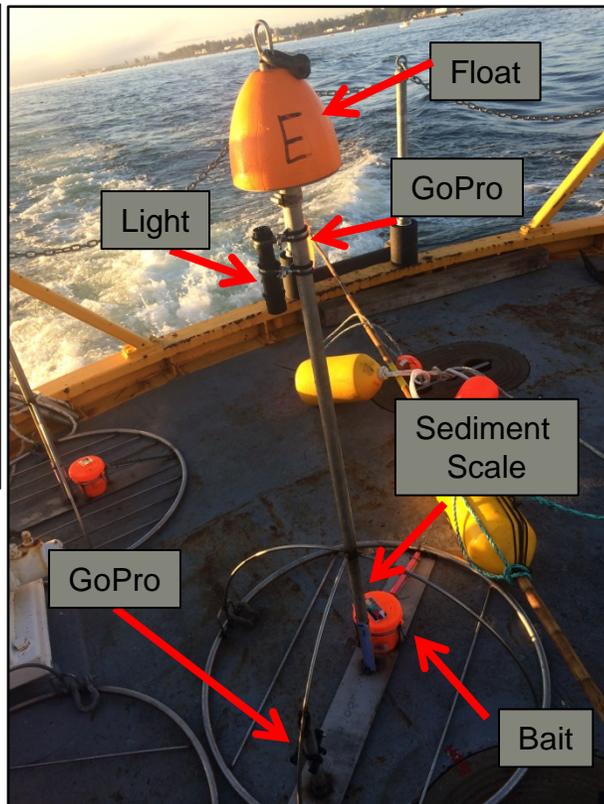
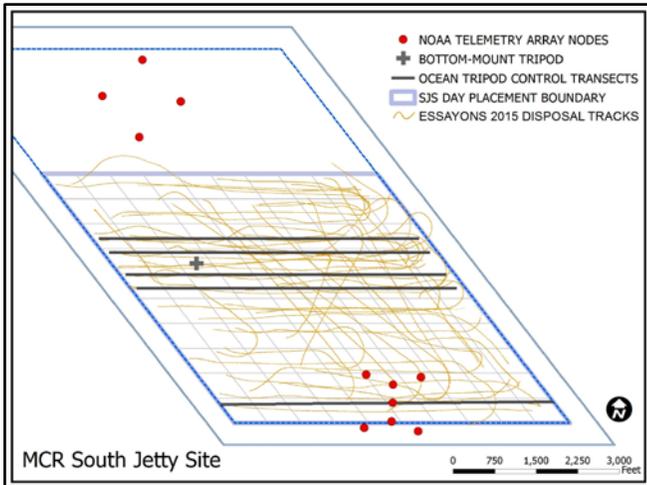
(Photo courtesy of NOAA)



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DEPOSITION MONITORING INSTRUMENTS (CAMPODS)



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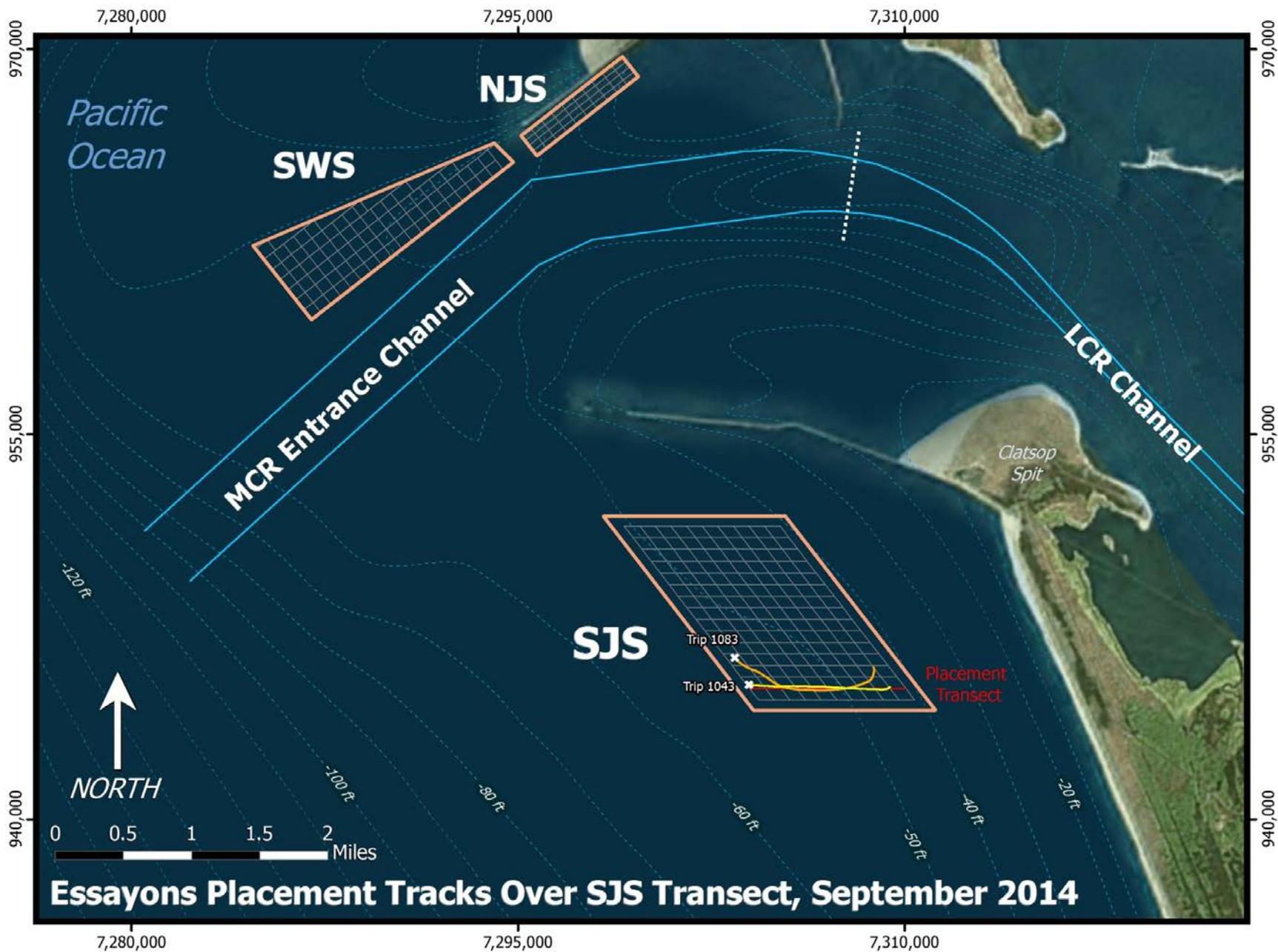


↑
Prototype deployable deposition meter, via Curtis Roegner-NOAA. These are designed to go “over the side” and be retrieved like crab traps.

↗
A Gopro camera, attached to the deposition meter mount, can record the deposition event.

COURTESY OF CURTIS ROEGNER-NOAA



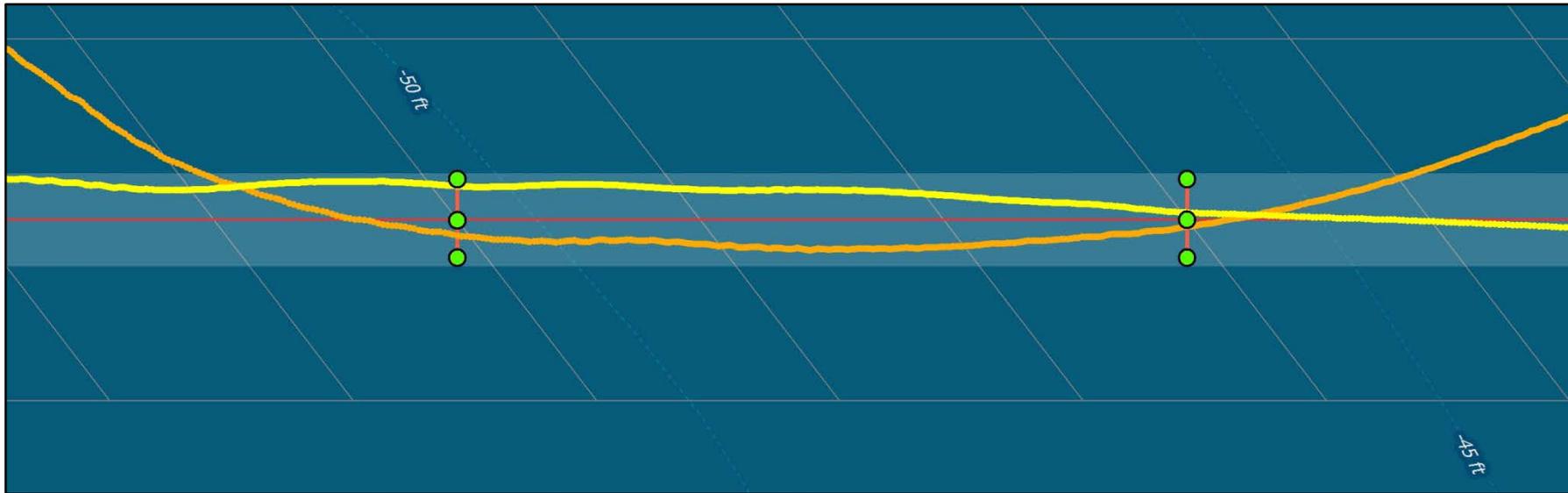


Essayons Placement Tracks Over SJS Transect, September 2014



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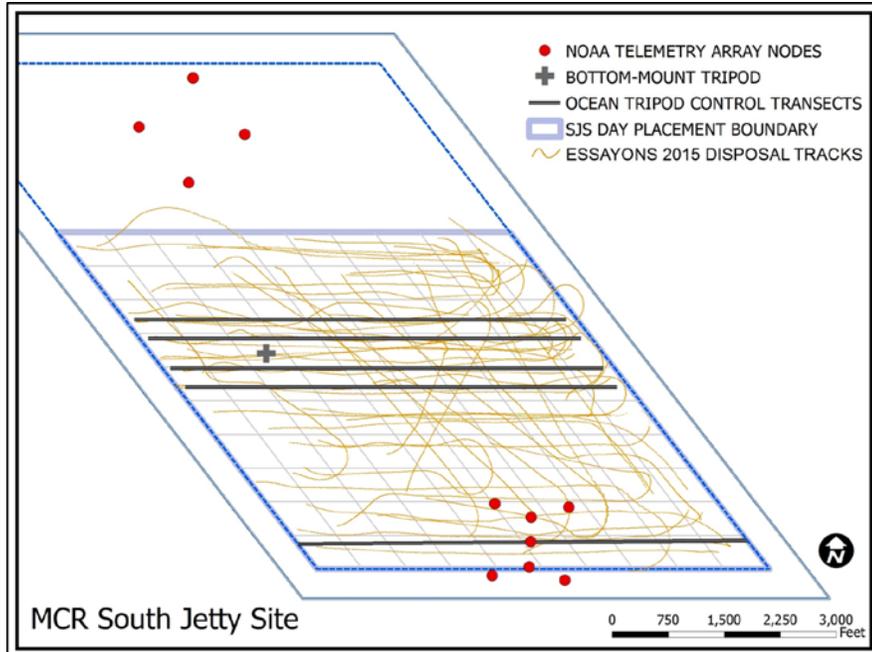


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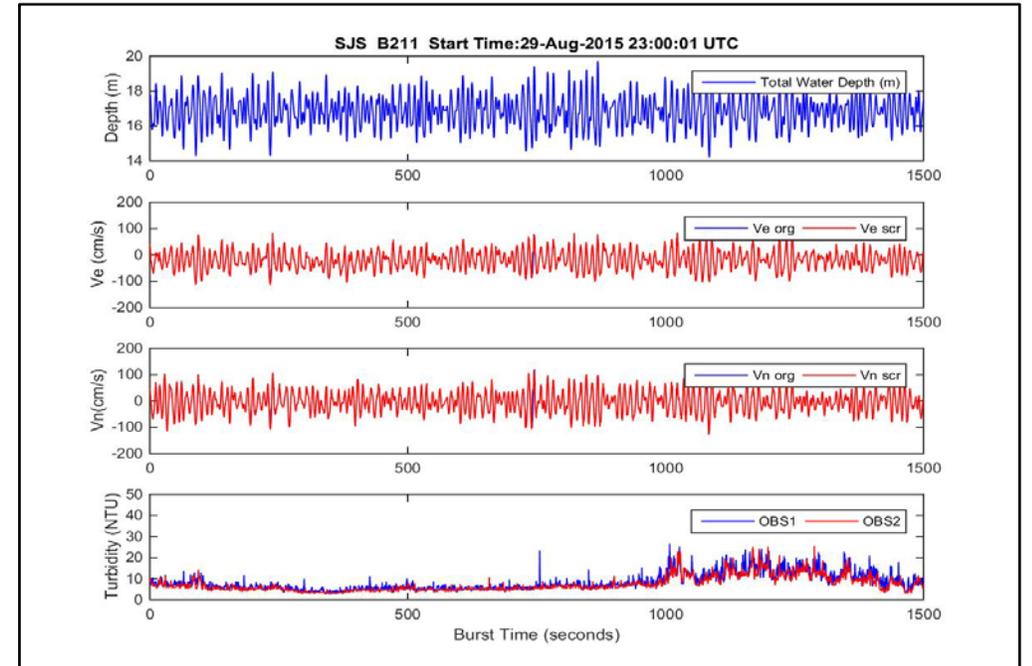


ADCP Data Collection

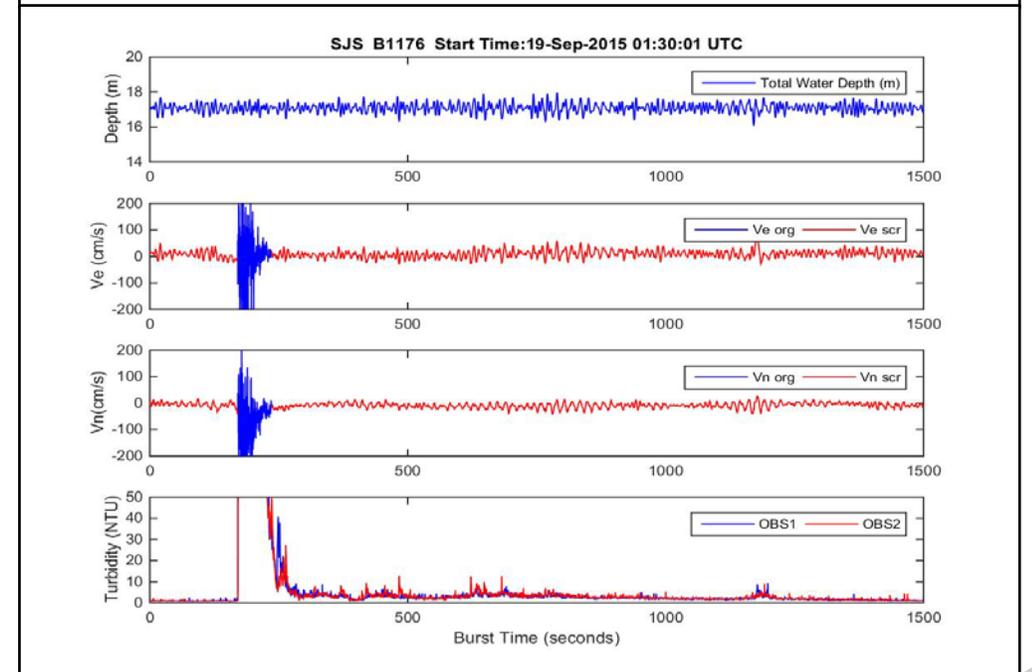
- Measured currents through the water column
- Directional waves
- Suspended sediments
- Bottom current regime



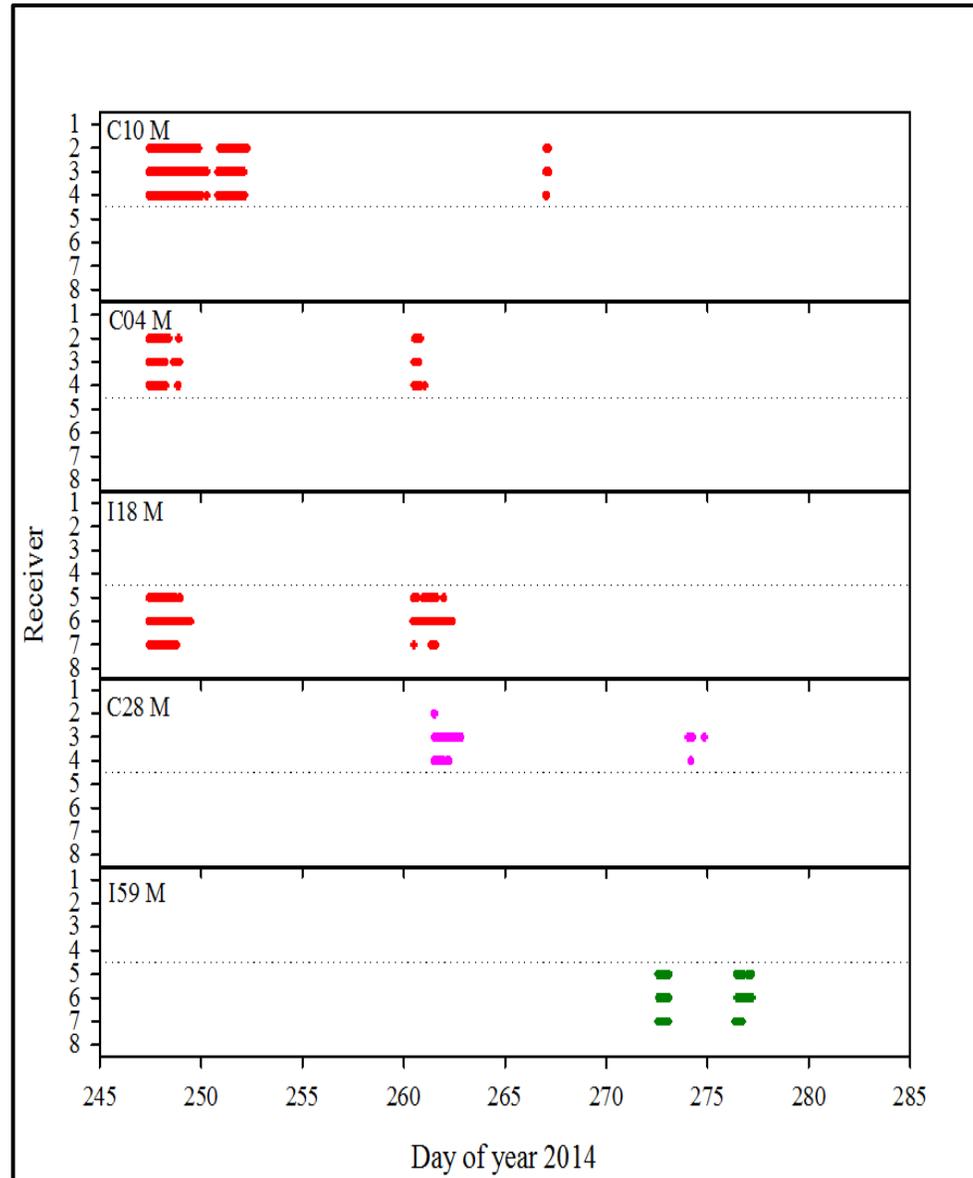
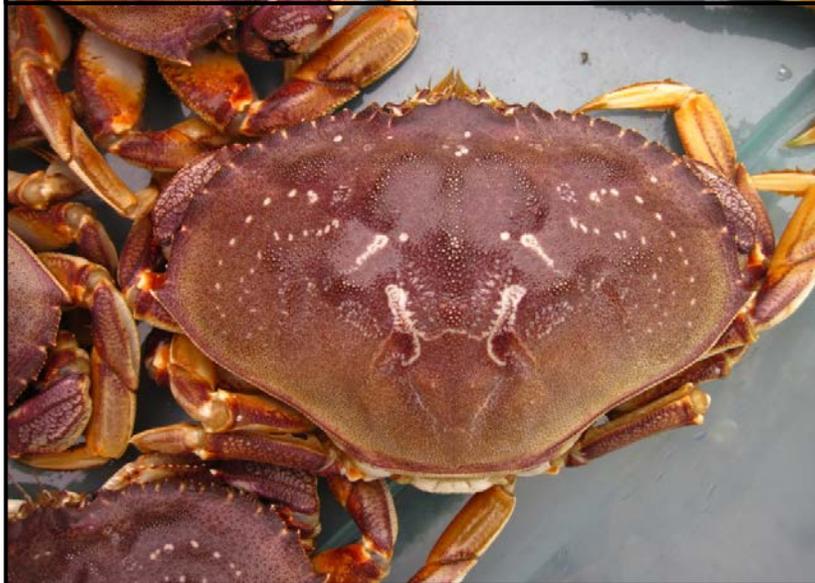
Big Waves



Placement Event



ACOUSTIC CRAB TAGS



(data courtesy of NOAA)



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CONCLUSIONS/LIMITATIONS

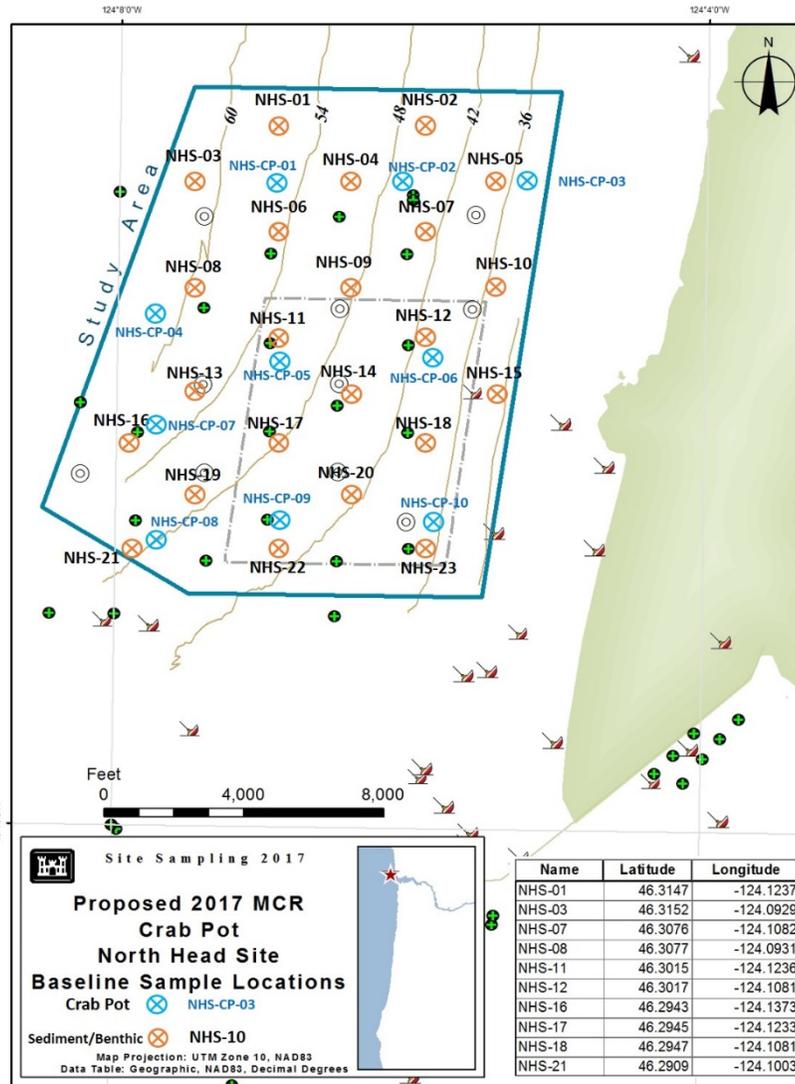
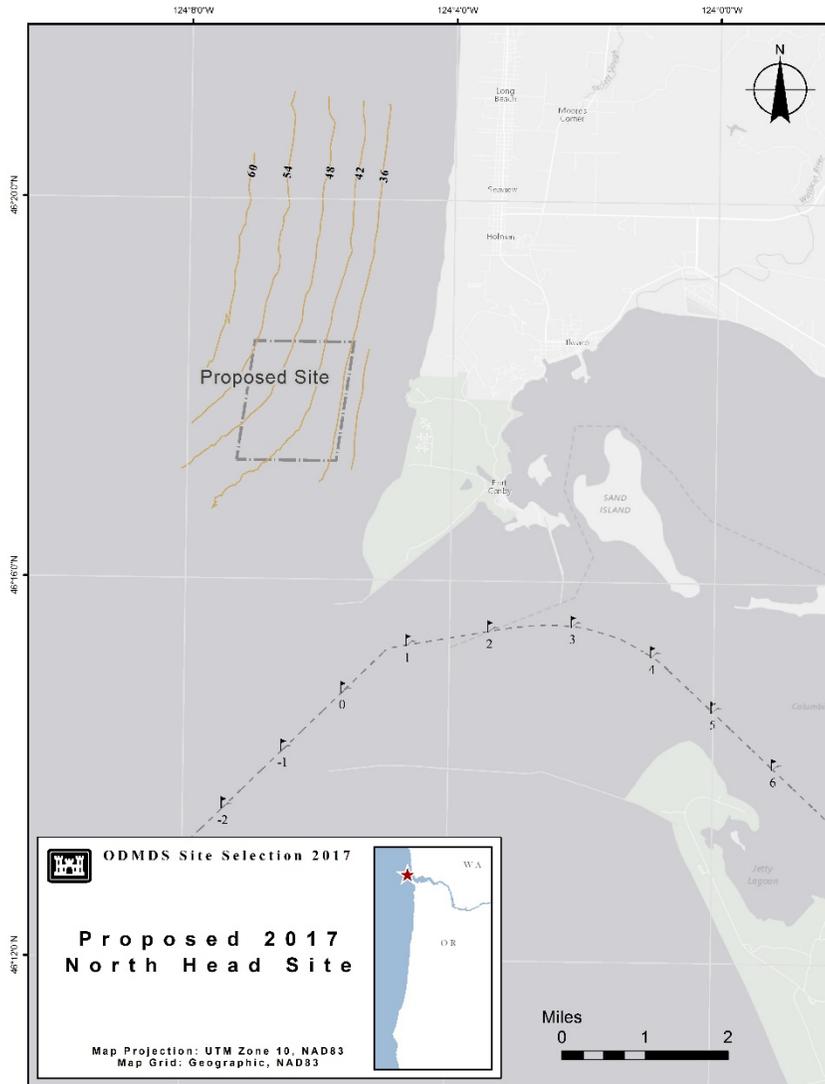
- Critical need for on-going stakeholder engagement
- Confidence in benthic response to dredged material placement
- Passive acoustic detections
 - Green Sturgeon (20+ detections)
 - Great White Sharks (4 detections, 3 individuals)
- On-going operational placement of 500kcy annually
- Continue developing innovative monitoring techniques
- Quantifying the migration of material from the nearshore site to the beach
 - Re-evaluating the depth of closure, partial benefits
- Use information from monitoring to expand network of nearshore sites, reduce costs of future monitoring



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WHAT'S NEXT



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