



Willapa Bay Dredging and Flow Lane Disposal

October 27, 2011

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Rebecca Chafee, Port of Willapa Harbor***



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Outline

- Willapa Bay, Tokeland Marina Dredging
- Tokeland Marina Dredged Material Flow Lane Disposal
- Willapa Bay Other Dredging Projects and Flow Lane Disposal Sites





QUILLAYUTE
RIVER

GRAYS HARBOR

WILLAPA BAY

COLUMBIA RIVER



HARBOR
ERING

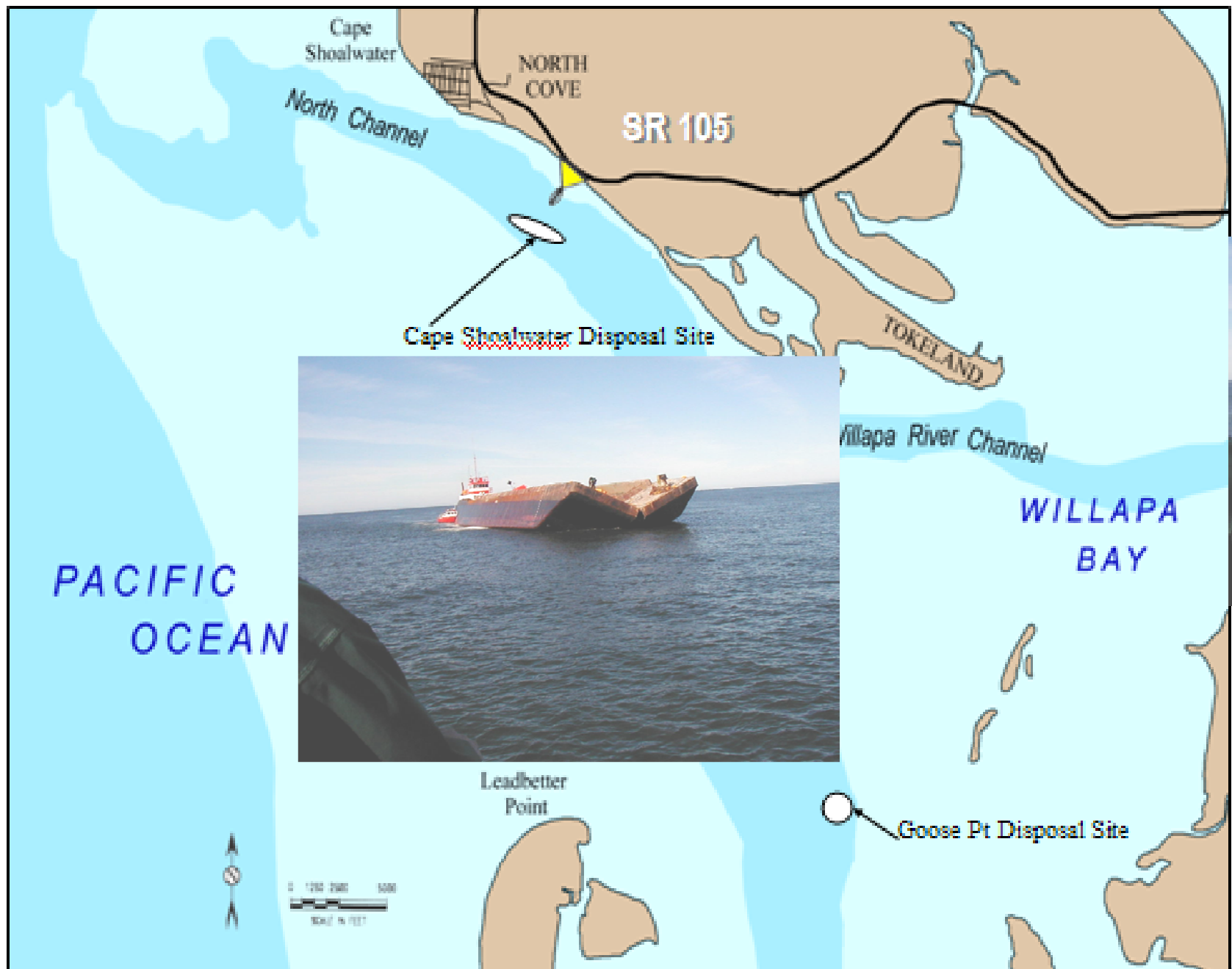


Federal Navigation Channel

Tokeland Marina



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Small Hydraulic Dredge & Flow Lane Disposal Site

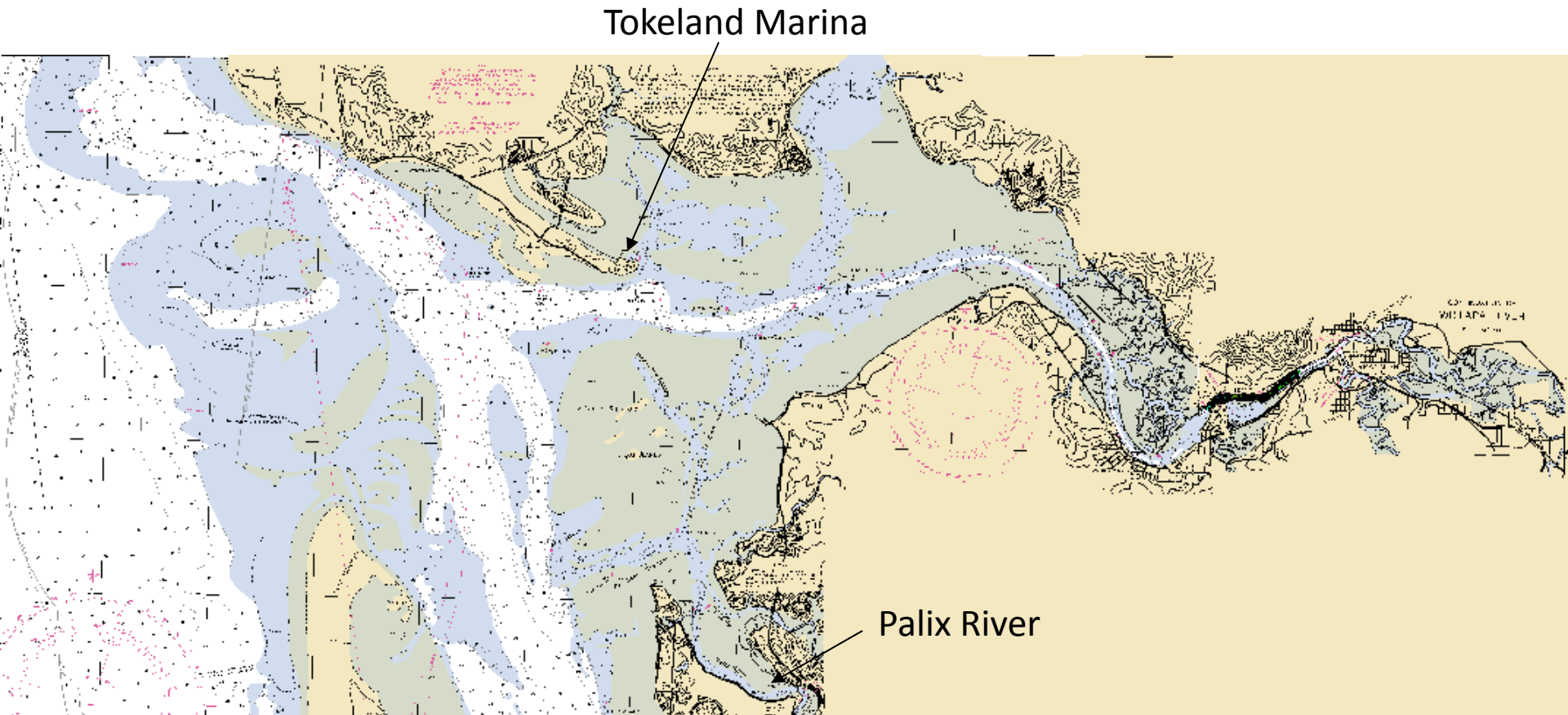


Flow Lane Disposal Site

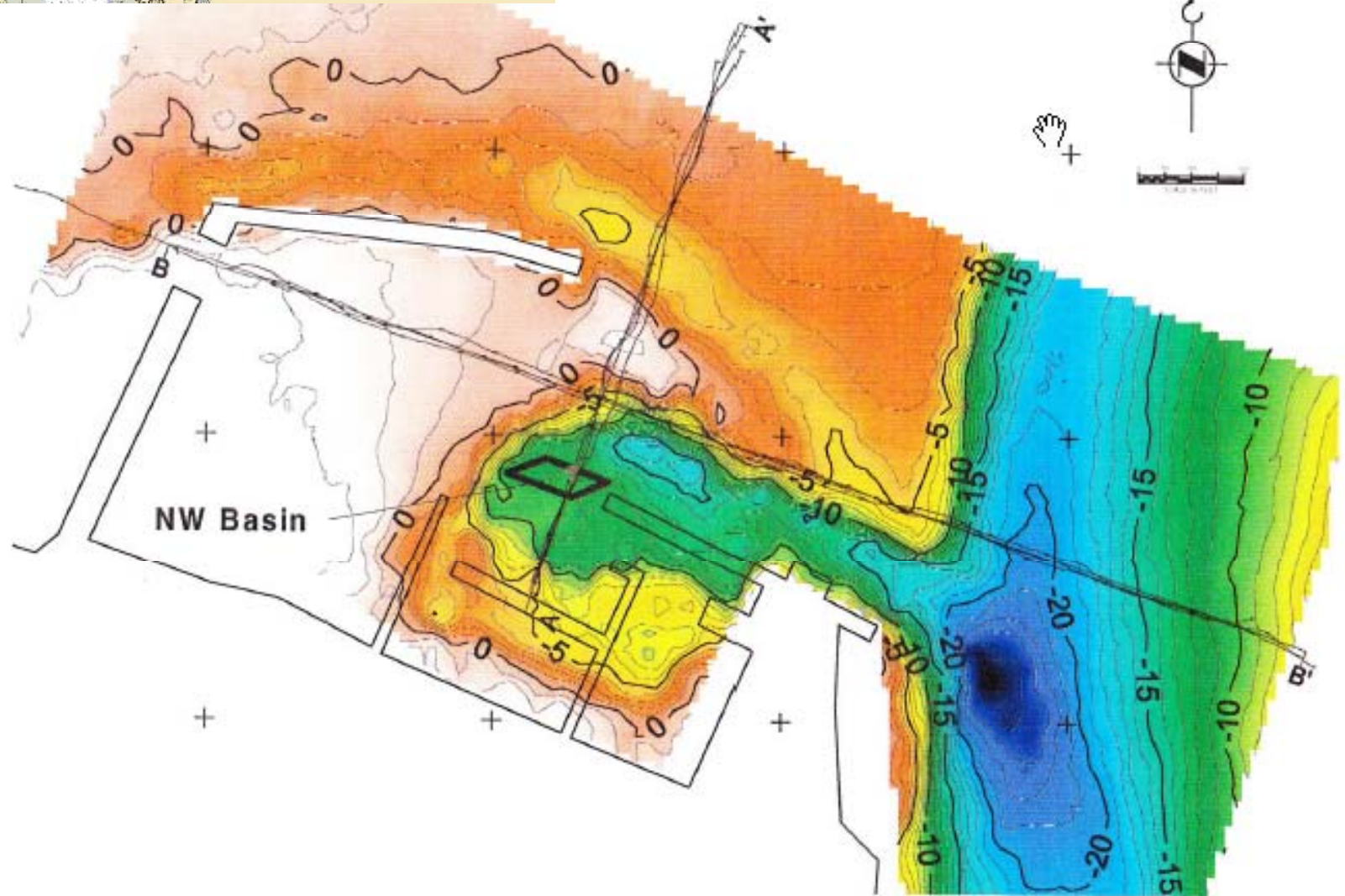
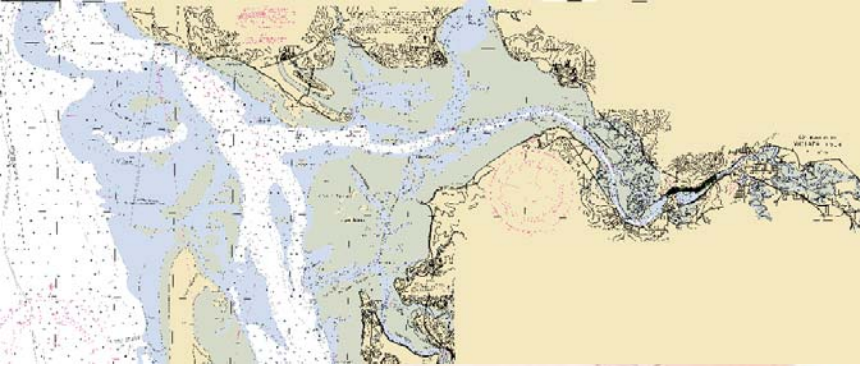
- Typically is located along (or in close proximity) to dredging site
- Keeps sediment in littoral system
- Does not change bottom morphology
- Complies with water quality standards and other environmental clearances
- Does not increase sedimentation at downstream navigation projects and environmentally sensitive areas



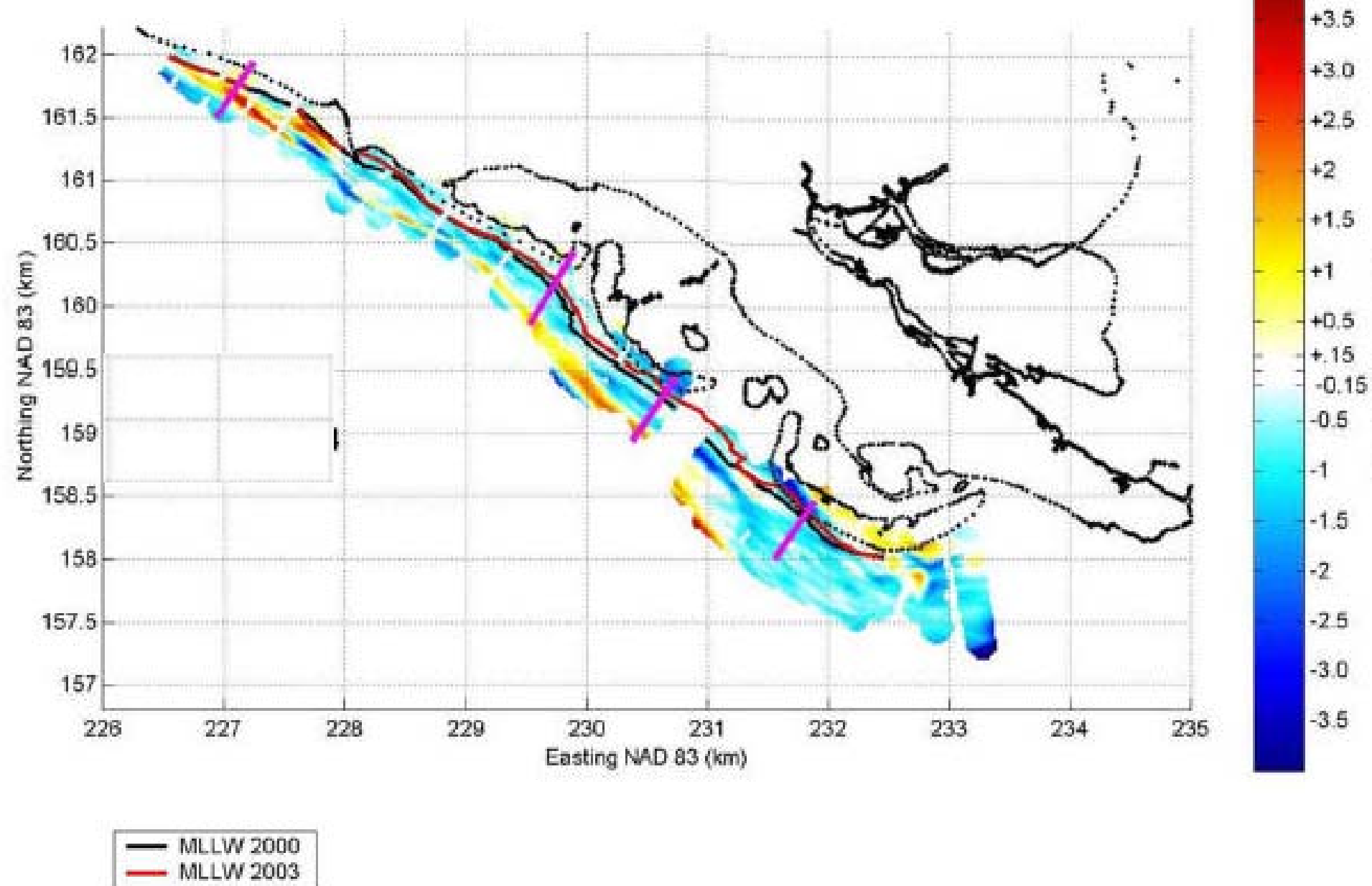
Location Map



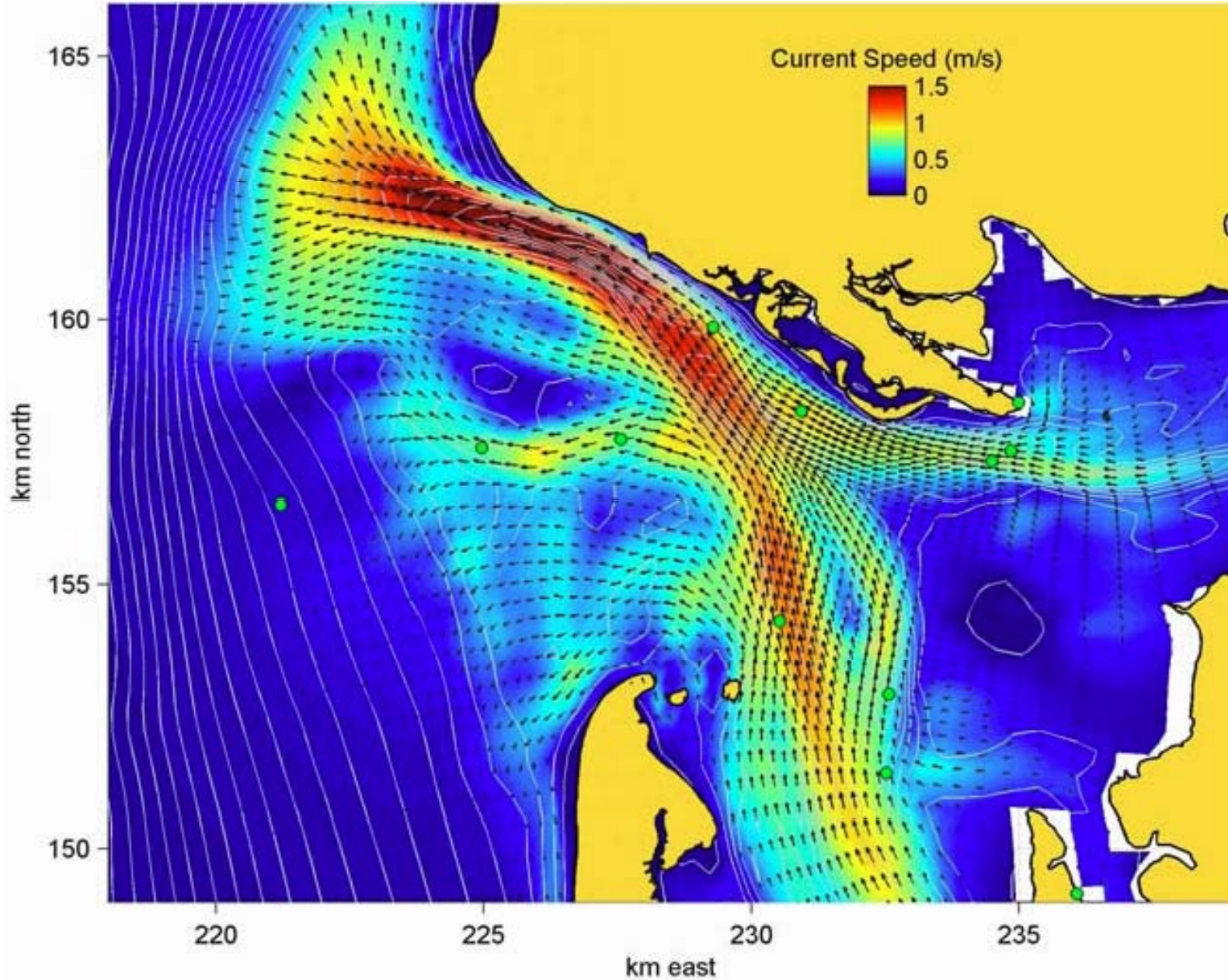
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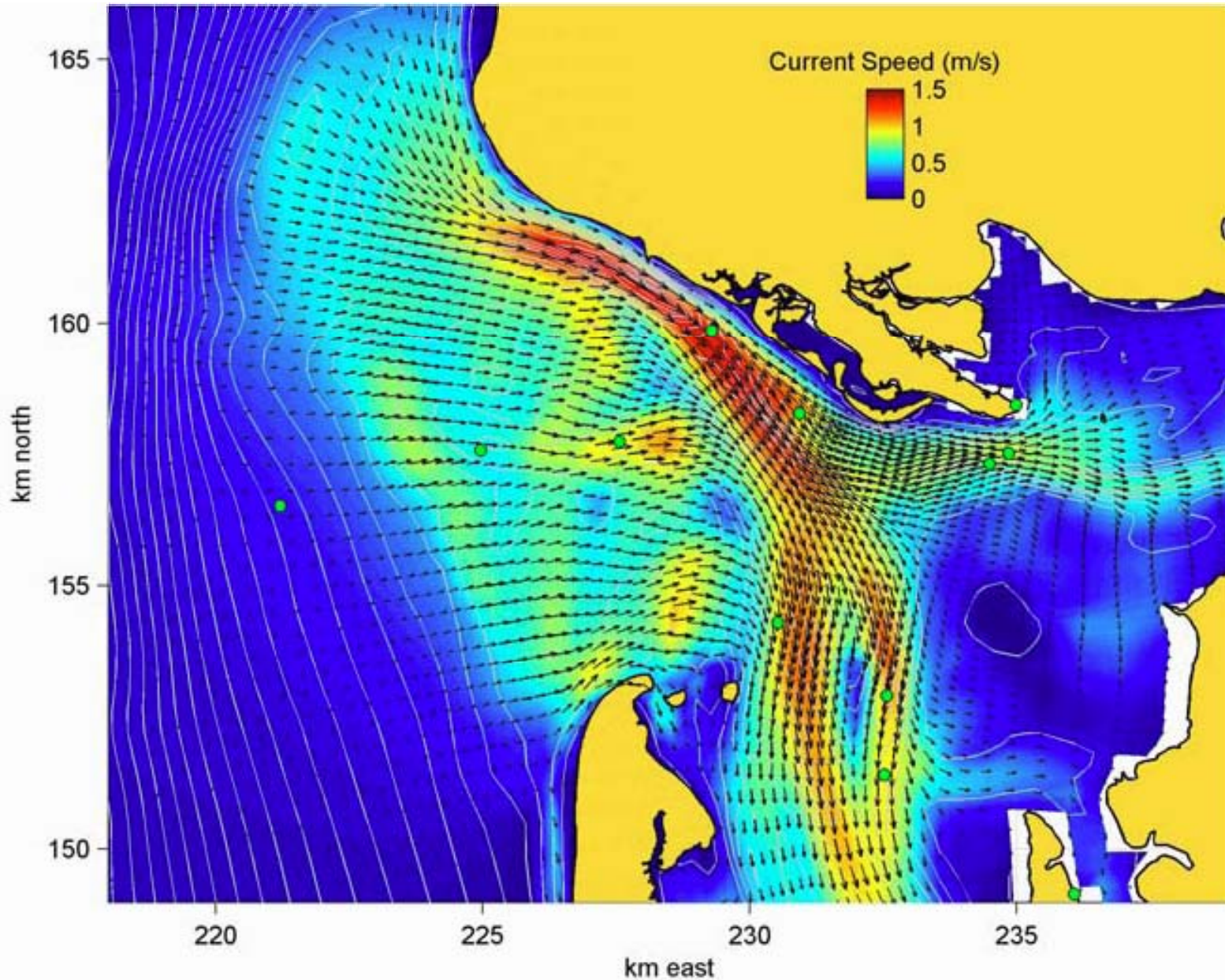
Bathymetric Survey Differences, 8/14/2000 minus 8/4/2003



Flow Circulation Numerical Modeling , Ebb



Flow Circulation Numerical Modeling , Flood

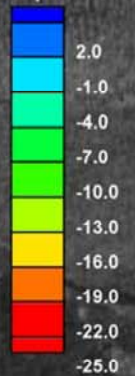


Local Conditions

- Tidal flow at Toke Pt is relatively strong and has resulted in deepening of the bottom slope of tidal channel in front of the Tokeland Marina. It appears that scour hole is a result of localized long-term morphologic trend
- During ebb flow, sediment is transported along the tidal channel toward the North Cove. During flood flow, sediment is transported to the east of Tokeland Point, diverging further to the southeast
- It was proposed to place dredged sediment from Tokeland Marina to the deep hole at the bottom in front of the marina. This sediment was expected to be dispersed by tidal flow and no cumulative bottom depth changes would occur.

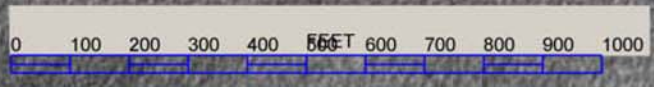


Depth in Feet

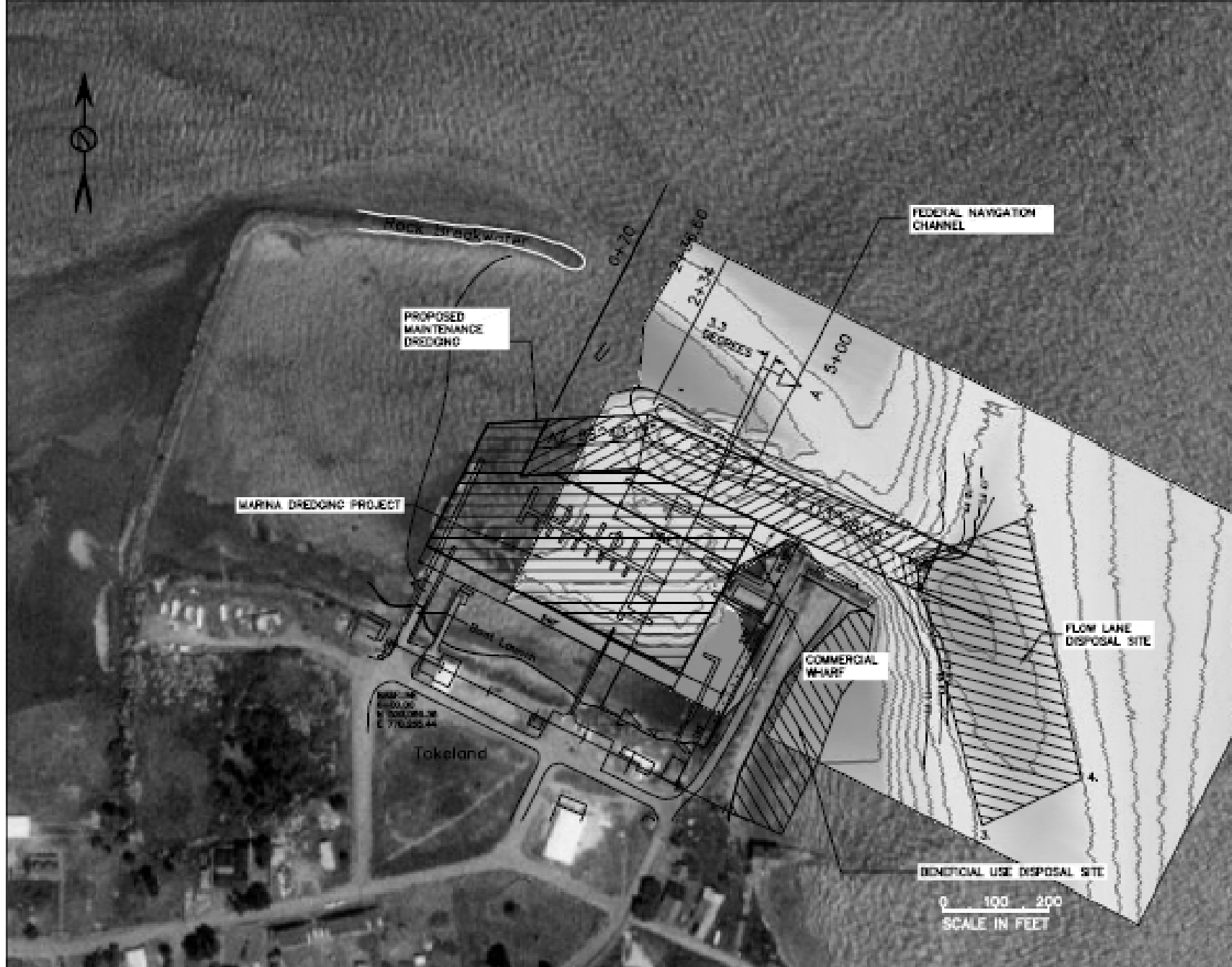


Designated Flow Lane Disposal Site

Dredging area



(1 inch = 365.796 ft)



SITE PLAN

FLOW LANE DISPOSAL SITE
(LAT LONG)



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October 9, 2009

March 5, 2010

771400 X

771600 X

70+00

Diffuser

Diffuser



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Flow Lane Disposal Site

- Typically is located along (or in close proximity) to the dredging site
- Keeps sediment in littoral system
- Does not change bottom morphology
- Complies with water quality standards and other environmental clearances
- Does not increase sedimentation at downstream navigation projects and environmentally sensitive areas



Toke Pt. Marina Flow Lane Disposal Performance

- Sediment has been kept in littoral system
- Disposal of sediment at flow lane disposal did not change bottom morphology
- Disposal operations complied with water quality standards
- No siltation at adjacent oyster fields has occurred



Marina Modification Plans



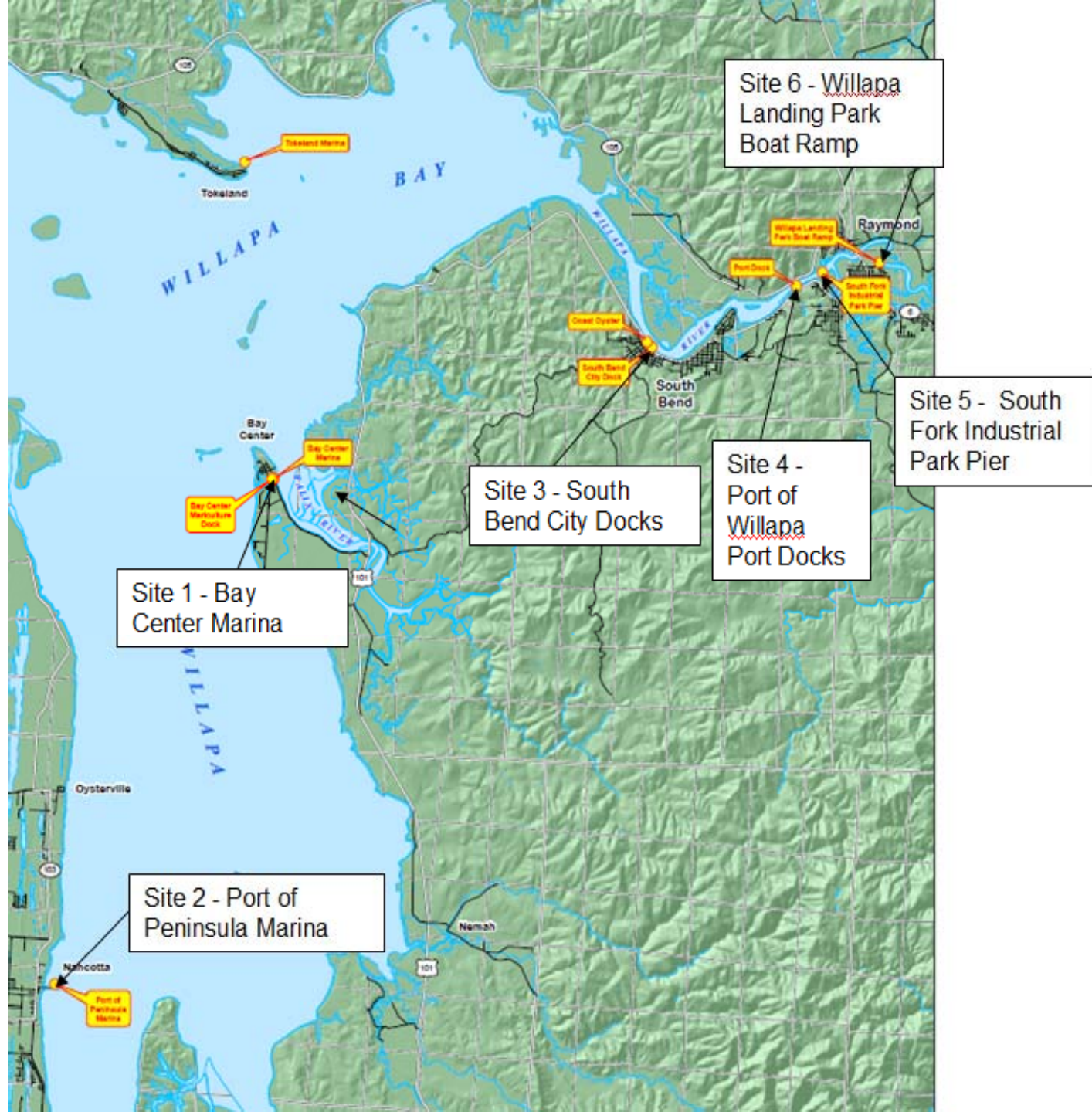
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Willapa Bay Flow Lane Disposal Site

Physical Conditions Success Criteria

- Sufficient depth, preferably there is a depression at the bottom slope, which would indicate erosion or a scour hole.
- Long-term tidal-river current velocities.
- Location within 1 mile from the dredging site.
- Fine (silt-fine sand) sediment to be dredged.
- Relatively small volume and/or low frequency of dredging.





Willapa Bay Dredging Sites

- Site 1 – Bay Center Marina
- Site 2 – Port of Peninsula Marina
- Site 3 – South Bend City Docks
- Site 4 – Port of Willapa Port Docks
- Site 5 – South Fork Industrial Park Pier
- Site 6 – Willapa Landing Park Boat Ramp

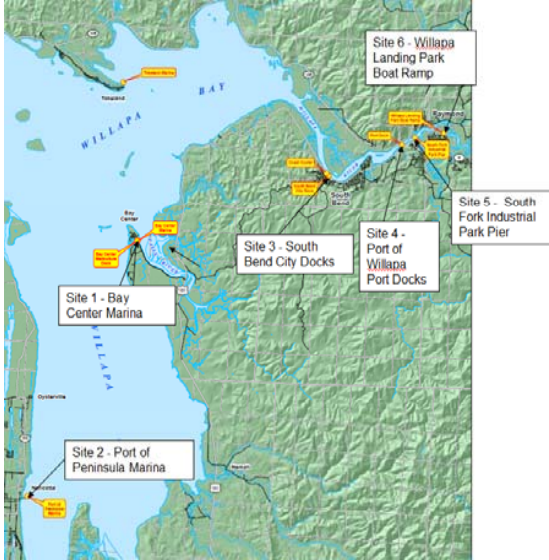


Required Navigable Depth, Frequency, and Volume of Dredging

Public Facilities	Location	Required Depth, ft MLLW	Frequency and Volumes of Dredging CY/per cycle
Port of Peninsula Marina and Channel	Nahcotta, Long Beach Peninsula	10	25,000-30,000 Per 5 years
Bay Center Marina and Channel	Palix River, Bay Center	10	10,000 cy Per 3 years
		4.0	3,500 Per 1 year
Site 3. South Bend City Docks	Willapa River, South Bend	10	7,000 Per 10 years
Site 4. Port Dock	Willapa River, Raymond	20	22,500 Per 20 years
Site 5. South Fork Industrial Park Pier	Willapa River, Raymond	20	1,900 Per 10 years
Site 6. Willapa Landing Park Boat Ramp	Willapa River, Raymond	6	1,500 Per 10 years



Port of Peninsula

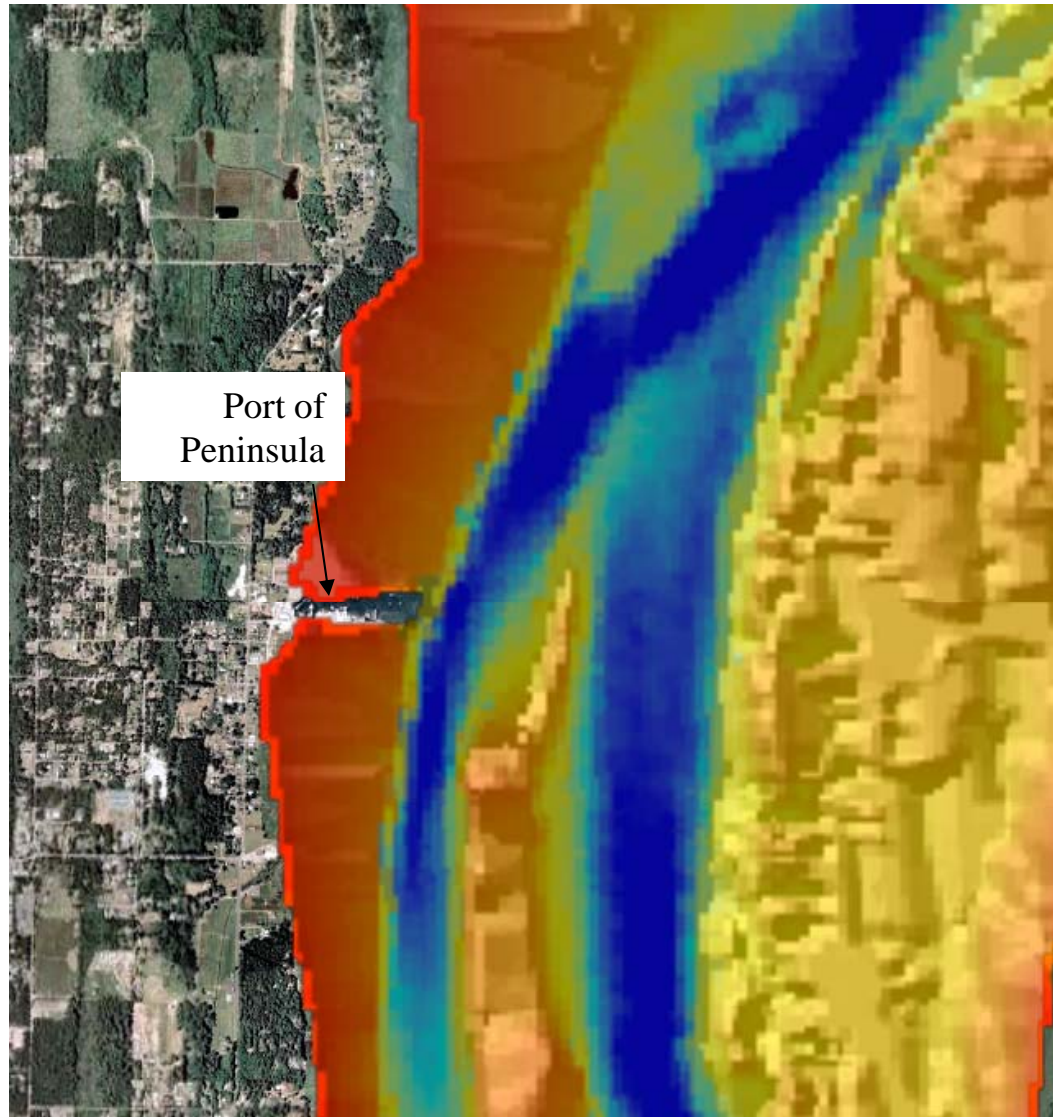


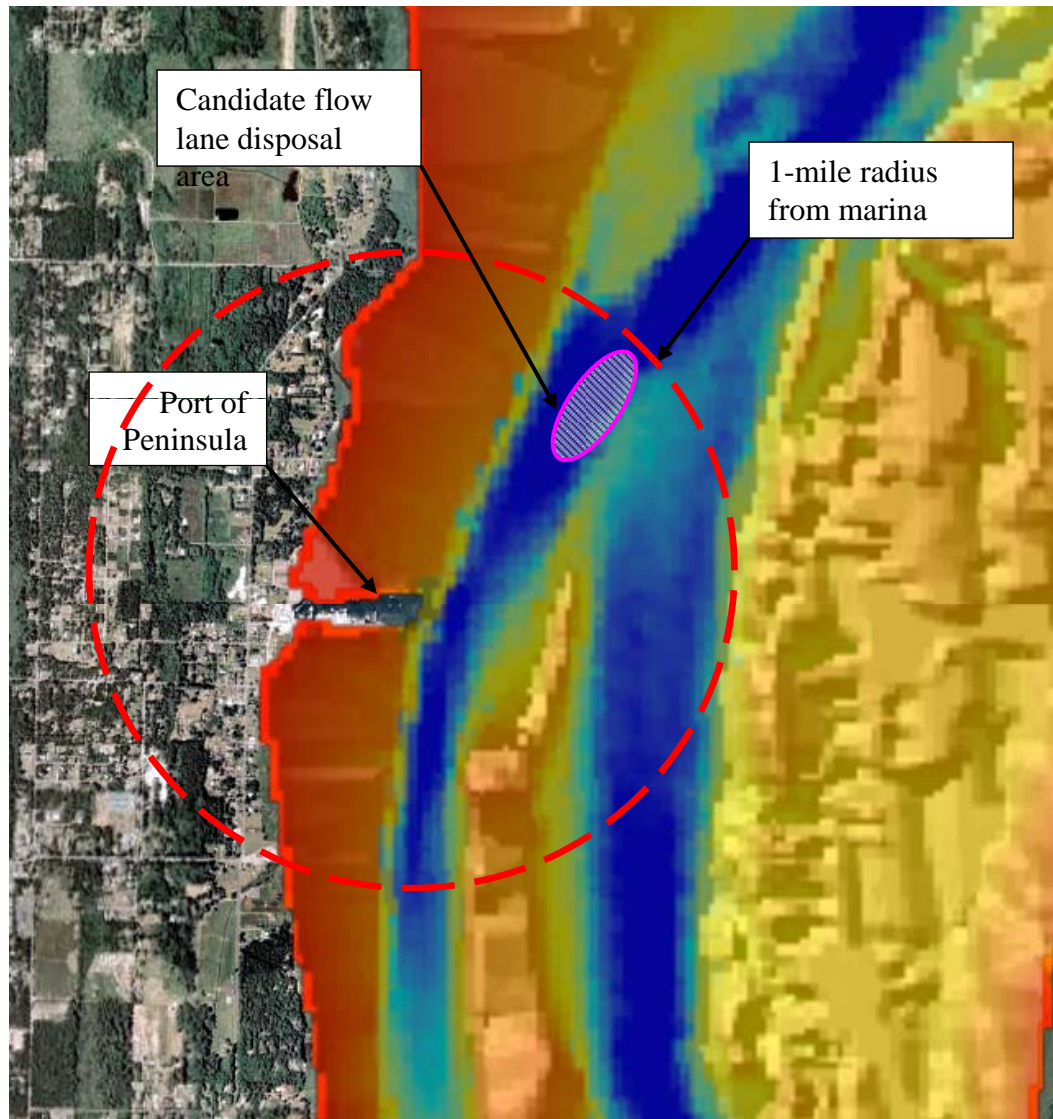
**Frequency and
Volumes of Dredging
CY/per cycle**

**25,000-30,000
Per 5 years**

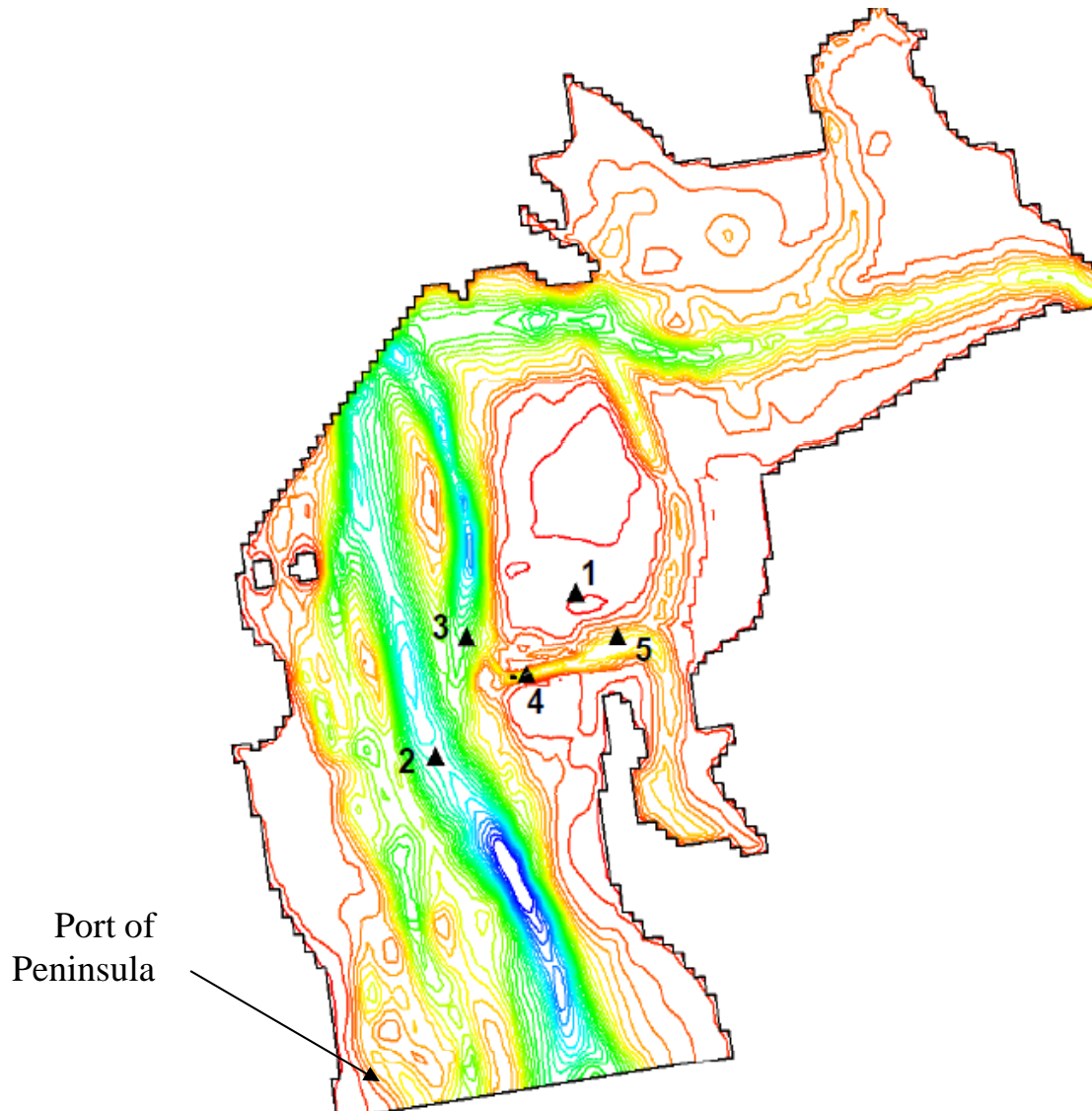


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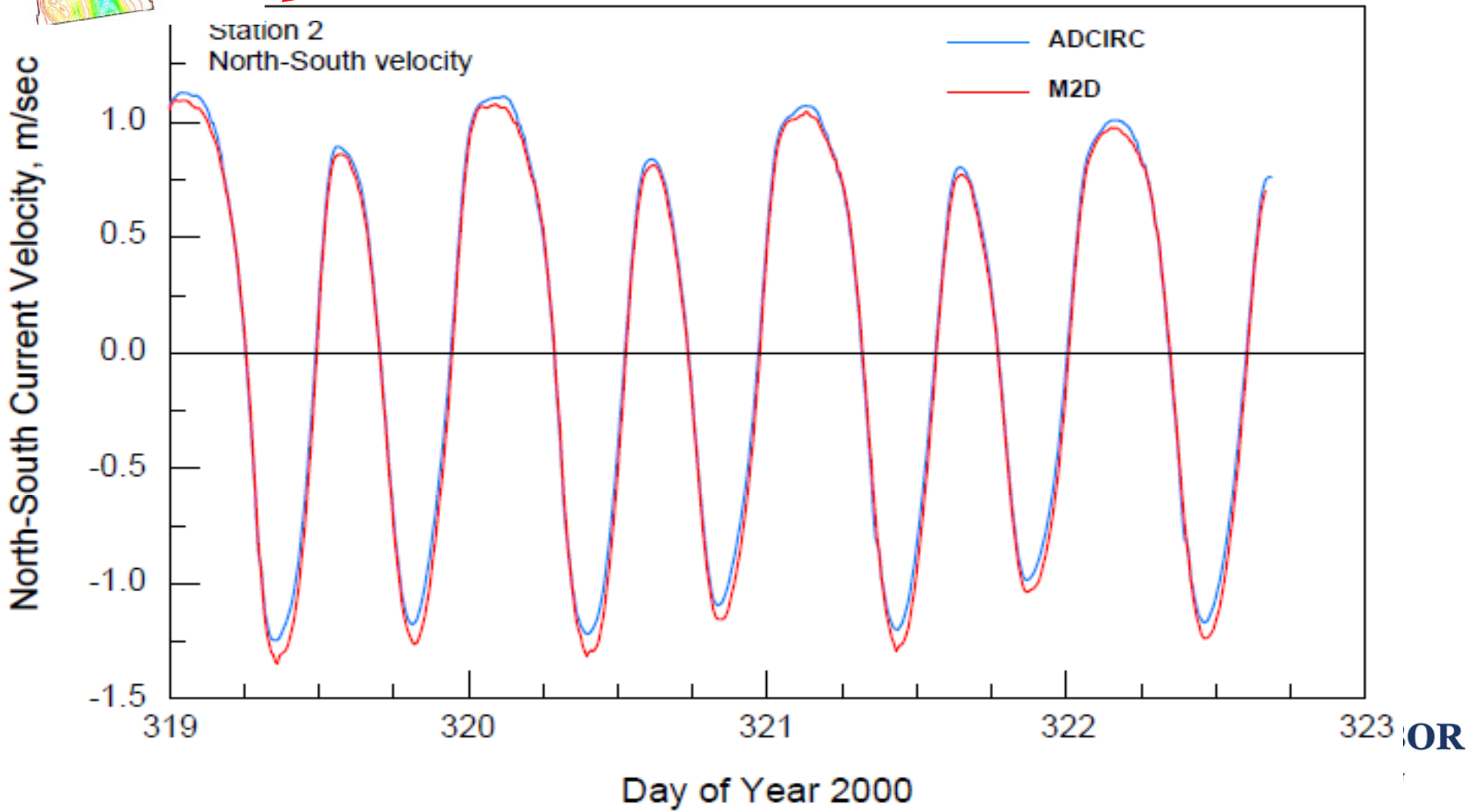
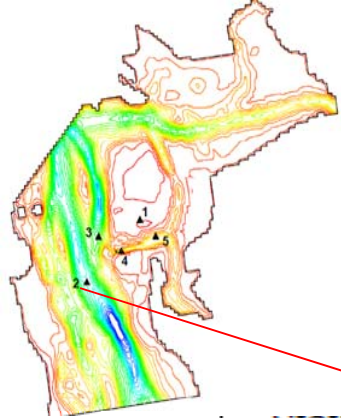




Tidal Flow Modeling Domain and Extraction Points



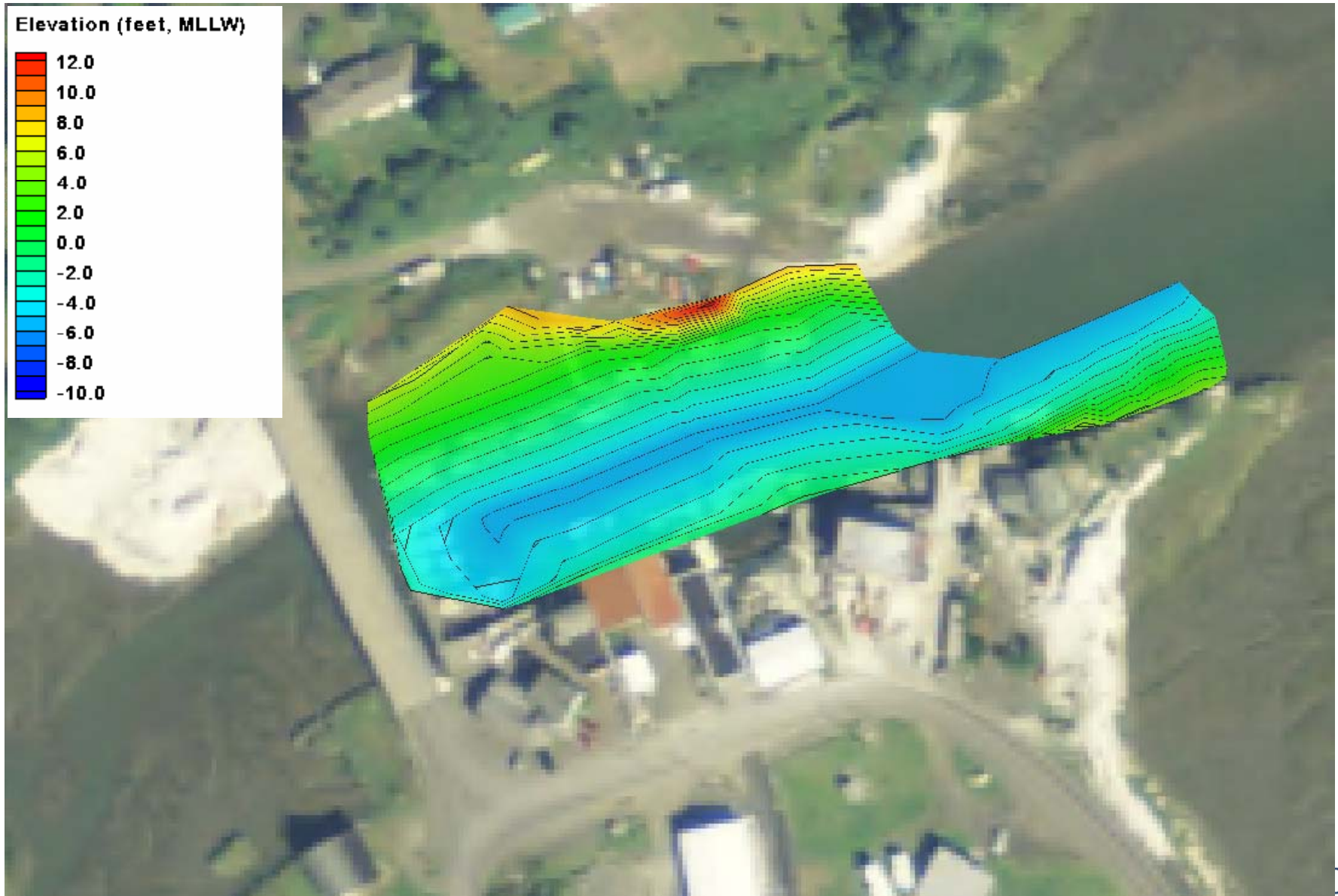
Flow Velocity Modeling Results at Station 2



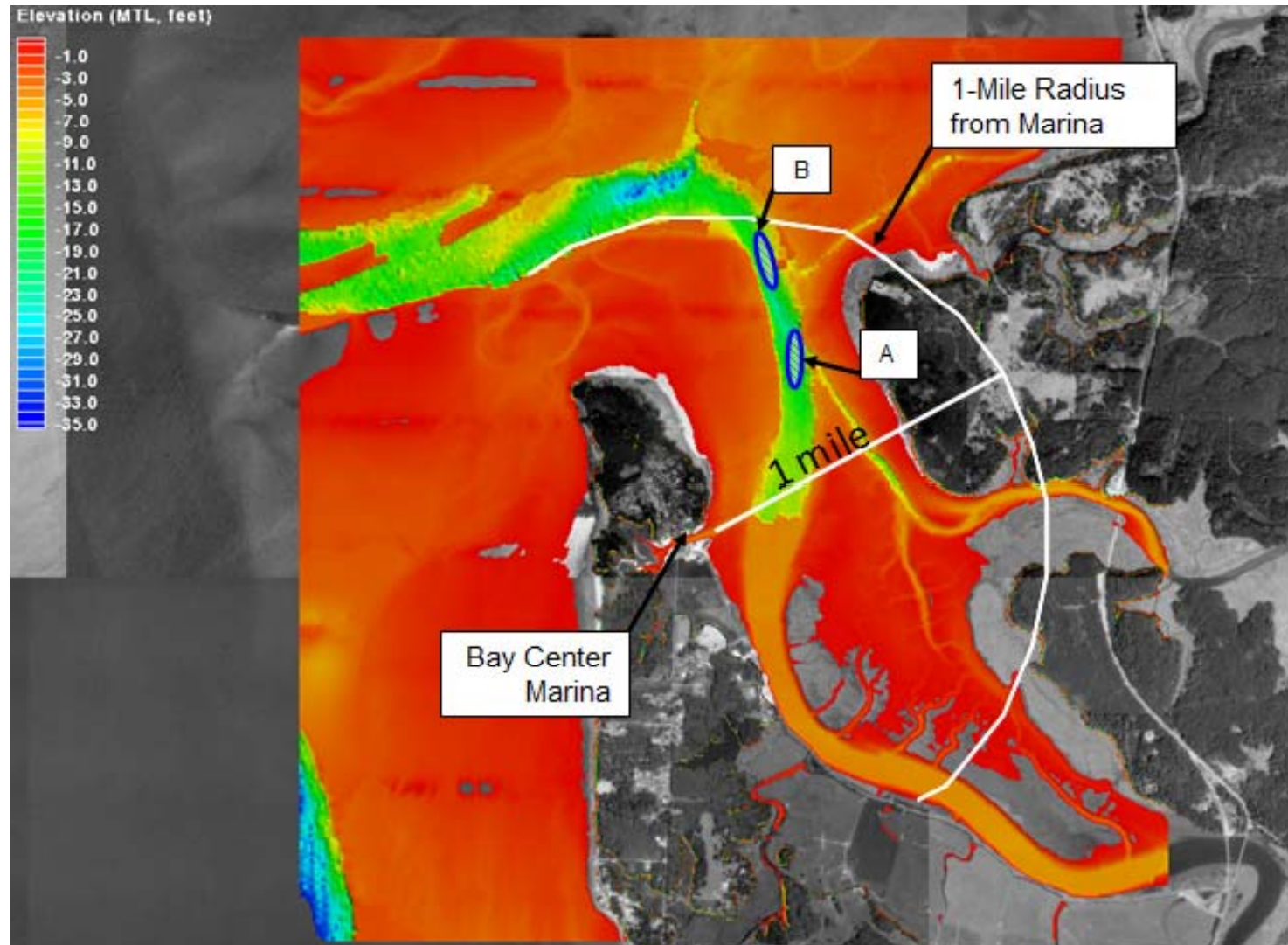


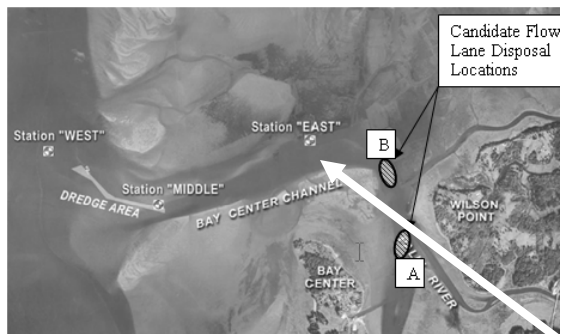
Required Depth, ft MLLW	Frequency and Volumes of Dredging CY/per cycle
10	10,000 cy Per 3 year

Bay Center, August 2010 Bathymetry

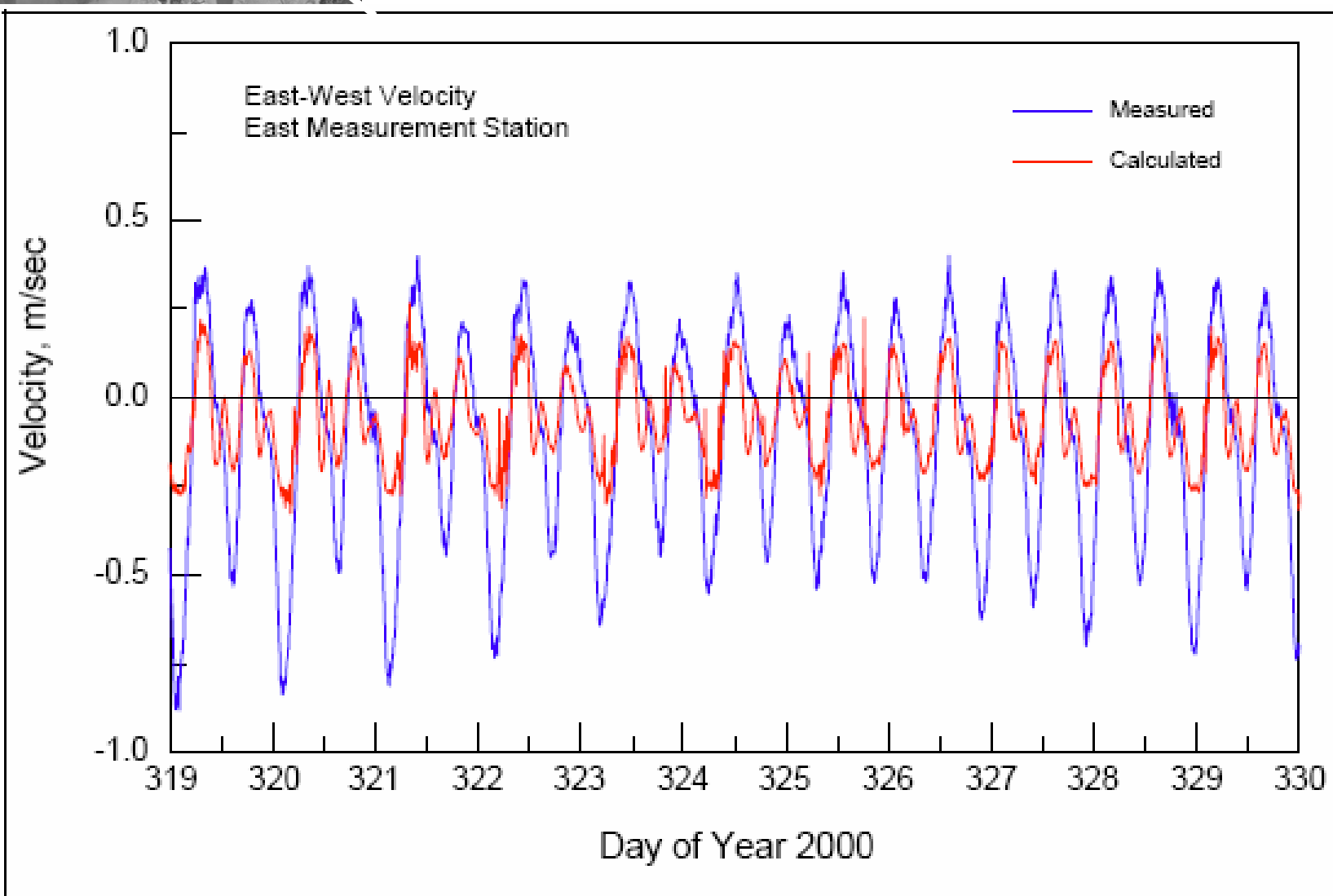


Bay Center Bathymetry

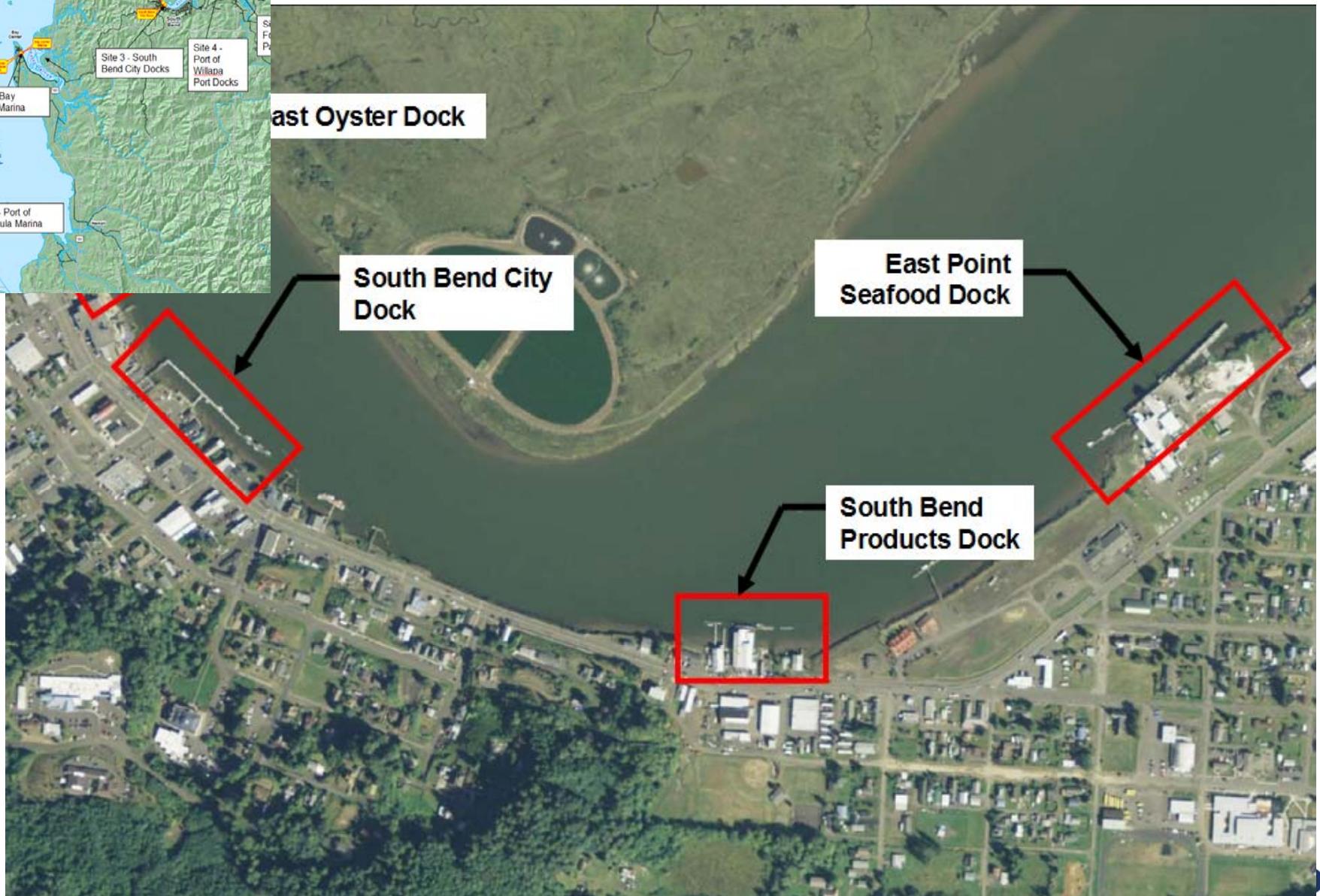




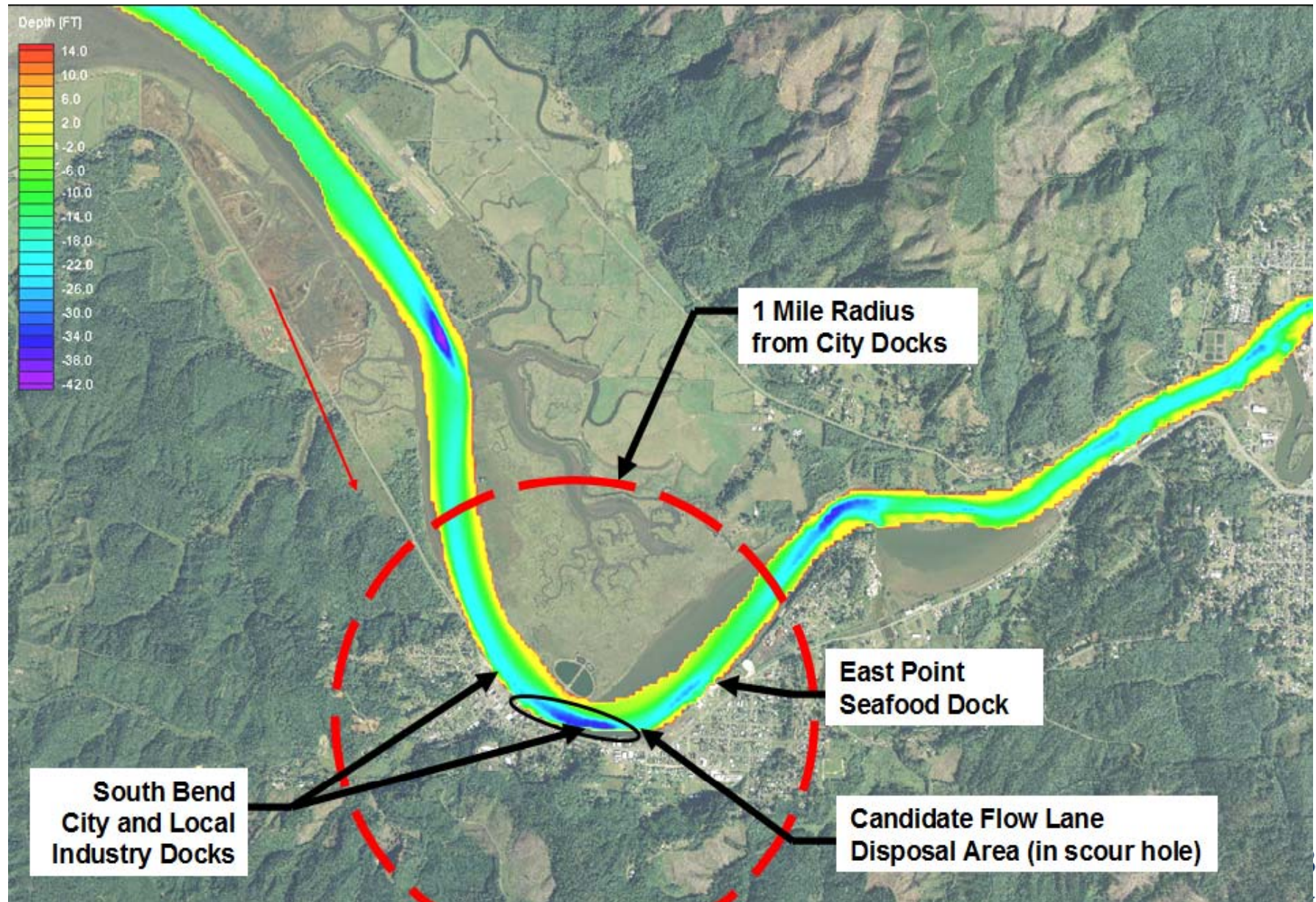
Station "East" Velocities Sample



Site 3 – South Bend Docks



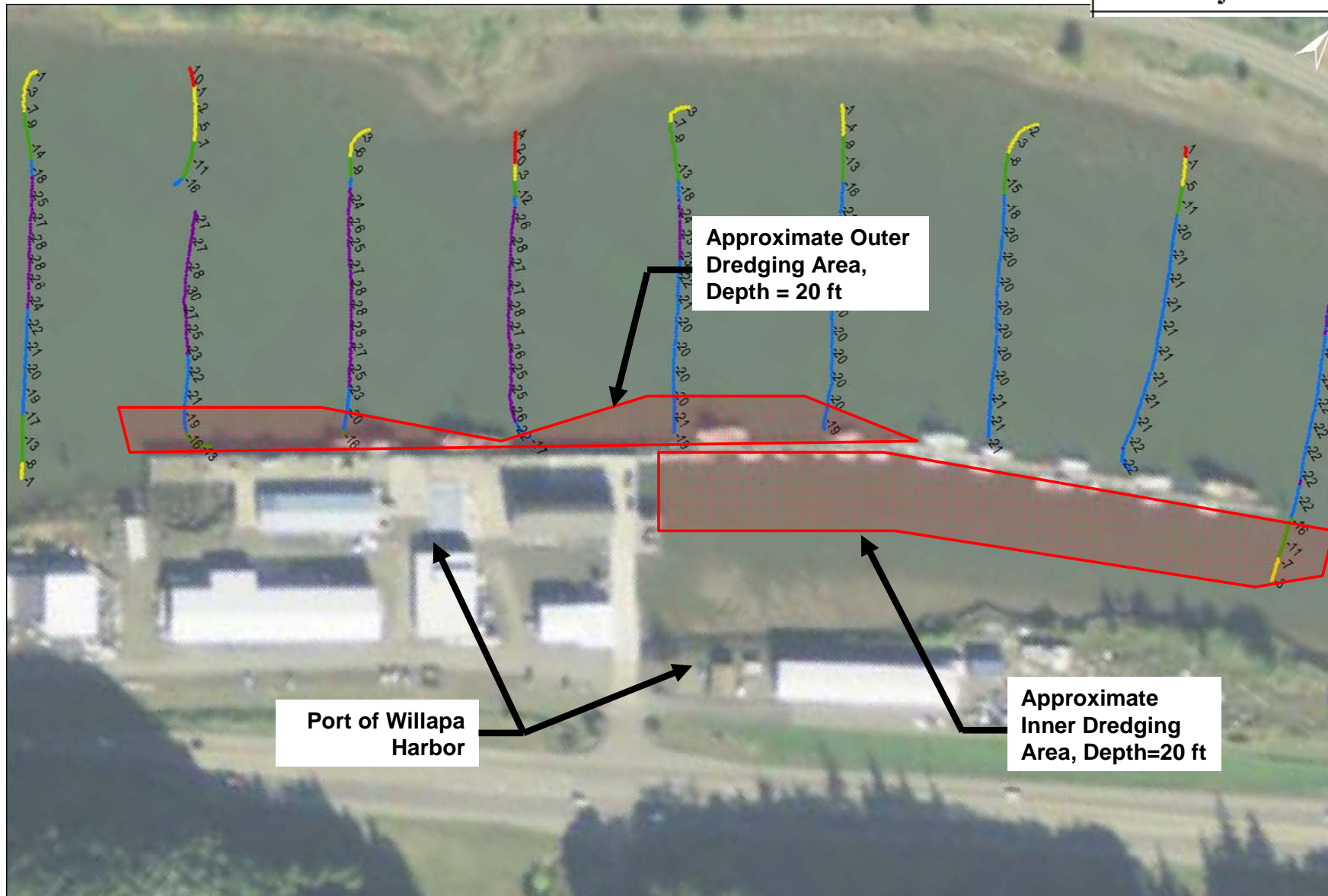
South Bend City Docks Depth and Proposed Flow Lane Disposal Sites



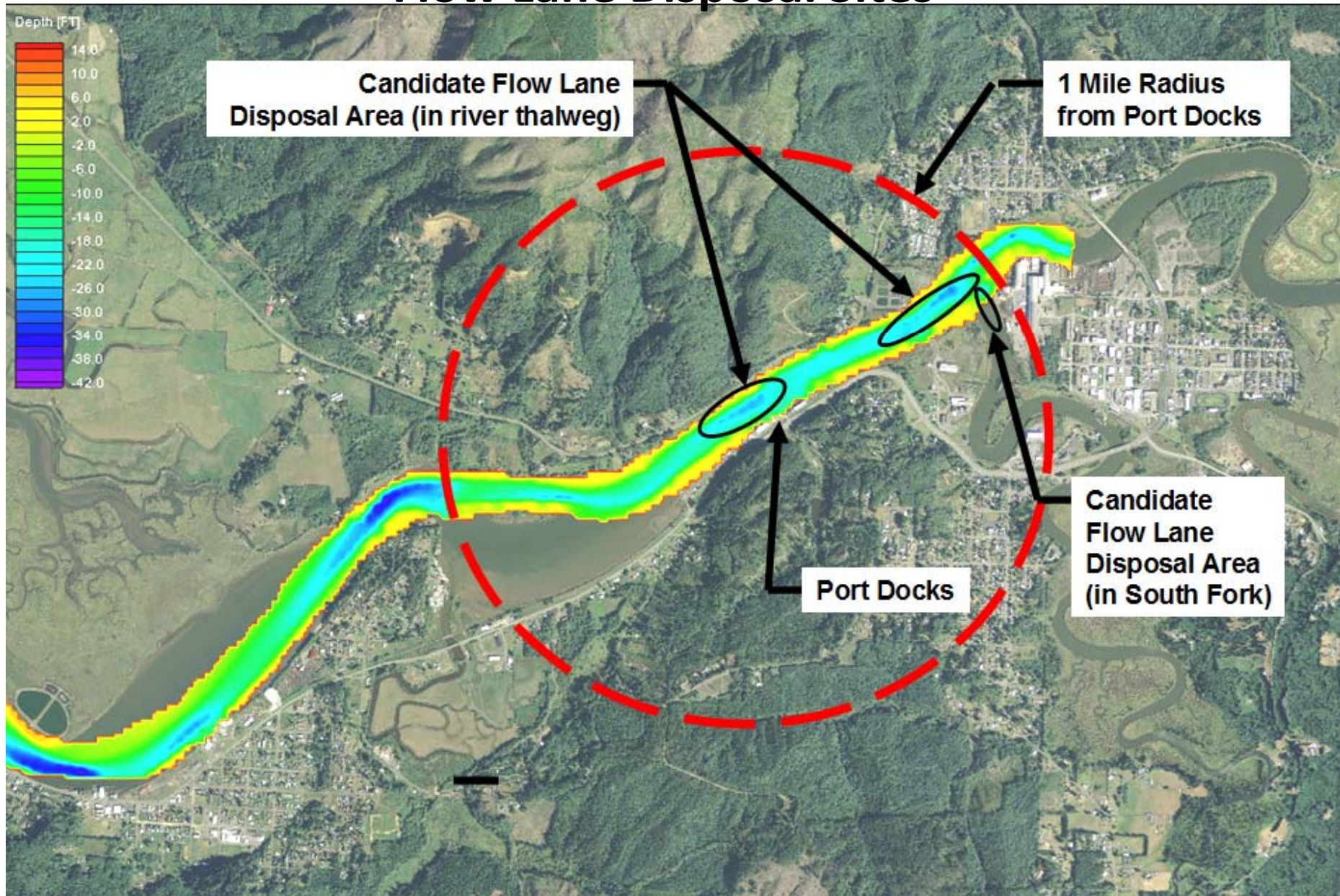
Site 4 – Port of Willapa Harbor Port Docks

Frequency and
Volumes of Dredging
CY/per cycle

22,500
Per 20 years



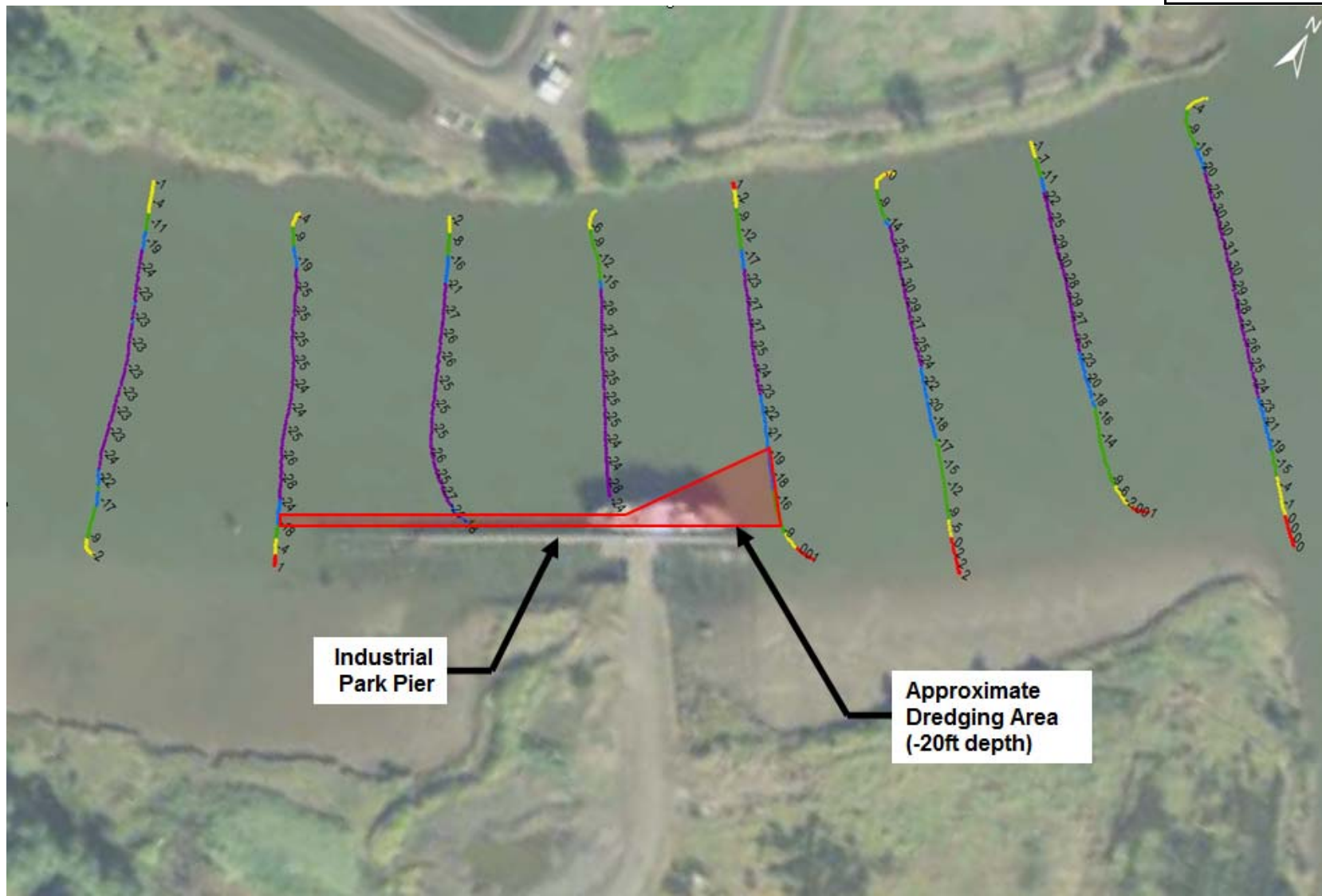
Site 4 – Bathymetry and Proposed Flow Lane Disposal Sites



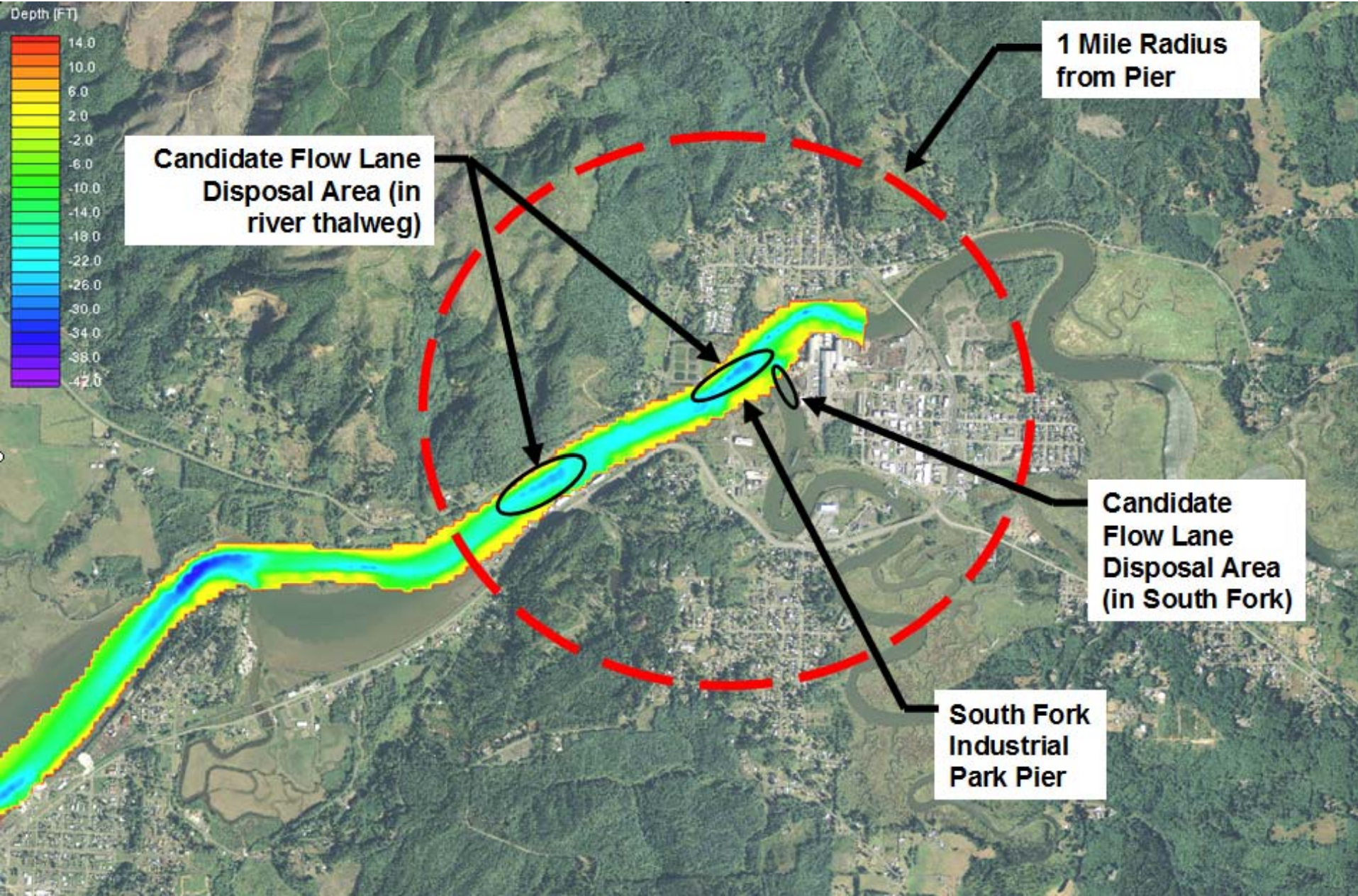
Site 5 – South Fork Industrial Park Pier

Frequency and Volumes
of Dredging
CY/per cycle

1,900
Per 10 years



Site 5 – Bathymetry and Possible Flow Lane Disposal Sites



Willapa River Flow Lane Disposal Sites Summary

- Toke Pt. flow lane disposal sites proved to be a reliable long-term site for hydraulic dredging in the Federal Navigation Channel and Tokeland Marina.
- A feasibility study was conducted by CHE to identify potential flow lane disposal sites for future proposed maintenance dredging projects within Willapa Bay and the Willapa River. Based on this study a total of six proposed designated flow lane disposal were identified and recommended for future dredging work in Willapa Bay.
- Results of the feasibility study were presented at a joint meeting with DMMP and Small Ports of Willapa Harbor on April 7, 2011. DMMP recommended to proceed with implementation of these flow lane disposal sites.
- The feasibility study indentified five major physical conditions criteria for providing successful flow lane disposal projects in Willapa Bay that may be applicable at other locations.
- Introduction (re-introduction) of hydraulic dredging with flow lane disposal site may be an appropriate solution for small marinas and ports that are not supported by the Corps of Engineering dredging program

