

The N-EWN Knowledge Series

A Continuing Education Series about Engineering with Nature



Josef Rieger
Senior Managing Scientist
Anchor QEA, Inc

Beyond the Dredge: Boosting Remediation Impact with Nature-Based Solutions – The Money Point Case

Located on the Southern Branch of the Elizabeth River in Chesapeake, Virginia, Money Point was once among the most contaminated sites on the Chesapeake Bay. Decades of industrial activity, including wood treatment operations, left the riverbed coated with toxic creosote. By 2006, the river bottom was biologically dead, and the few remaining fish showed high cancer rates. The Elizabeth River Project, a local nonprofit, led a comprehensive 6-year remediation effort with scientists, regulators, and industrial landowners. Using a hybrid approach that combined nature-based solutions with engineered structures, the project established 7 acres of tidal marsh, a 3-acre oyster reef, a forested shoreline, and the nation's first "living cap" to isolate contaminants while supporting habitat. These efforts revived Money Point's ecosystem, reduced flooding, and restored thriving aquatic and terrestrial life. Fish cancer rates have returned to background levels, and researchers have recorded more than 26 fish species, 110 bird species, and a resident otter family. The project proves that nature-based solutions can address even severely contaminated sites and earned the American Shore and Beach Preservation Association's 2019 "Best Restored Shore" award.

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Nov. 20
12:30pm ET

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Stantec
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Register here: <https://bit.ly/3gR9ADL>

or scan:



1 Continuing Education Credit (CEC) is available to attendees

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Presented by:



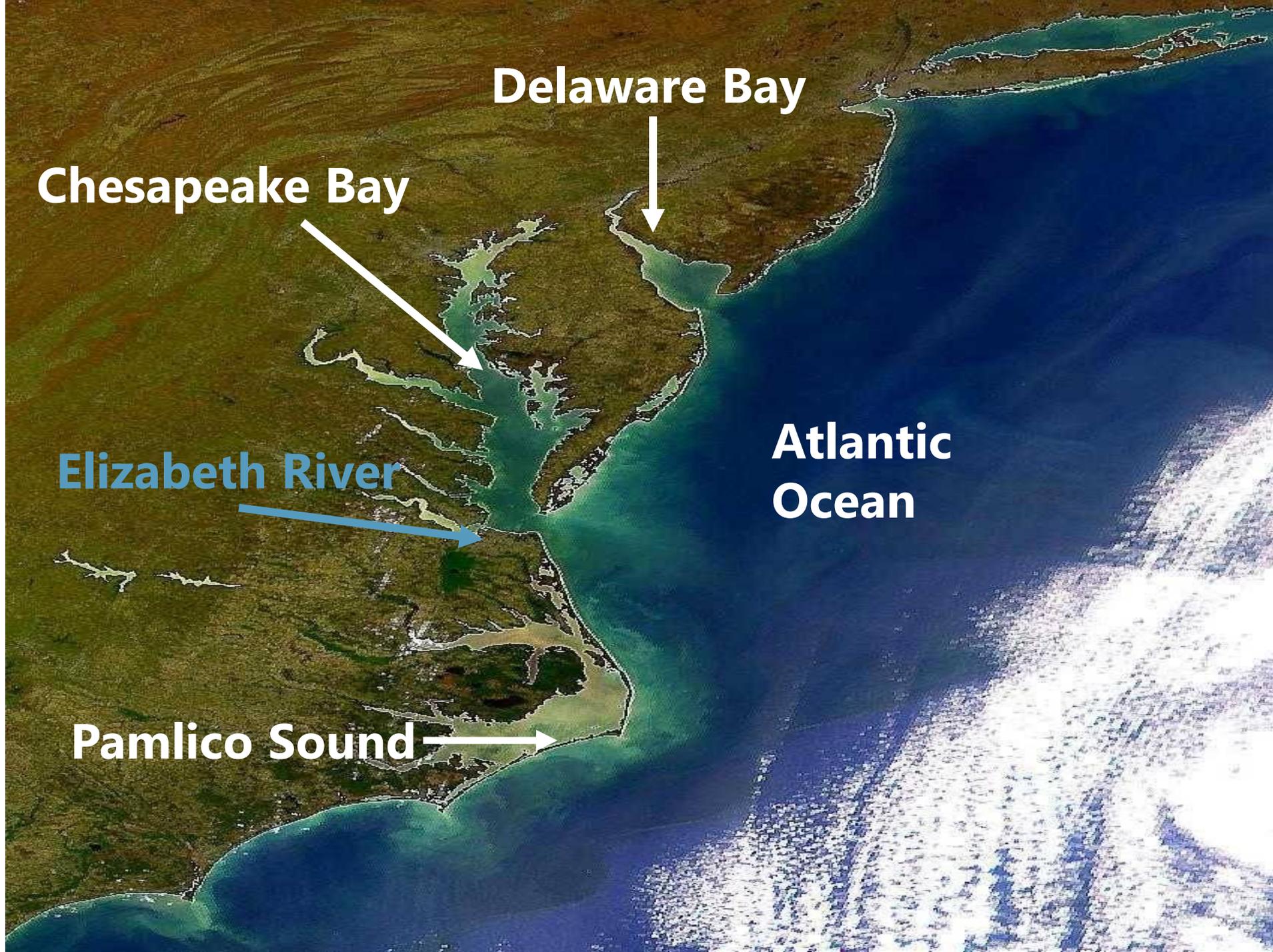
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Presented by Joe Rieger
N-EWN Knowledge Series

November 20, 2025





Chesapeake Bay

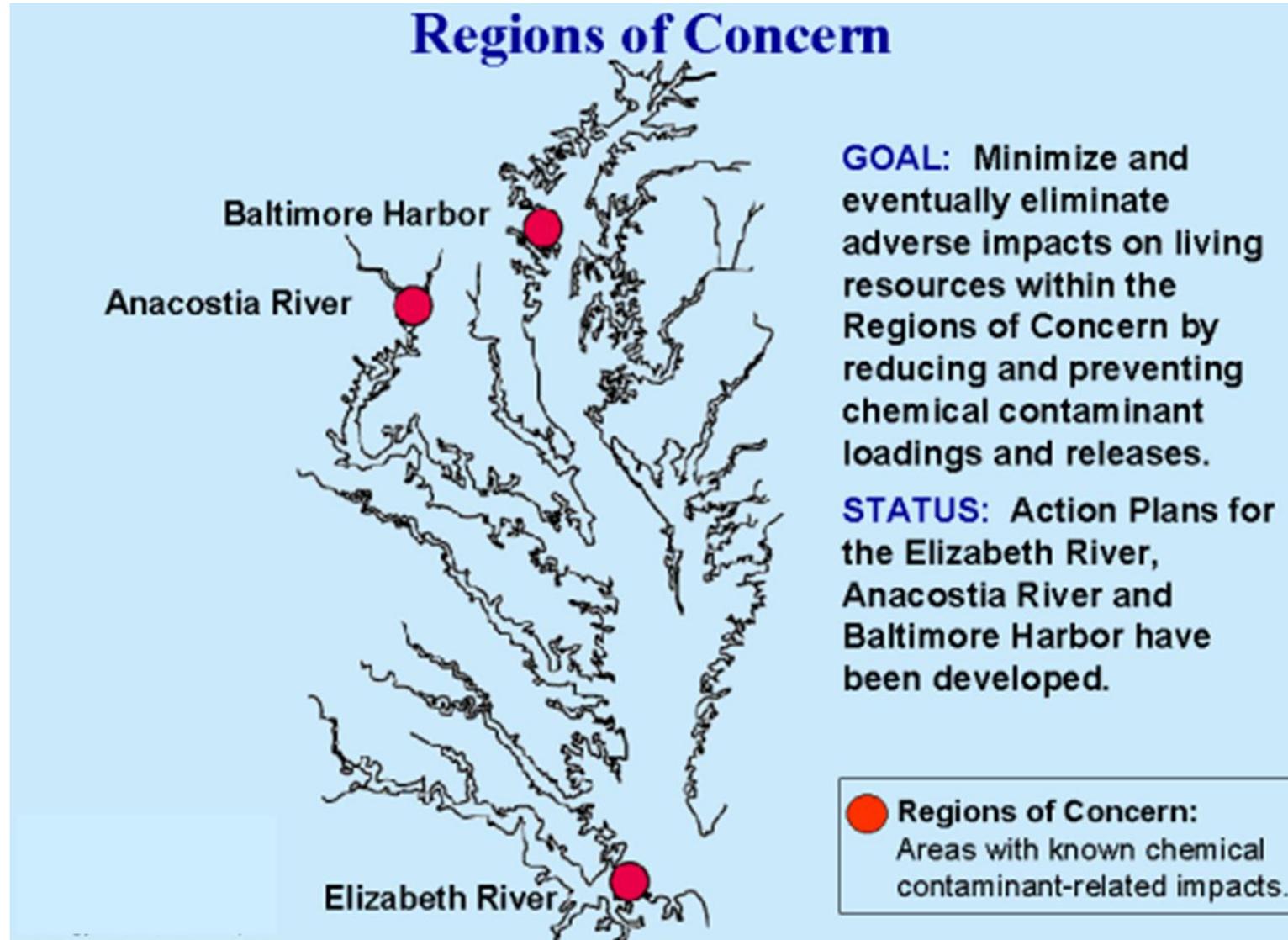
Delaware Bay

Elizabeth River

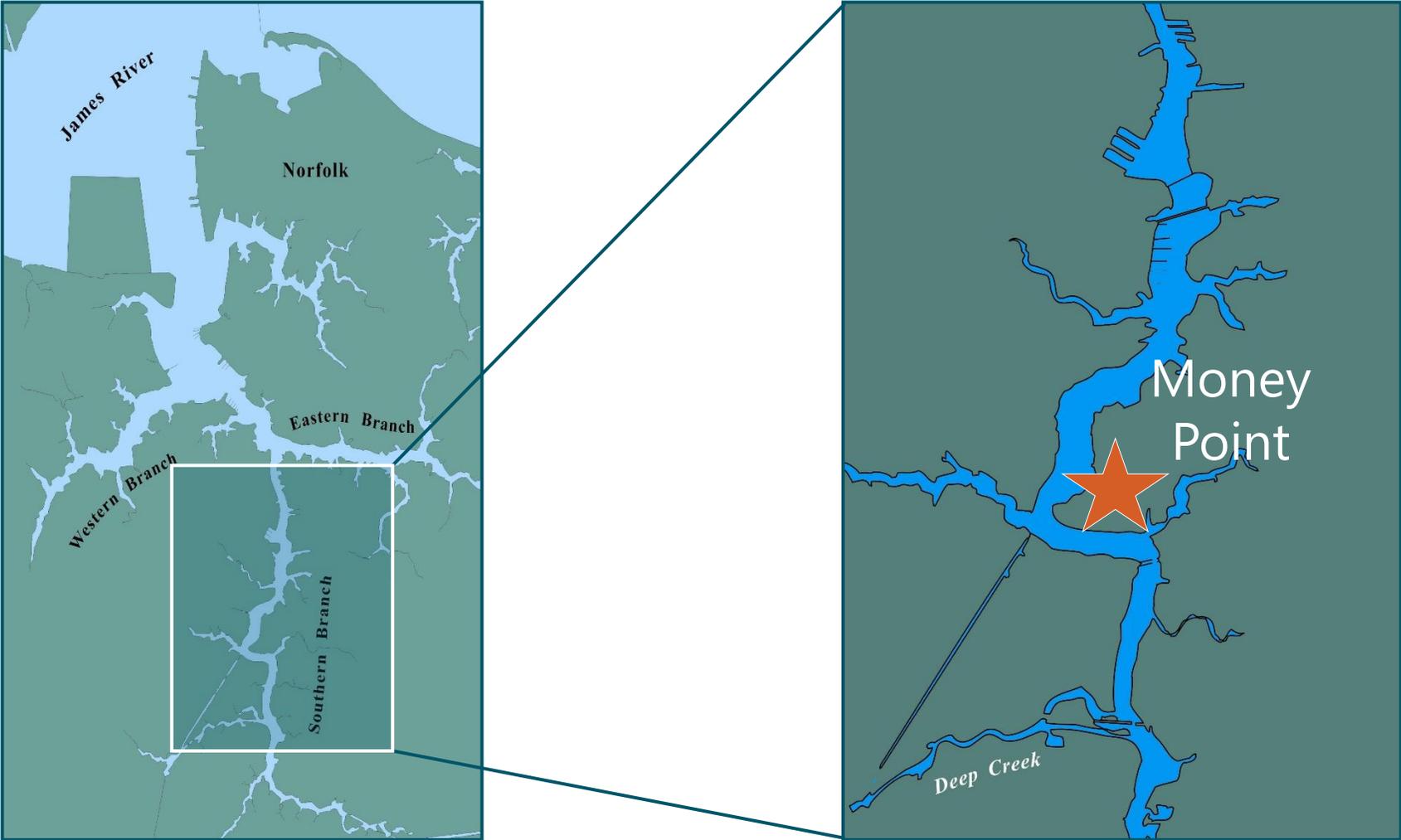
Atlantic Ocean

Pamlico Sound

Chesapeake Bay Program – Environmental Indicators



Money Point, Virginia



Eppinger & Russell – Former Creosote Plant

- **1880s to 1953:** Wastewater discharged directly into the Elizabeth River
- **1963:** Large fire spilled 130,000 gallons of creosote
- **1967:** Tanks ruptured depositing 20,000 to 30,000 gallons of creosote into the bottom of the river



Photo credit: Virginian Pilot

Coastal Virginia Conservancy

- It is the first in-lieu fee (ILF) mitigation program of its kind in the United States. They are approved by the federal government for compensation of impacts to the bottom of a waterway.
- Money Point activities were partially funded as mitigation for construction of APM Maersk facility.

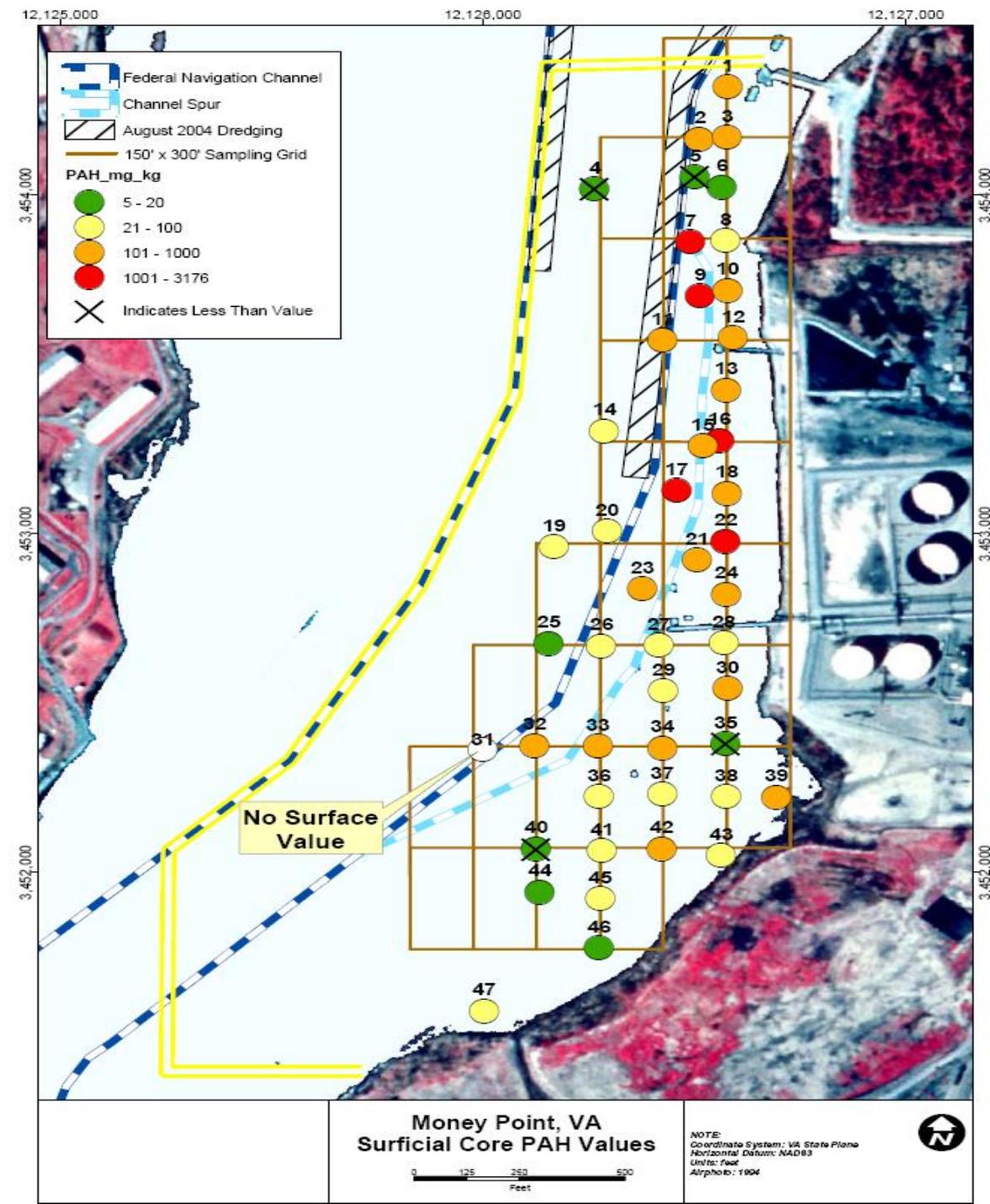


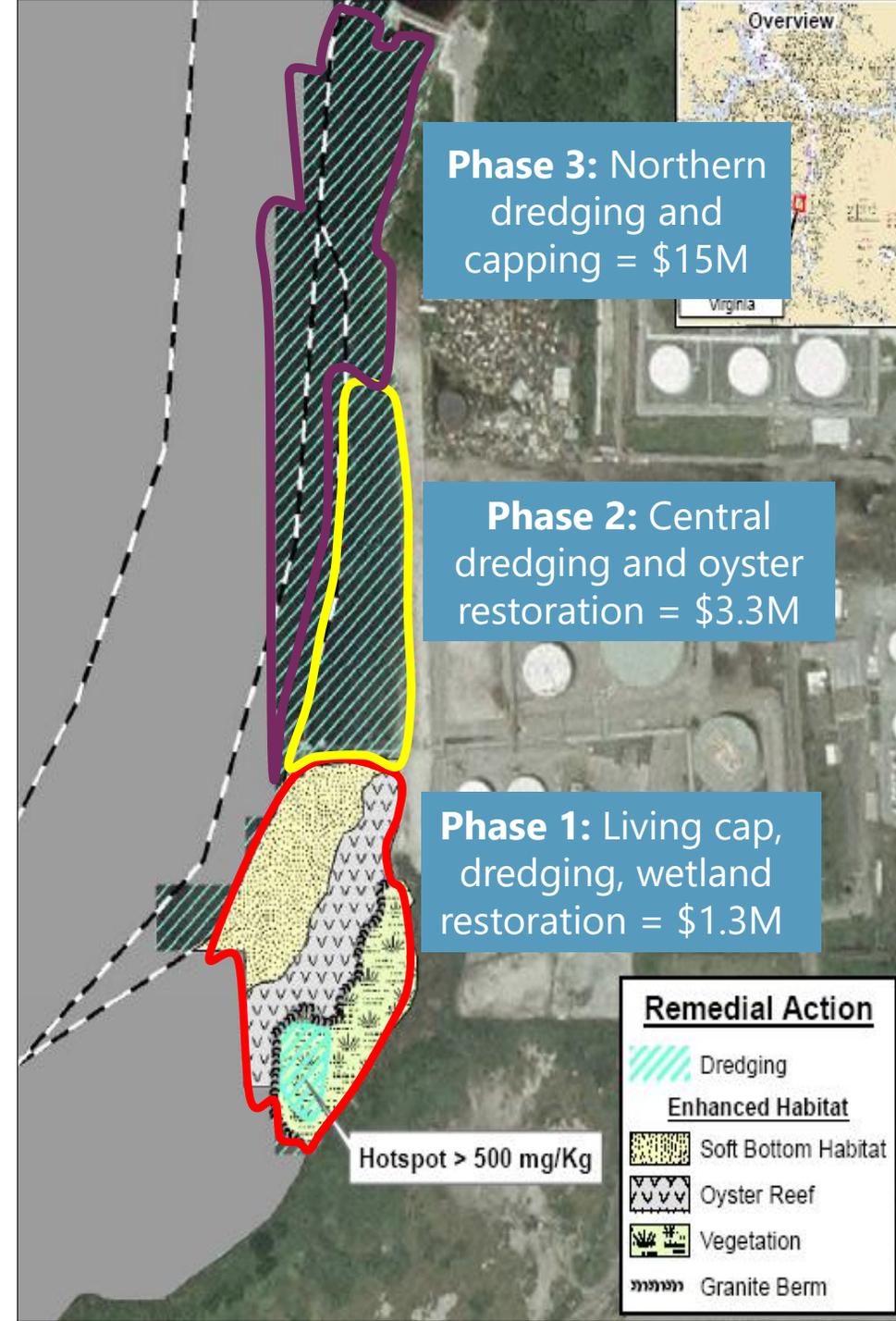
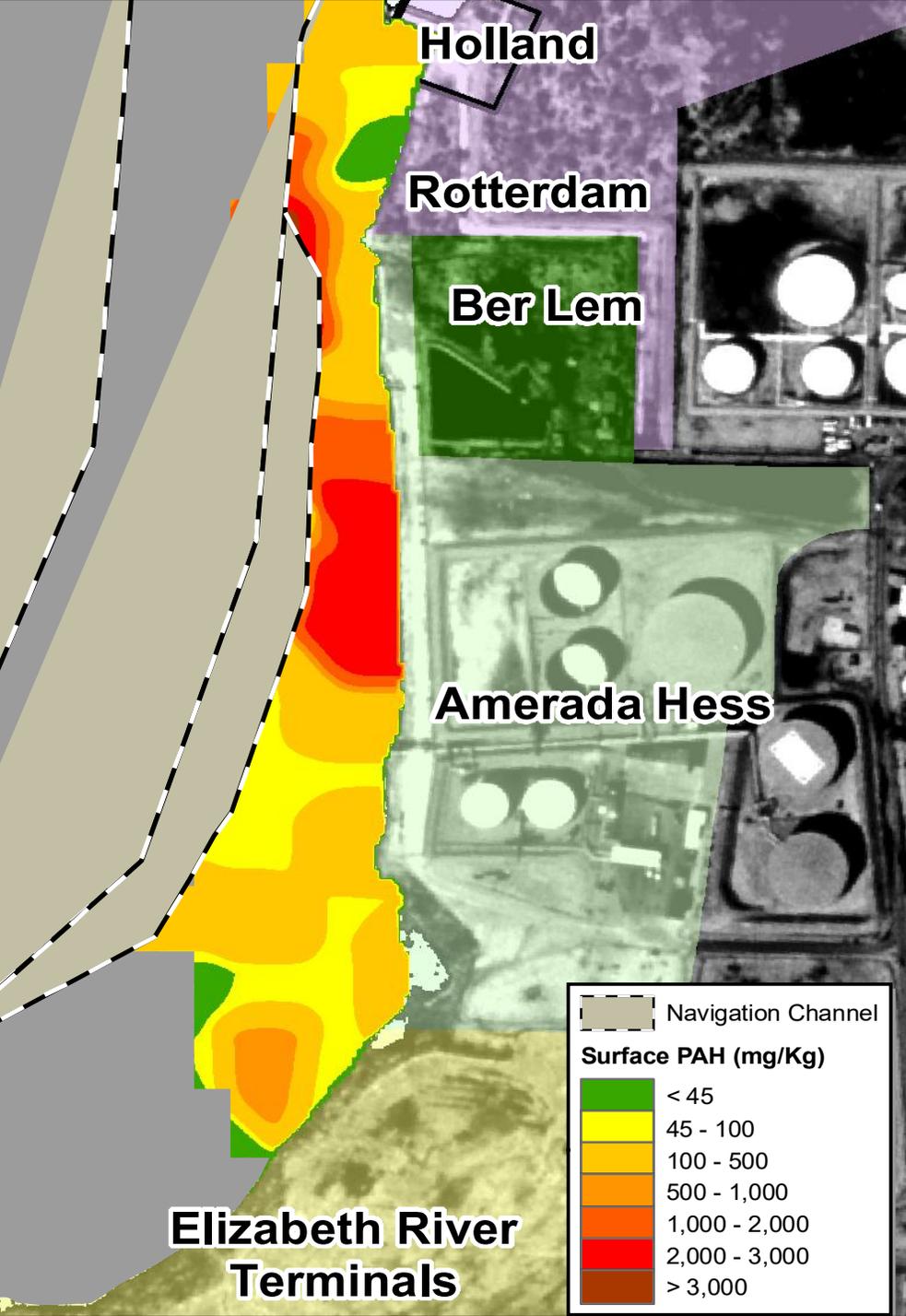
COASTAL VIRGINIA
CONSERVANCY
Conserving land and water for life



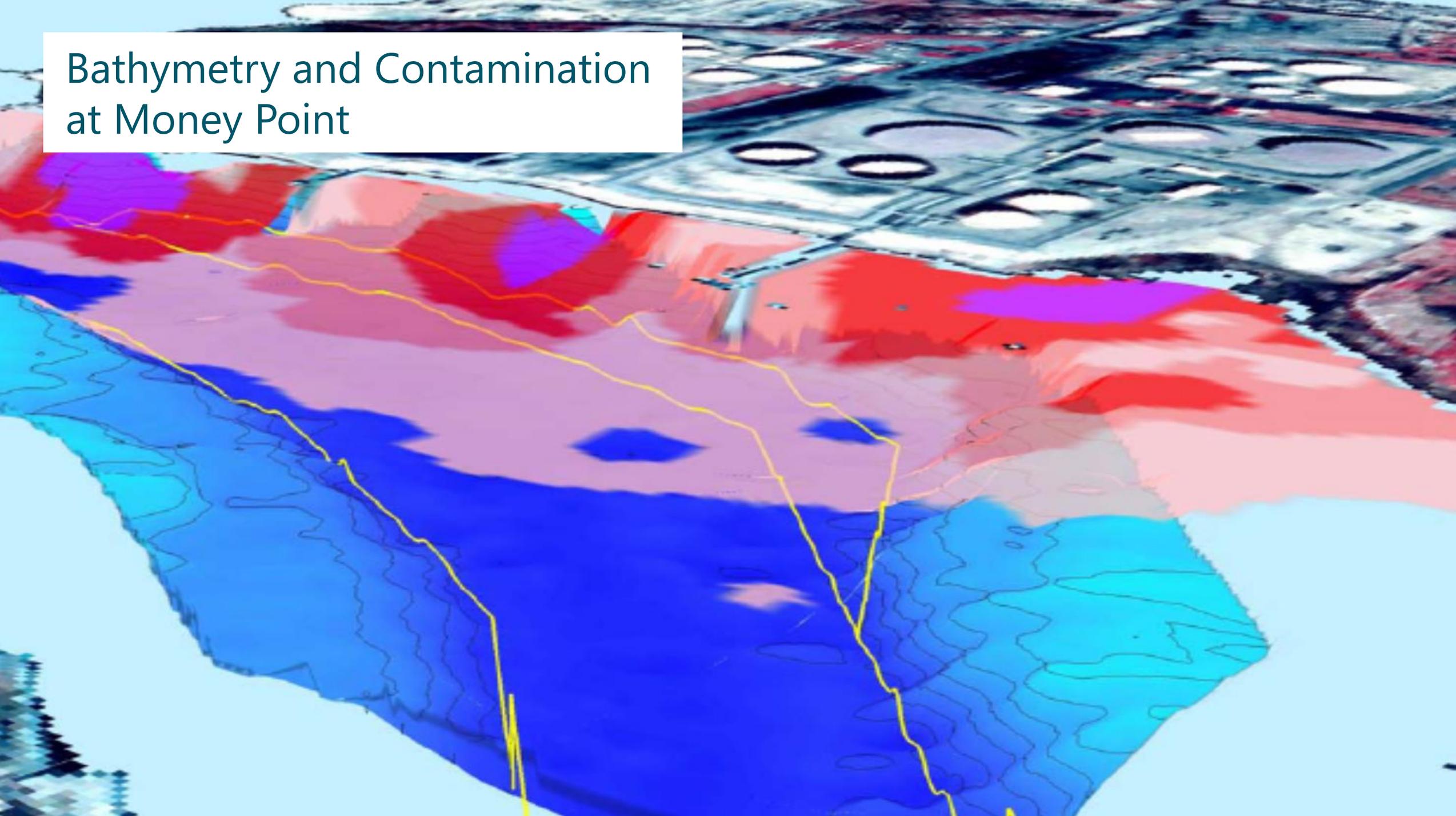
Extent of Contamination

- 30 acres of contamination
- Pure creosote in isolated hotspots
- Highest levels in shoal area





Bathymetry and Contamination at Money Point

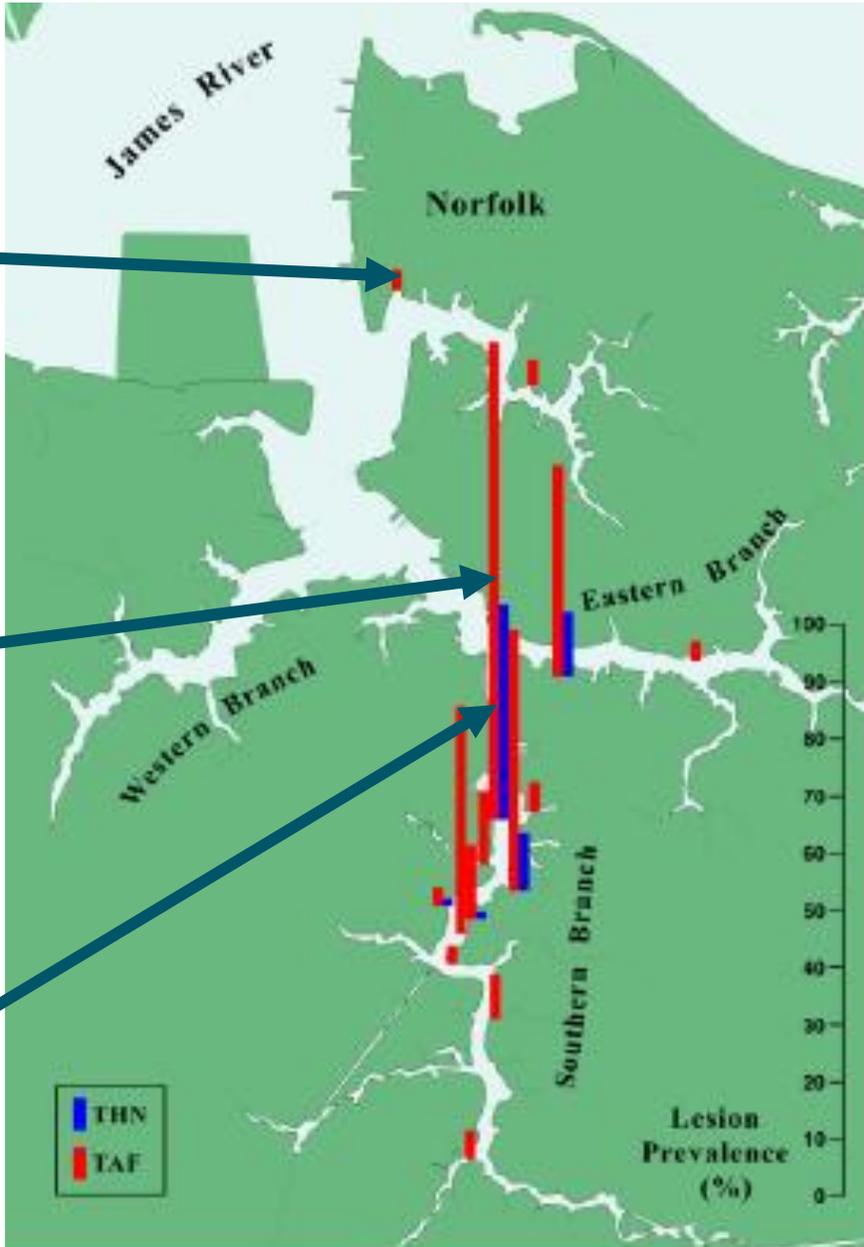
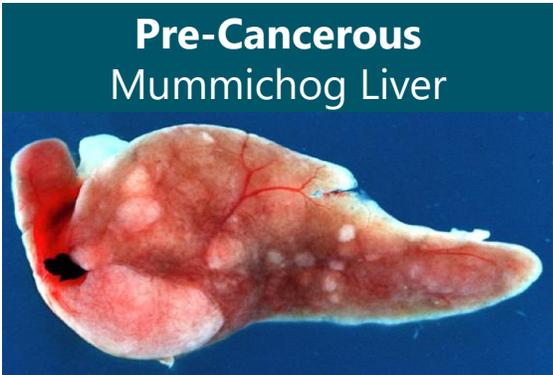


Elizabeth River Sediment Contamination from PAH *Highest in the Chesapeake Bay*



Photo credit: Virginia Institute of Marine Science

Cancer in the Mummichog



Phase I – Construction



Living Cap Construction



Creating an Oyster Reef



Tidal Marsh Oyster Reef



Money Point Living Cap Combined with ERT Wetlands Restoration



Living Cap



ERT Wetlands

Phase 1 Water Quality Monitoring

VIMS Water Quality Vessel

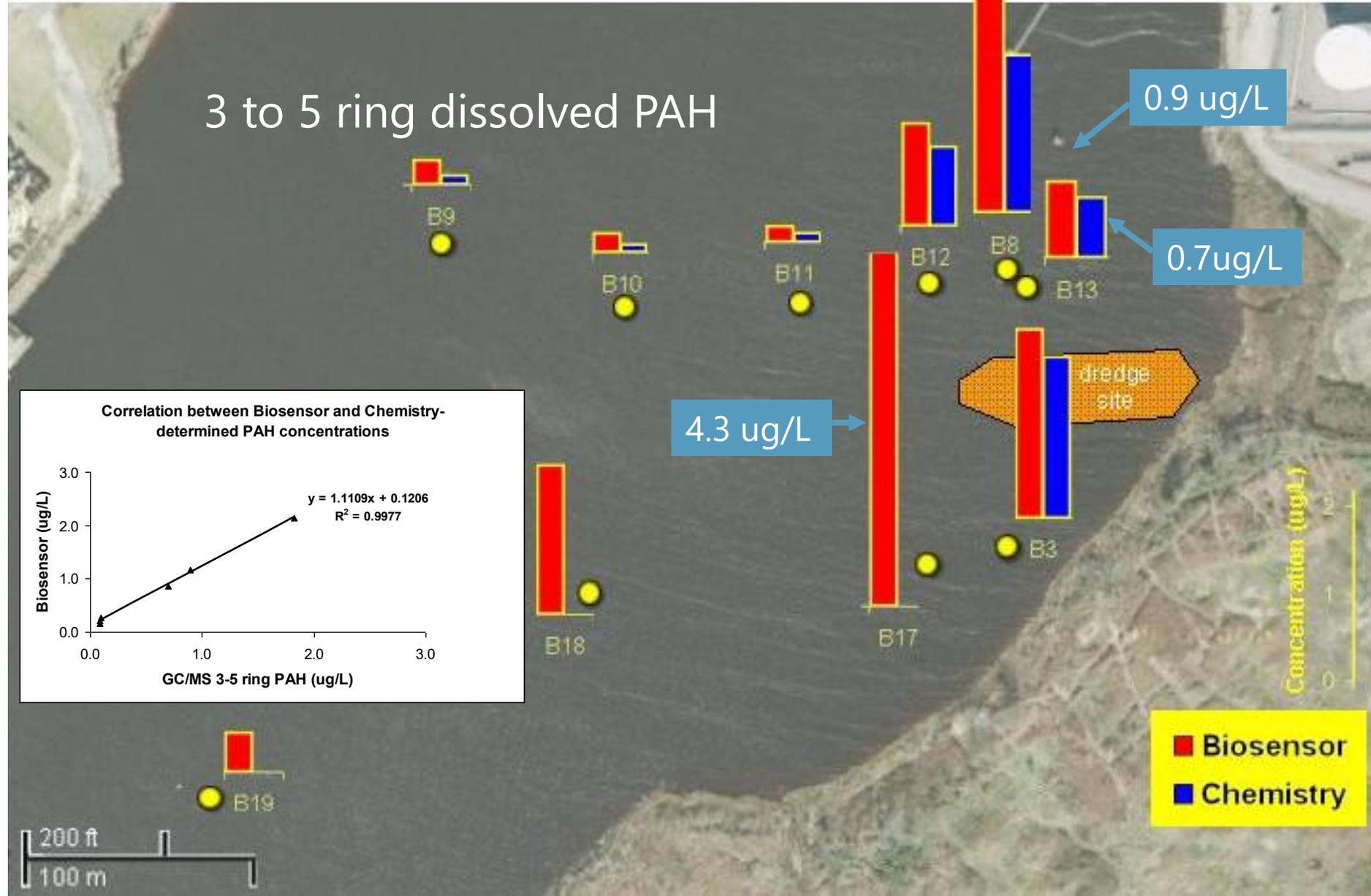


Phase 1 Restoration



2011

Money Point Sampling (during Dredging) – June 9, 2009



Phase 2 Dredging



Dredge Buckets

4.5-CY Cable Arm Environmental Bucket



3.5-CY Clamshell Bucket



Dredging with an Environmental Dredge Bucket









Phase 2 Restoration Sand Clean River Bottom for Money Point



2025 New Living Shoreline



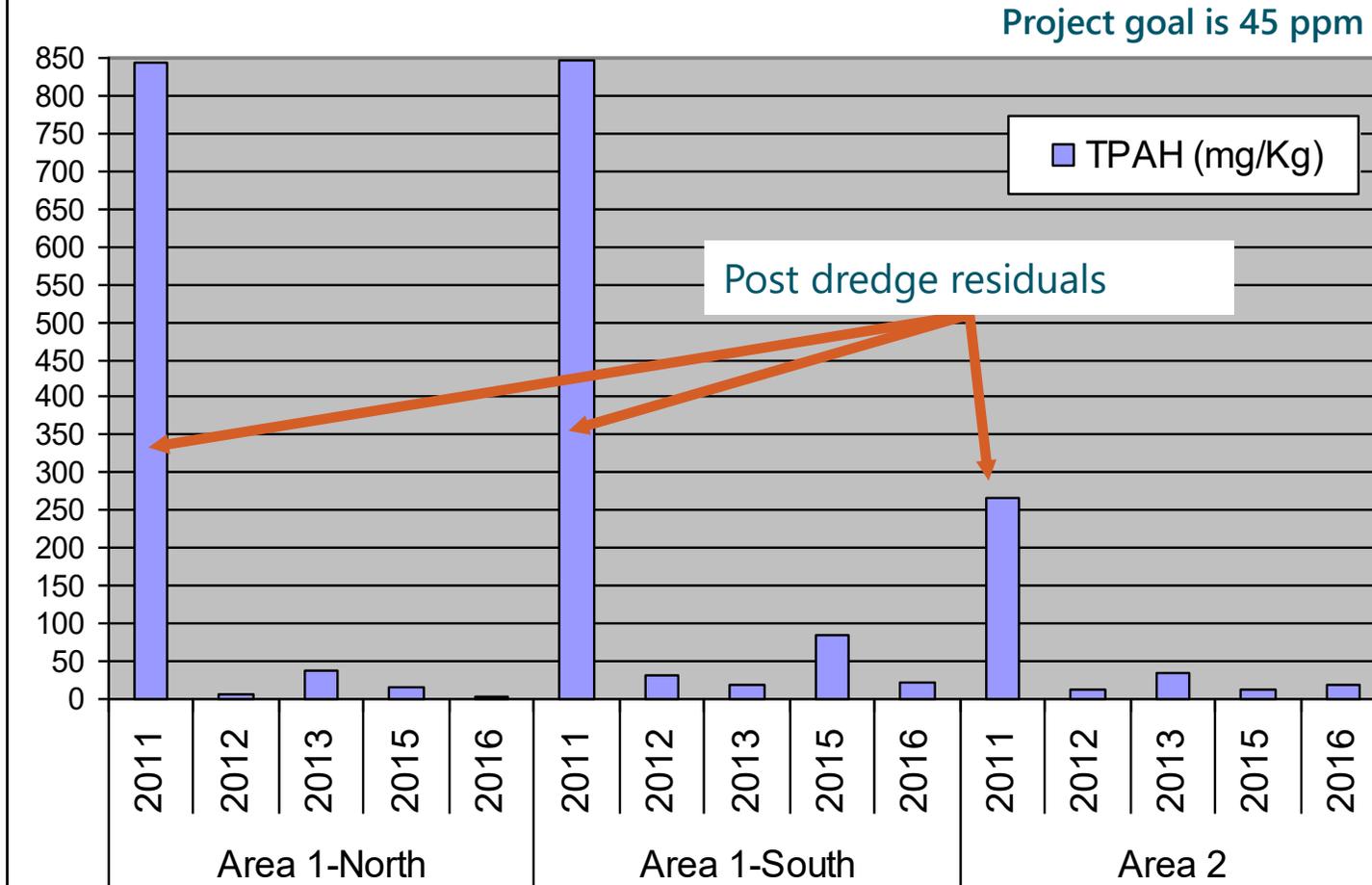
Money Point Site Monitoring

- **PAH monitoring** in the Phase I and Phase II restoration areas
- **Benthic monitoring:**
Old Dominion University
- **Mummichog cancer study:** Virginia Institute of Marine Science
- **PAH's impact on mummichog genetics:**
Duke University
- **Fish monitoring:** Elizabeth River Project



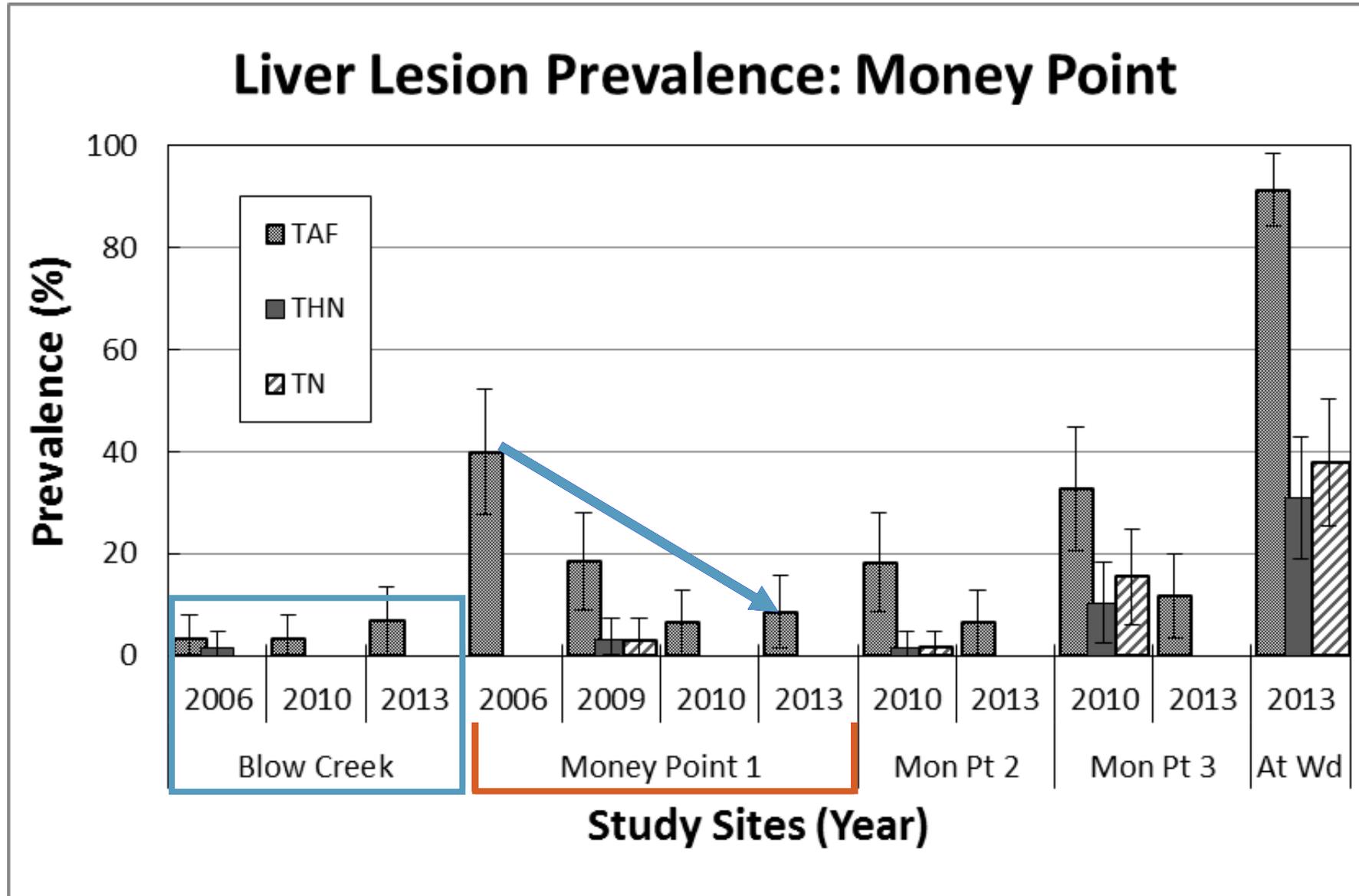
Sediment Results

Money Point Phase 2 Restoration Sand TPAH (mg/Kg)



Restoration Sand Area	Sample Date	Aver. tPAH Conc.
Area 1-North	2011	845
	2012	4.9
	2013	36.2
	2015	14.2
	2016	4.4
Area 1-South	2011	847
	2012	31.7
	2013	17.9
	2015	85.8
	2016	22.1
Area 2	2011	266
	2012	11.4
	2013	35.3
	2015	12.4
	2016	19.6
Numeric Averages	2011	652
	2012	16
	2013	29.8
	2015	37.5
	2016	15.3

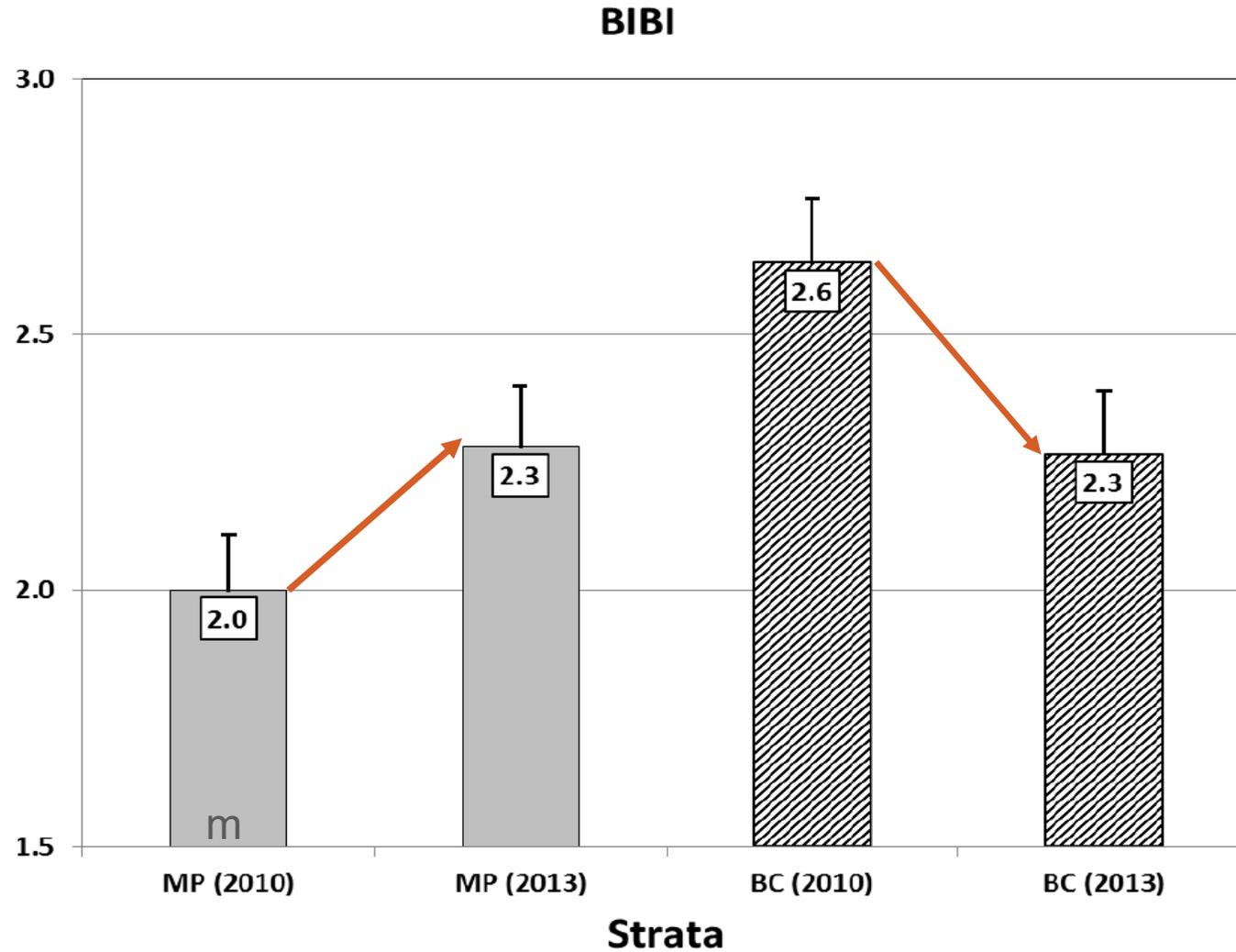
Mummichog Monitoring Results



Benthic Sampling



Benthic (B-IBI) Results



Increase in Fin Fish Diversity

4 species found prior to restoration

27 species now recorded

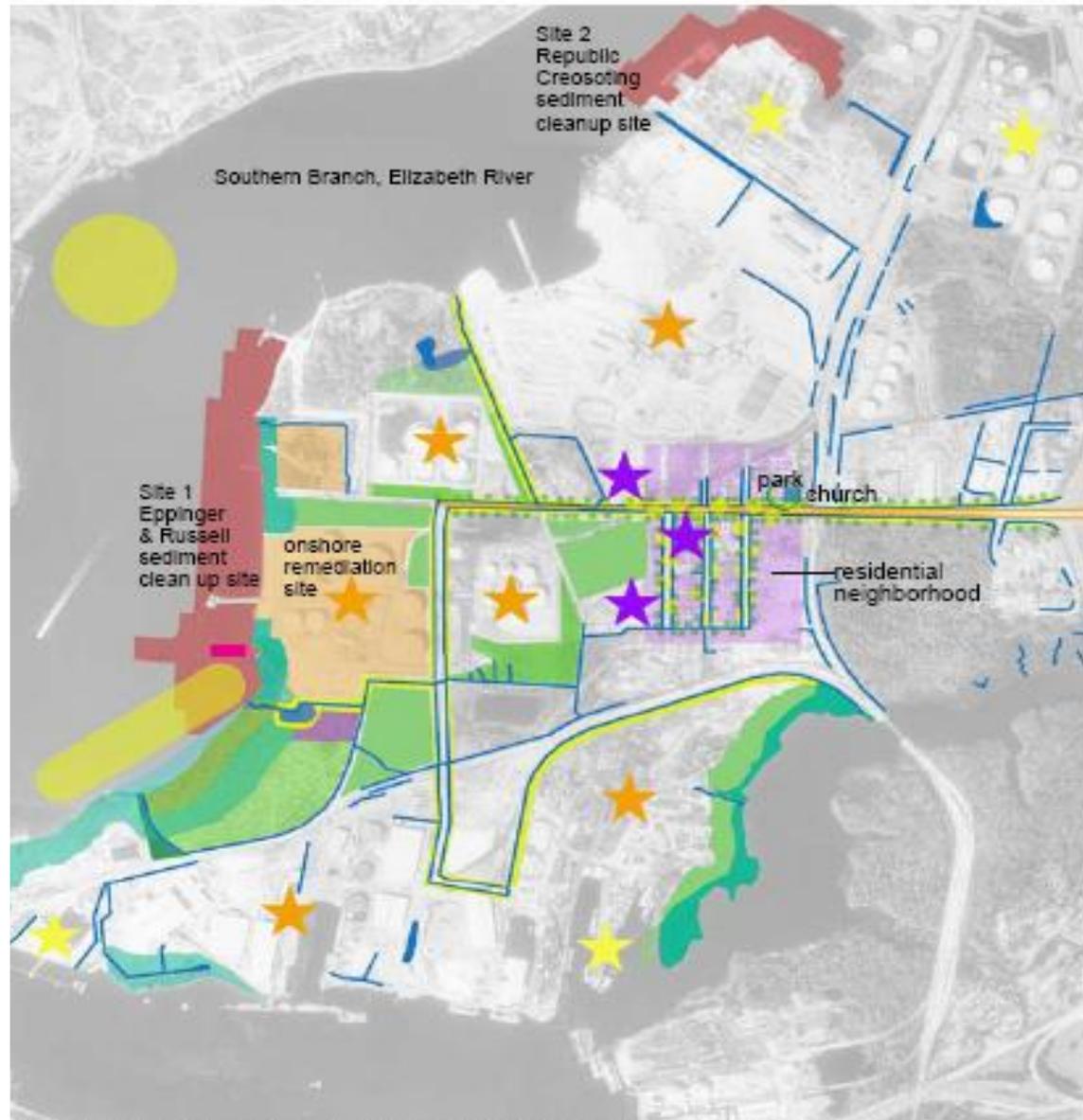


27 species of fin fish using the wetland cap





Money Point Revitalization Plan



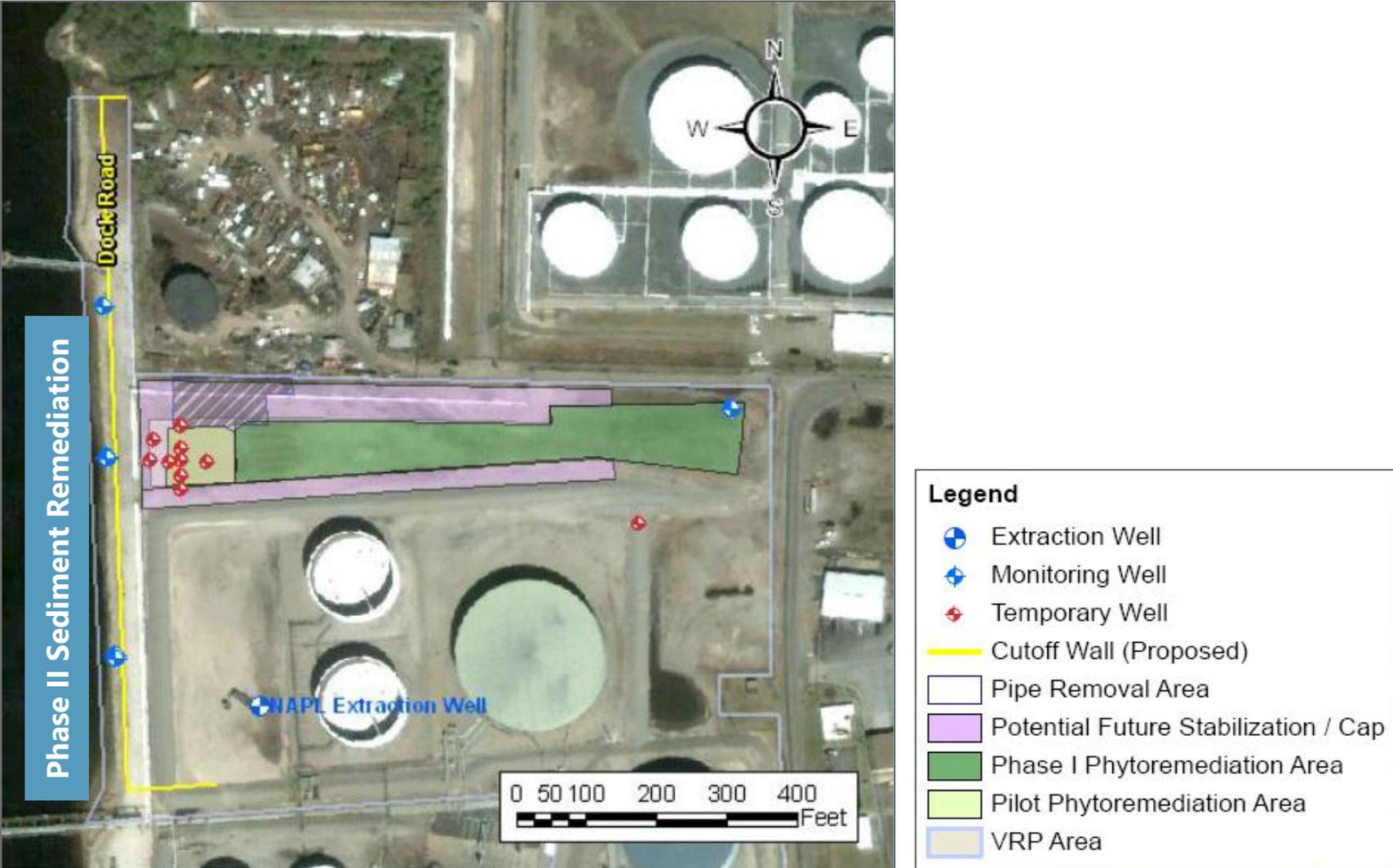
Composite Map of Proposed Restoration Projects

- Sediment cleanup site
 - Onshore cleanup site
- Stormwater Management**
- Bioswales/habitat corridor
 - Retention Ponds (BMPs)
 - Pervious Paving
- Wildlife Habitat**
- Riparian Buffers
 - Tidal Wetlands Restoration
 - No-mow+urban forest area
 - Street Trees
 - Shellfish restoration
- Community Quality of Life**
- Public park/playground
 - Learning Barge
 - Pervious Sidewalks
 - "Dark skies" Street lighting
- River Star Industries:**
- Current
 - In the making
 - Future target

Establish Environmental Stewardship through River Stars



Hess Upland Remediation Efforts



Phytoremediation Progress

• 2006



Water tanks



• 2011

-  Pilot plot boundary
-  Phase 1 expansion boundary



Wind Turbine

- Used to provide compressed air to operate remediation systems
 - Air sparge
 - Creosote extraction
 - Future interceptor drain



CITGO Petroleum, Chesapeake



CITGO Petroleum, Chesapeake

- Installed 3,000-sq-ft green roof



Lafarge Cement



- Certified by Wildlife Habitat Council
- Installed Blue Bird and Bat houses

City of Chesapeake

- Sustained Distinguished Performance: CITGO Petroleum – Chesapeake
- Installed a 3,000-sq-ft green roof



Results from a Hard-Won Collaborative Approach at Money Point

- Money Point sediment cleanup went from a concept to completion (Phase I and II) in less than 6 years
- Remediation cost have been very low compared to national average
- Partners have stepped up to carryout the plan (community and industries)
- Funding has been identified to complete Phase III sediment cleanup
- The river is responding with a decrease in PAHs, cancer in fish, and fish returning to the site



Questions?

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