MINNESOTA POLLUTION CONTROL AGENCY

Beneficial Use Opportunities Duluth-Superior Harbor

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MPCA

CLEAN WATER LAND & LEGACY AMENDMENT

Great Lakes RESTORATION

MINNESOTA POLLUTION CONTROL AGENCY

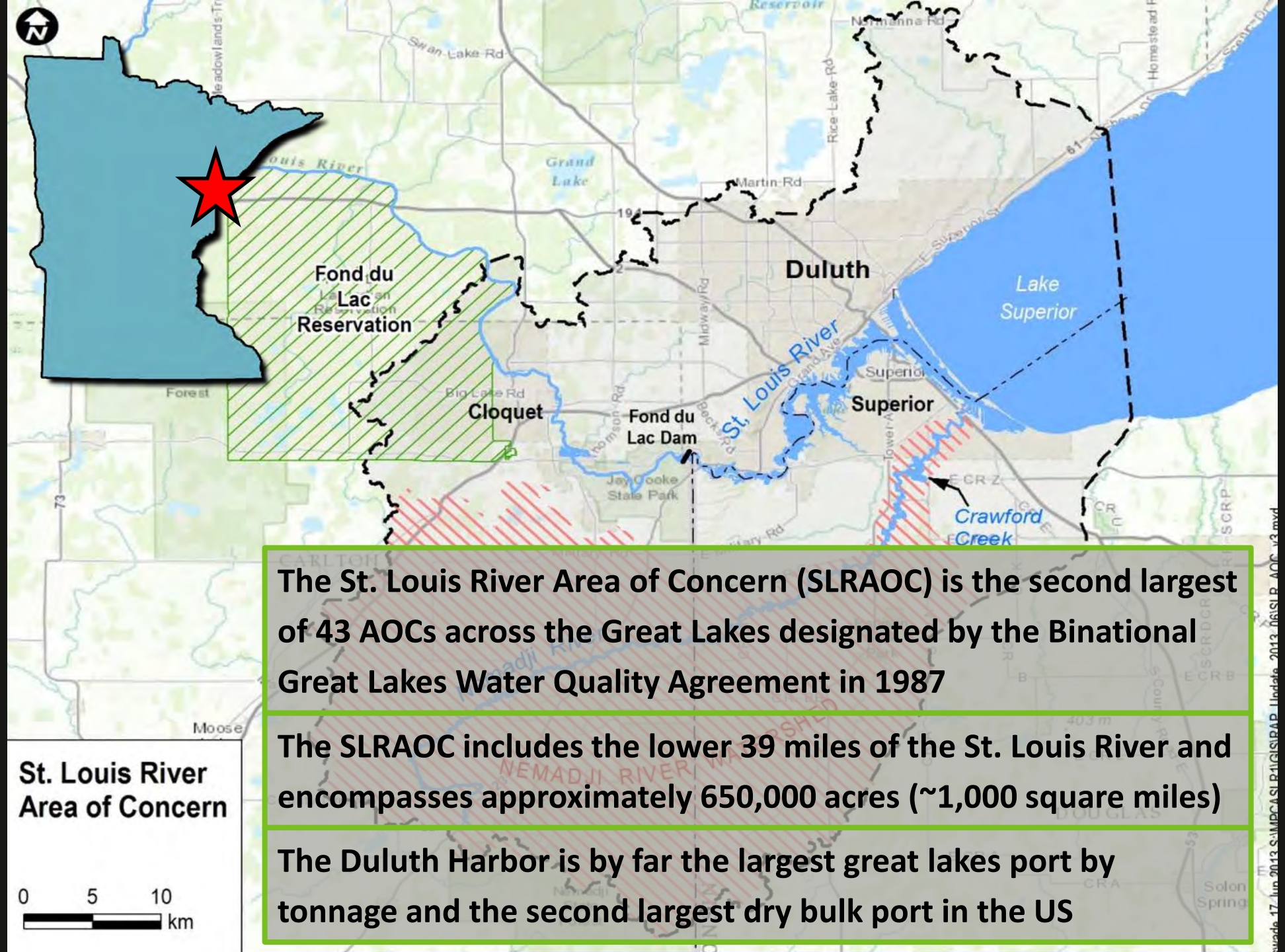
DEPARTMENT OF NATURAL RESOURCES

WEDA | 5 June 2019

Duluth-Superior Harbor

Outline

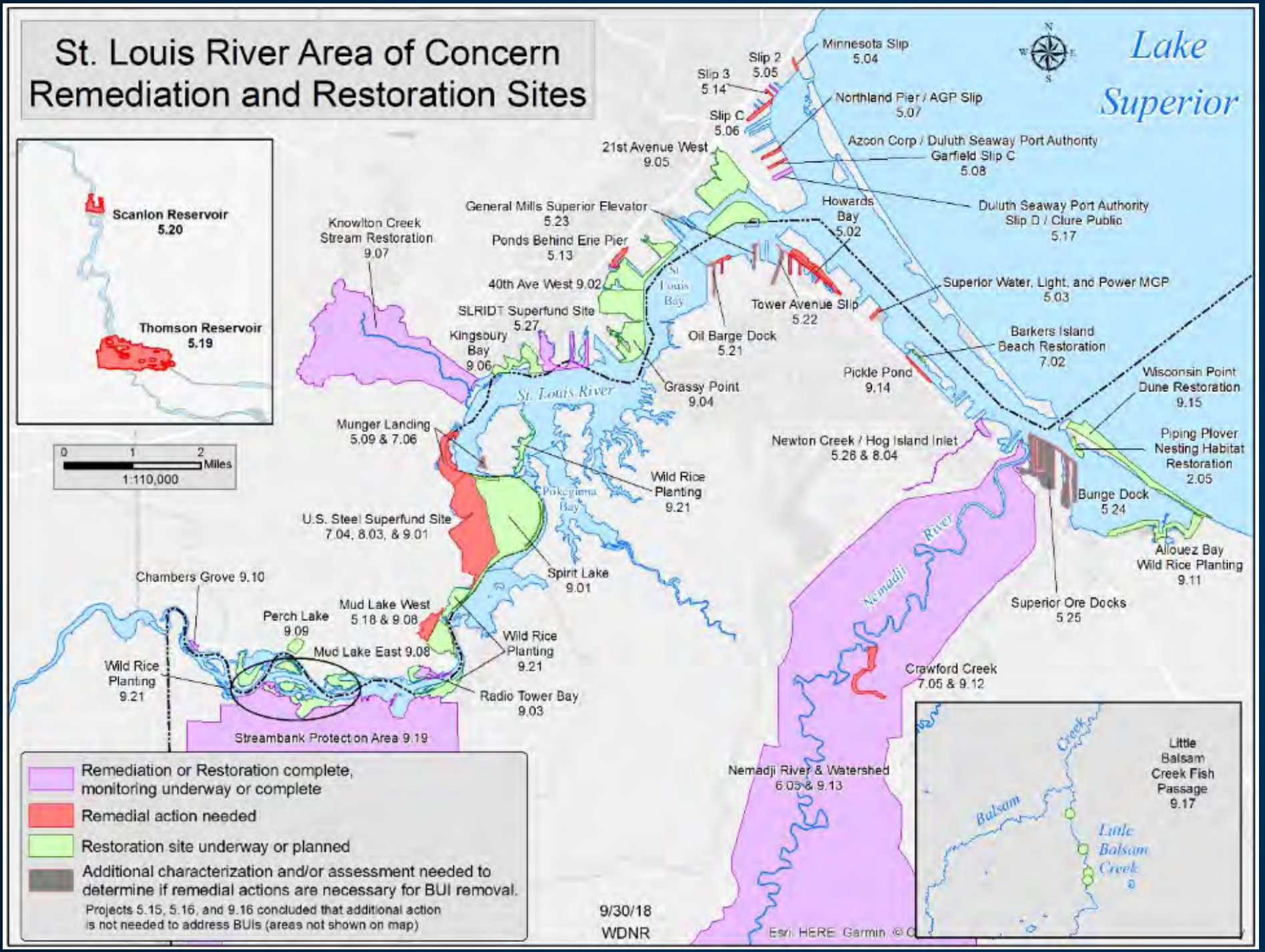
- Overview of the St. Louis River Area of Concern (AOC)
- Beneficial Use of Navigational Dredge Materials
  - Habitat Restoration Projects
  - Contaminated Sediment Remediation Projects
- Sustainable Dredge Management Planning
- Keys to Successful Beneficial Use Projects



The St. Louis River Area of Concern (SLRAOC) is the second largest of 43 AOCs across the Great Lakes designated by the Binational Great Lakes Water Quality Agreement in 1987

The SLRAOC includes the lower 39 miles of the St. Louis River and encompasses approximately 650,000 acres (~1,000 square miles)

The Duluth Harbor is by far the largest great lakes port by tonnage and the second largest dry bulk port in the US

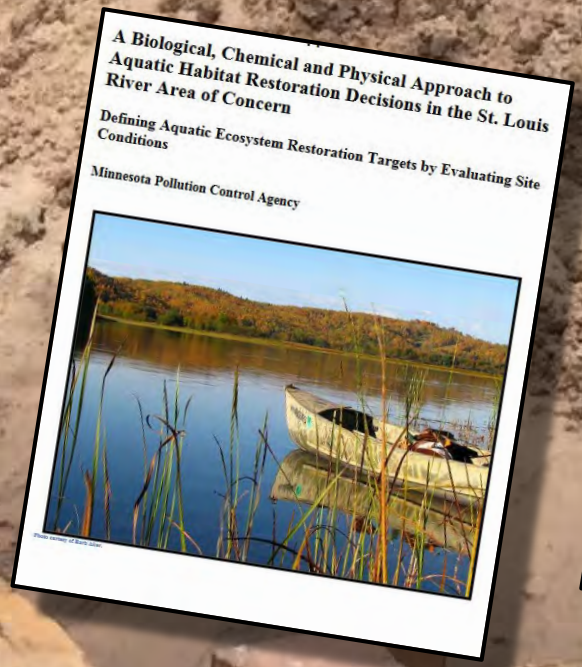


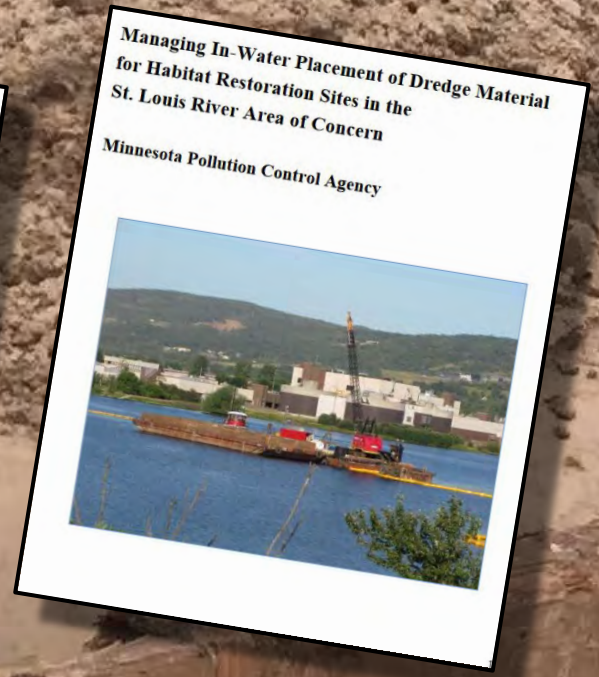
- 22 Remediation sites
  - 7 completed
  - 15 in progress
- 19 Restoration sites
  - 6 completed
  - 13 in progress

Beneficial Use
MN State Guidance

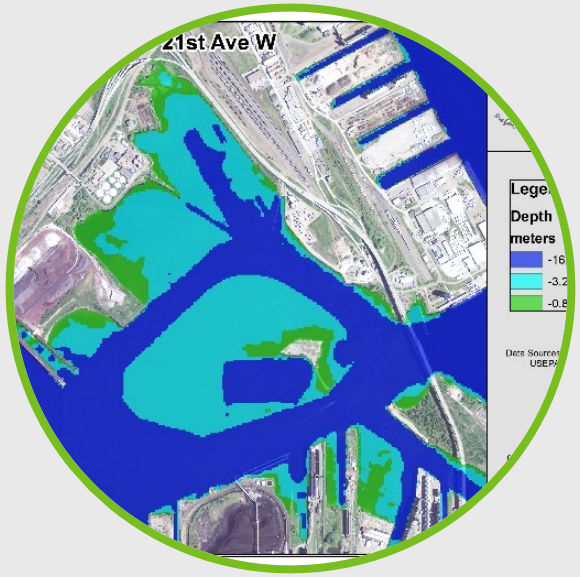
- *Testing Material*
- *Approving Locations*

- ❑ Sediment characterization
- ❑ Acceptable Risk
- ❑ Ecological improvement
- ❑ Public benefit

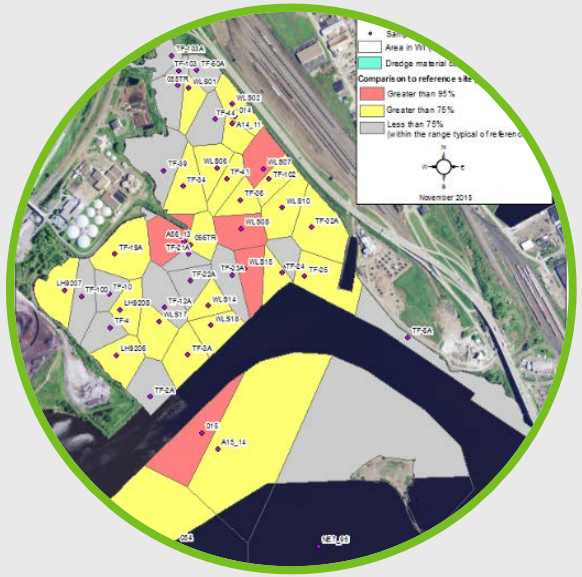




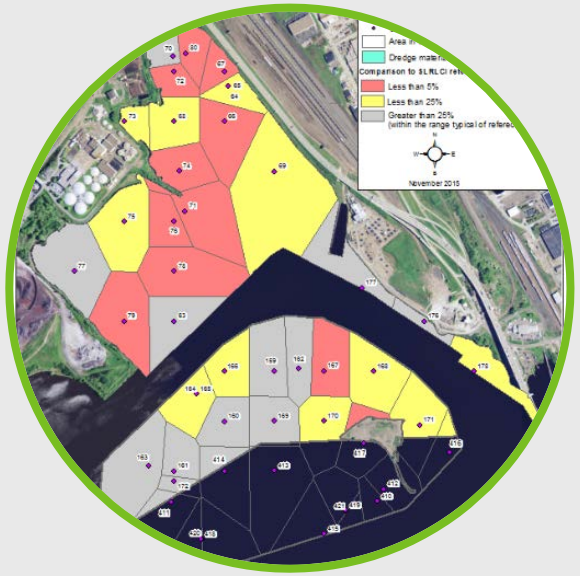
Approving Locations
Design-basis approach



Physical



Chemical



Biological

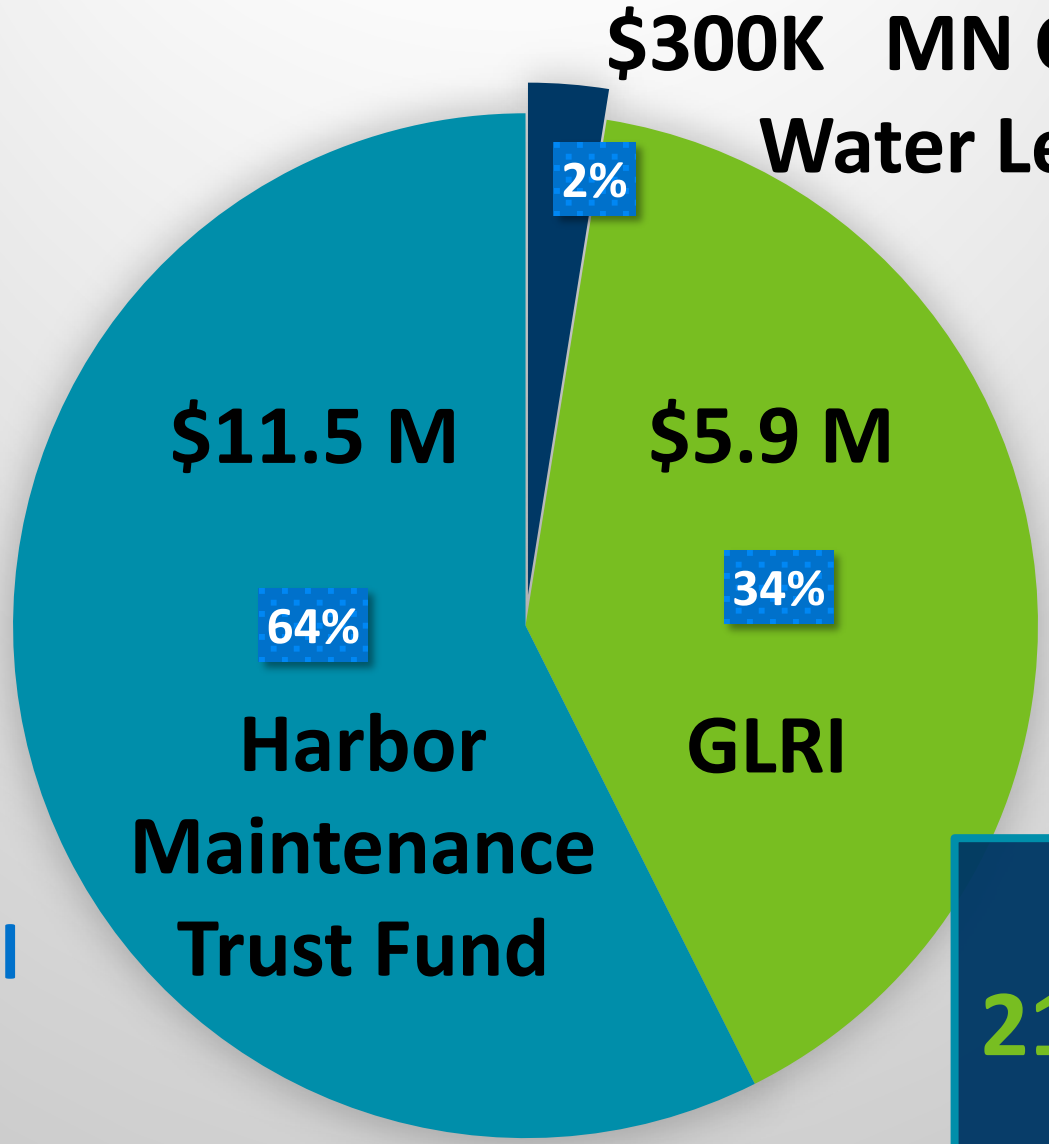
Economical/Social

Multiple lines of evidence, surface-area weighted averaging, data-driven decisions, and demonstrating project purpose & need to satisfy environmental review

St. Louis River AOC Program

Over 1.1 million CY used for aquatic Habitat Restoration

Combined Construction Costs

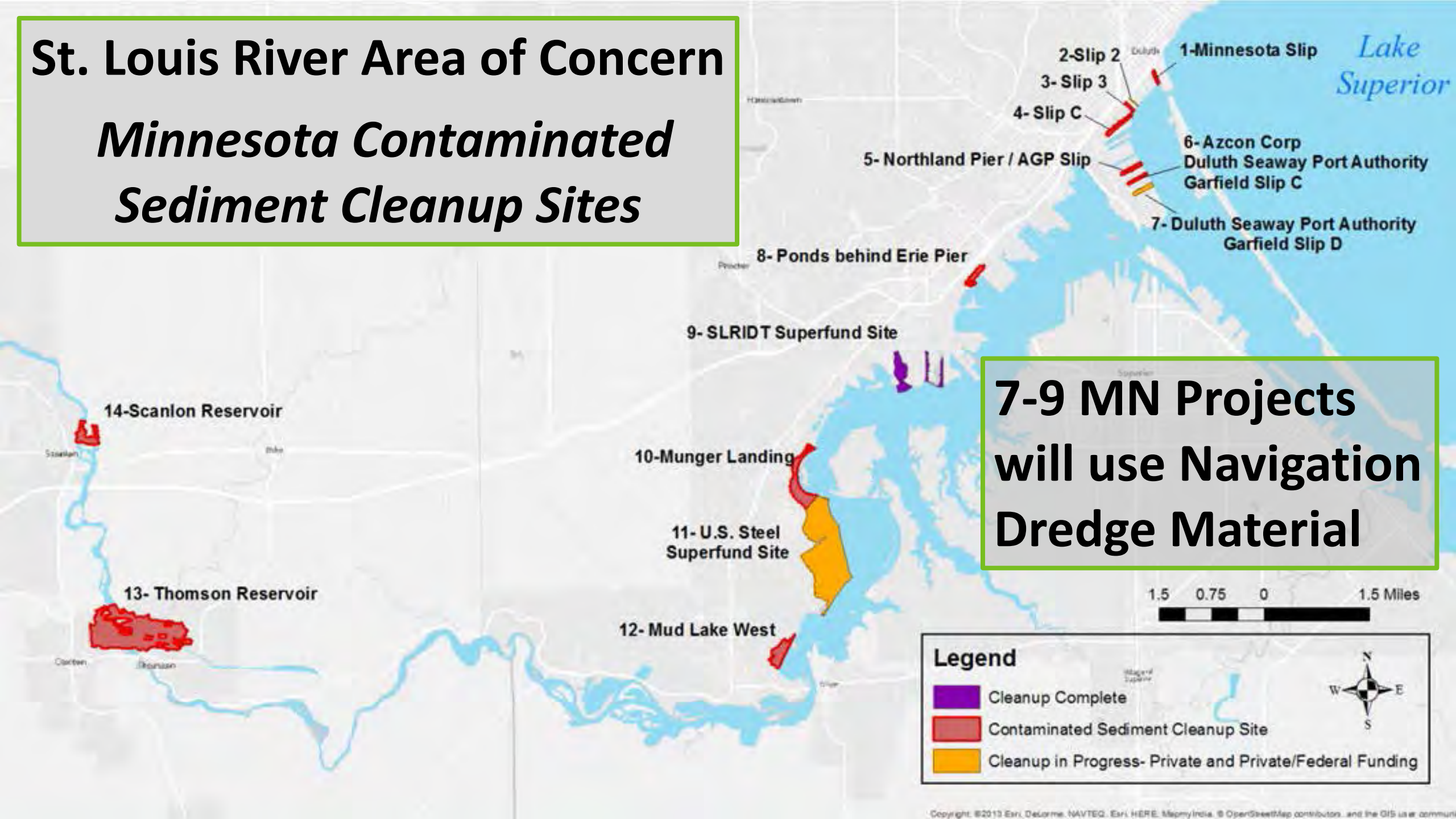


St. Louis River AOC Program

21st and 40th Avenues West partnership funding

St. Louis River Area of Concern

Minnesota Contaminated Sediment Cleanup Sites



7-9 MN Projects will use Navigation Dredge Material

Beneficial Use Remediation Capping Projects Completed

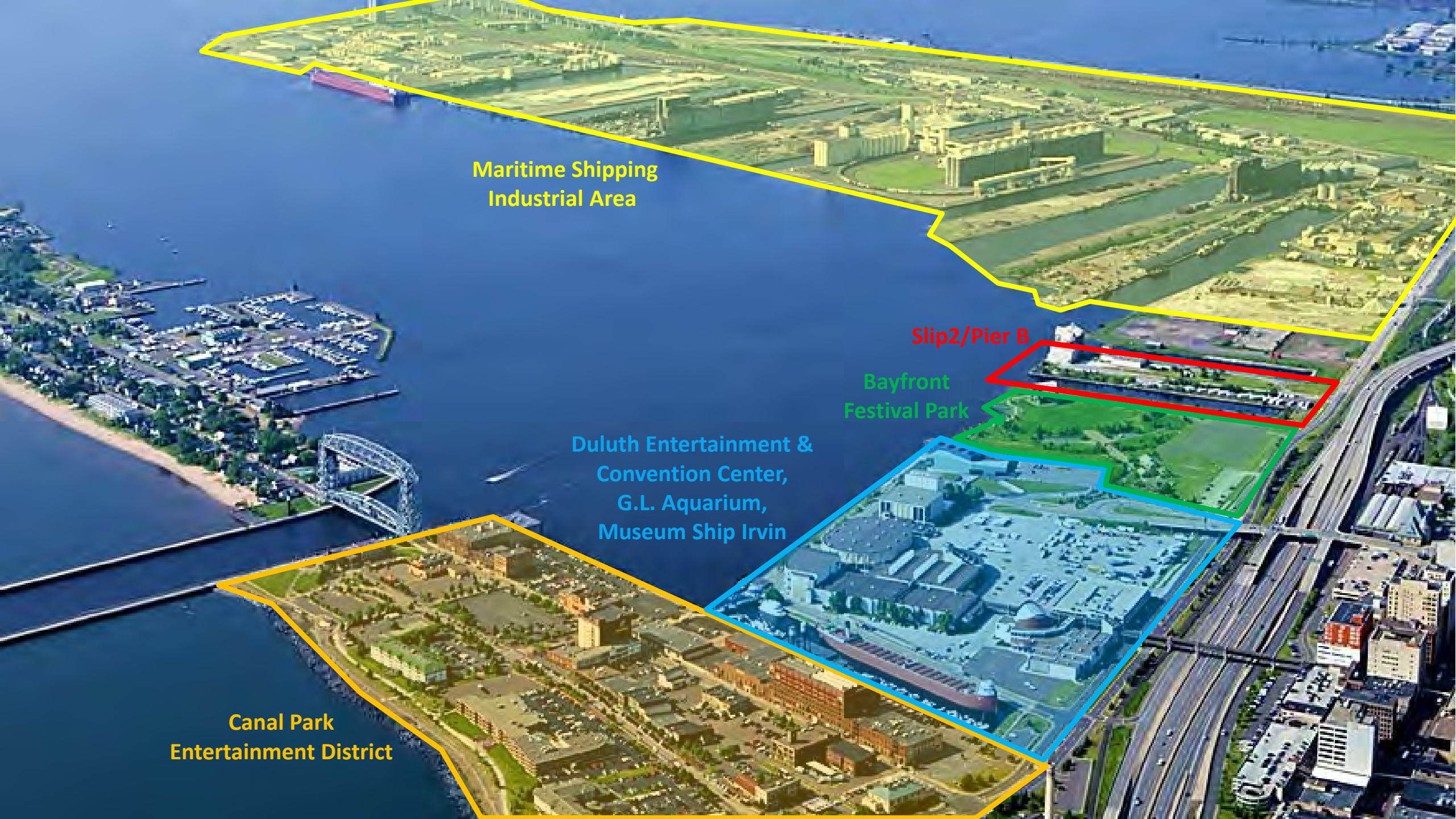
Slip 2

Minnesota Slip

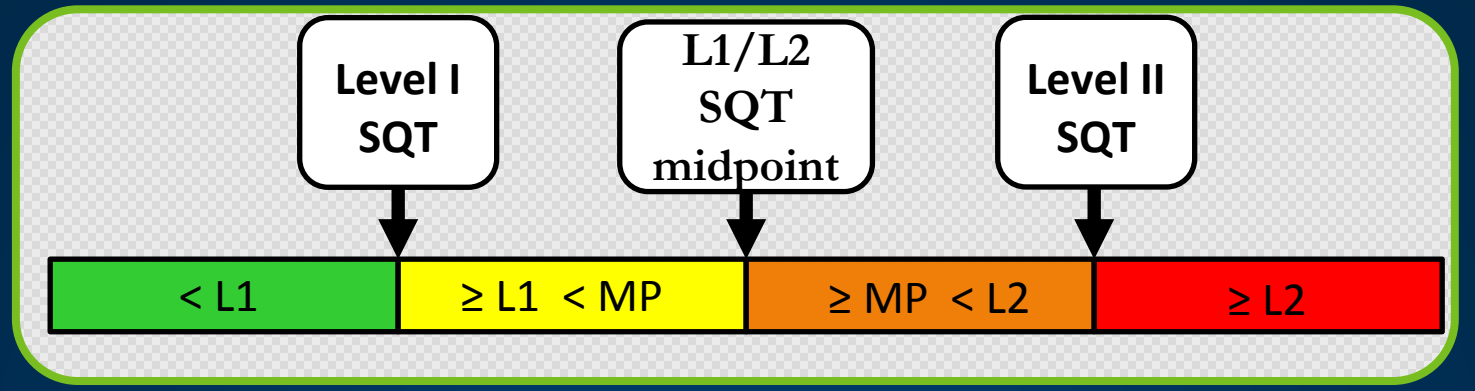
Slip 3

Slip C

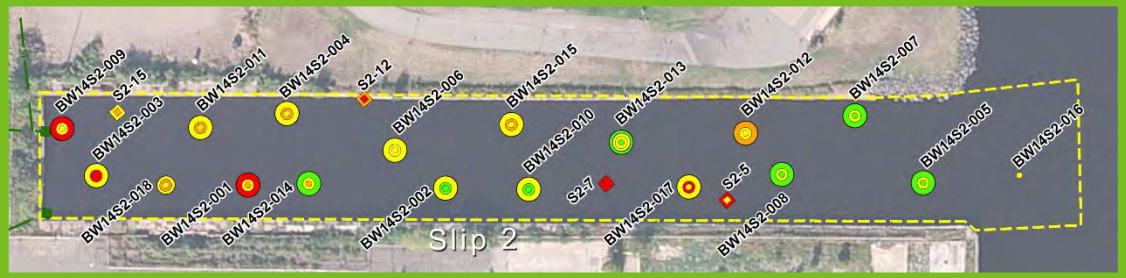
Private and Public supported projects utilized over 75,000 CY


Maritime Shipping
Industrial Area
Slip2/Pier B
Bayfront
Festival Park
Duluth Entertainment &
Convention Center,
G.L. Aquarium,
Museum Ship Irvin
Canal Park
Entertainment District

MN Sediment Quality Targets



Total PAH_{13}



Lead

Mean PEC-Q

Selected Contaminants of Concern

Total PAH13 SQT Comparison
- Does not exceed Level 1 SQT (1600 µg/kg)
- Exceeds Level 1 SQT (1600 µg/kg)
- Exceeds Midpoint SQT (12300 µg/kg)
- Exceeds Level 2 SQT (23000 µg/kg)

Lead SQT Comparison
- Does not exceed Level 1 SQT (36 mg/kg)
- Exceeds Level 1 SQT (36 mg/kg)
- Exceeds Midpoint SQT (83 mg/kg)
- Exceeds Level 2 SQT (130 mg/kg)

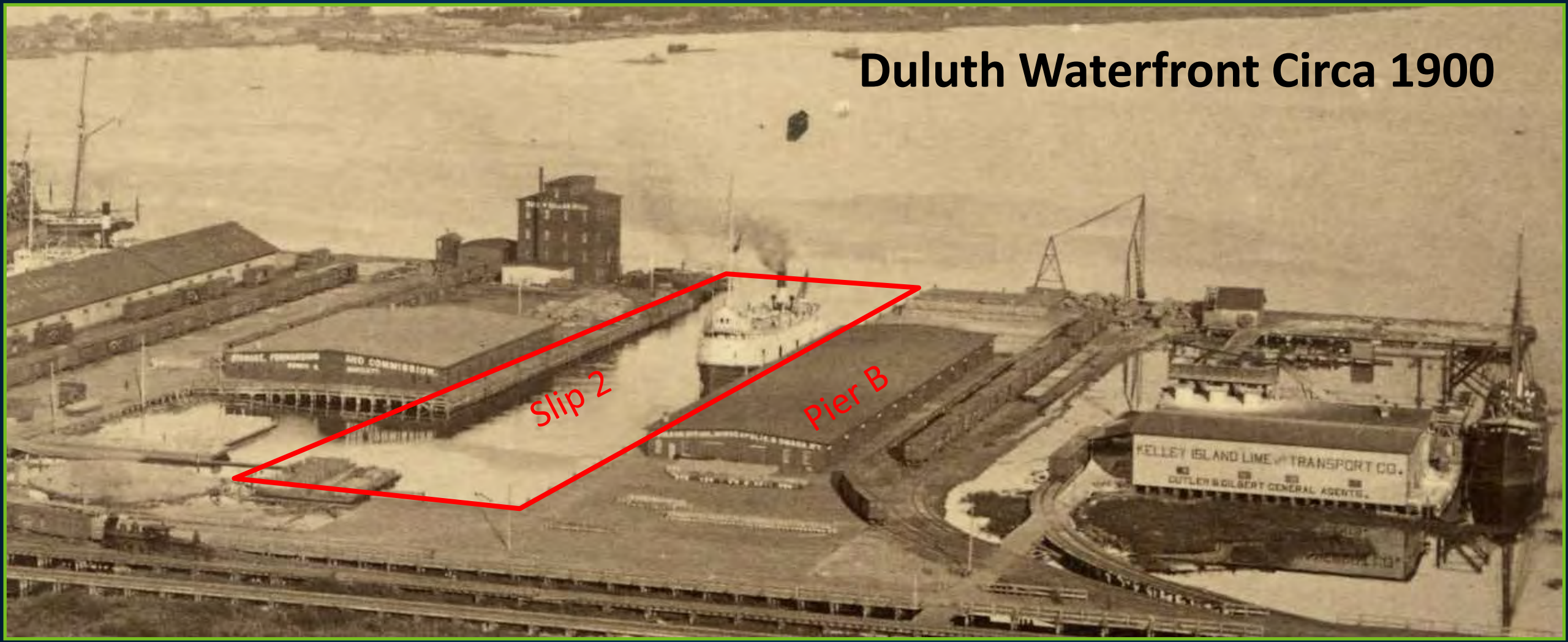
Mean PEC-Q SQT Comparison
- Does not exceed Level 1 SQT (0.1)
- Exceeds Level 1 SQT (0.1)
- Exceeds Midpoint SQT (0.35)
- Exceeds Level 2 SQT (0.6)

Sample Type
- Sediment Sample (Bay West 2014)
- Sediment Sample (Historical)

Sample Interval
- 0-0.15 m
- 0.15-0.50 m
- 0.50-1.0 m
- >1.0 m

Development Challenges

- Contaminated Land
- Contaminated Sediments
- Dock Wall Issues
- Structural Integrity of Pier
- Financial Viability
- Permitting Hurdles

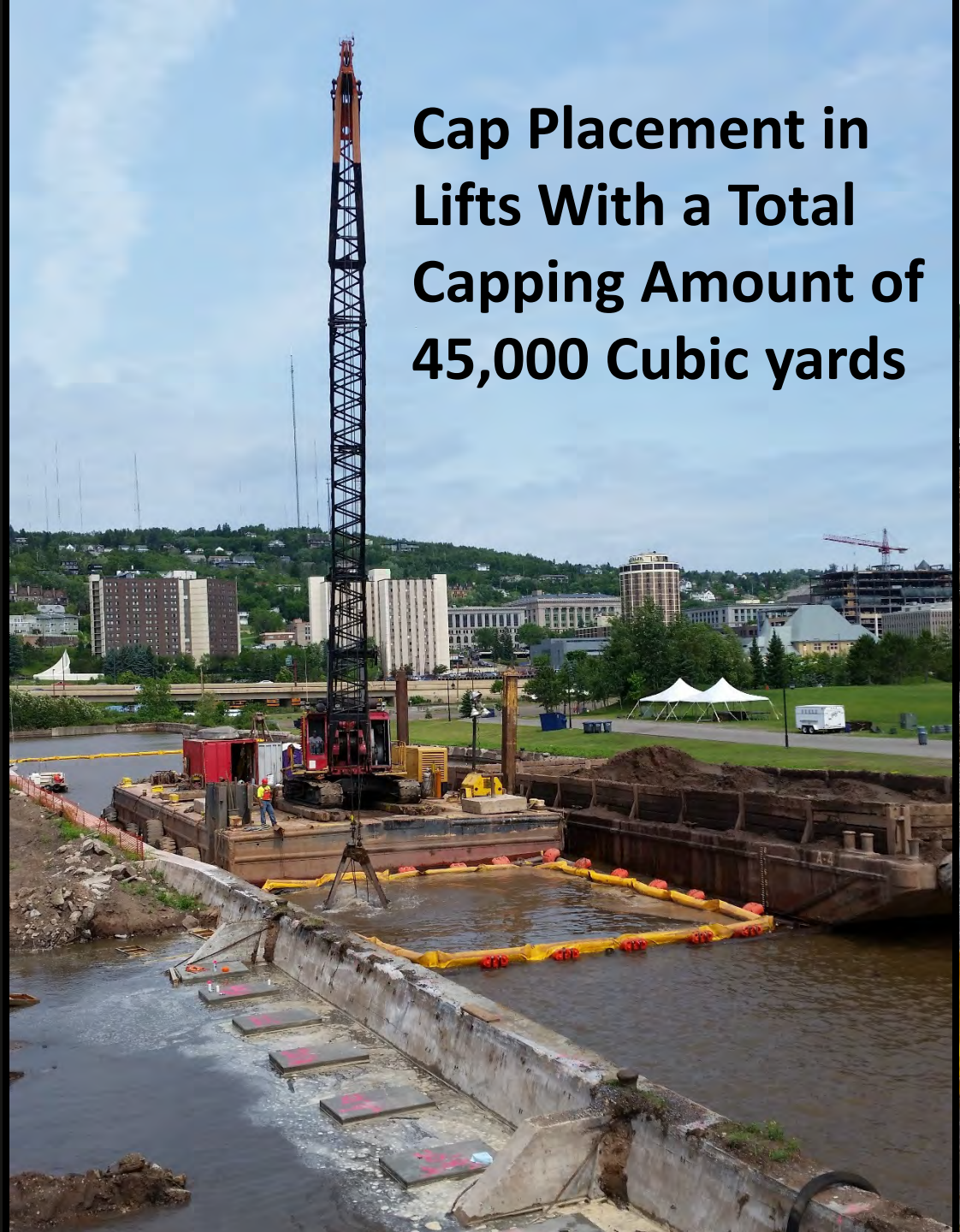


Failing Pile Supported Dock Wall

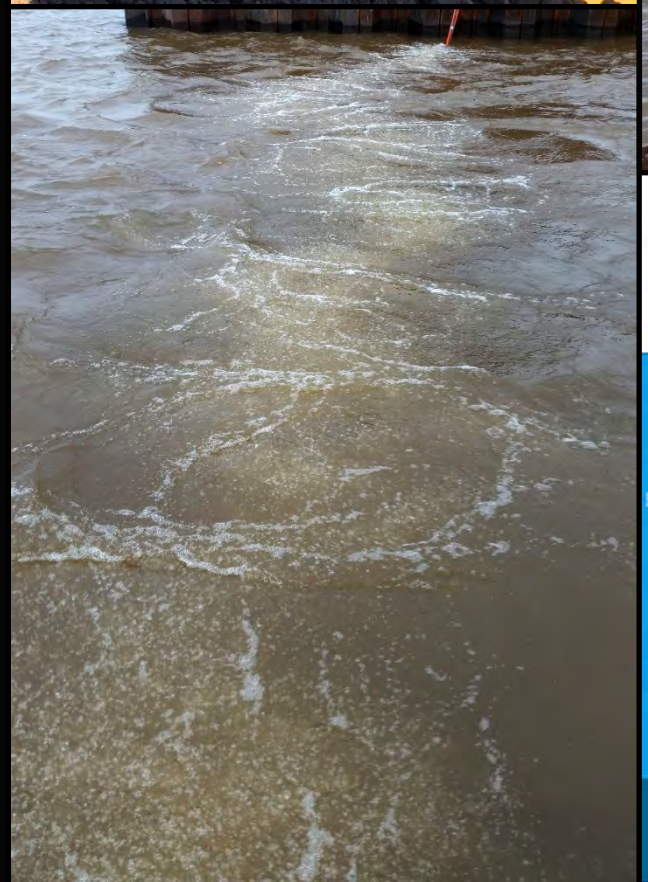
Navigation Dredge Material used for Remedial Capping

- Dredge Material Management Units (DMMUs) sampled at a greater frequency for chemistry and grain size distribution than normal UCACE requirements to determine if material is acceptable for remediation sites

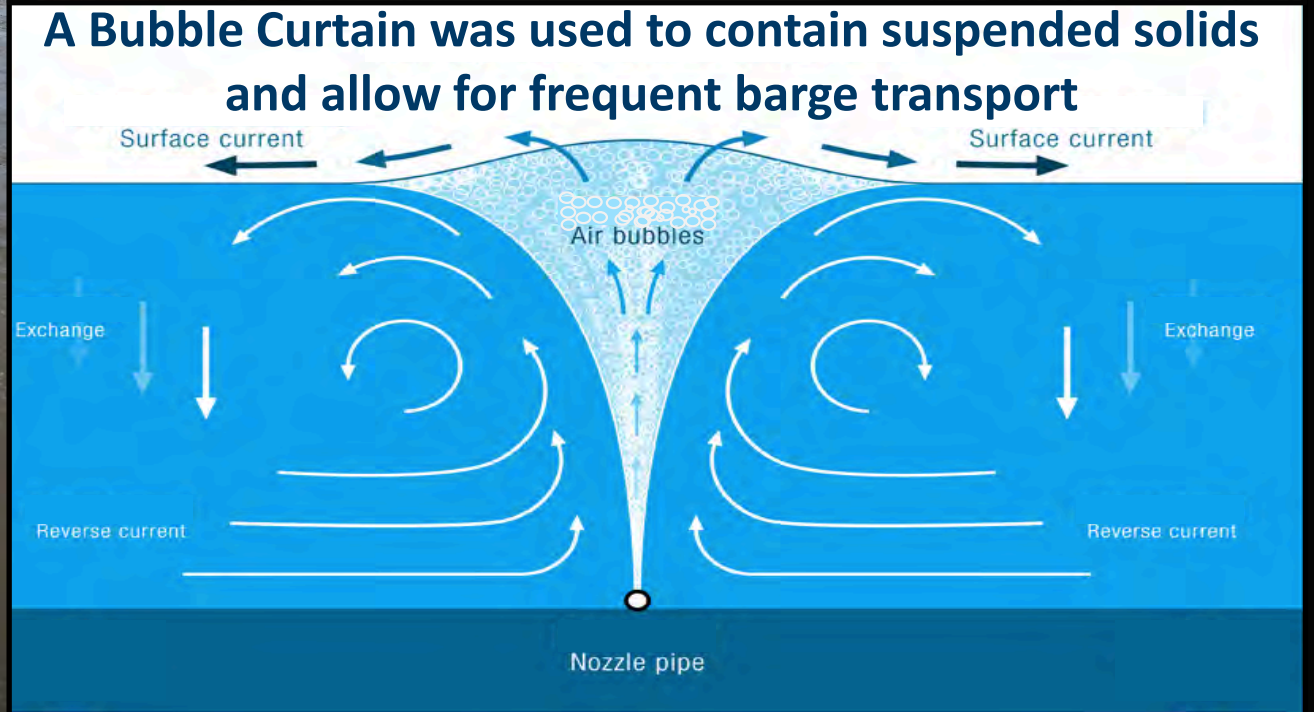
- Best Management Practices for capping were developed
  - Silt curtains surrounding dredge template placement area
  - Bubble curtain placed at slip entrance
  - Slowly open bucket at depth to reduce velocity and clumping
  - First two cap lifts no greater than 1 foot to reduce resuspension and potential for mud-waves
  - Thicker lifts allowed after initial lifts gained stability



Cap Placement in Lifts With a Total Capping Amount of 45,000 Cubic yards

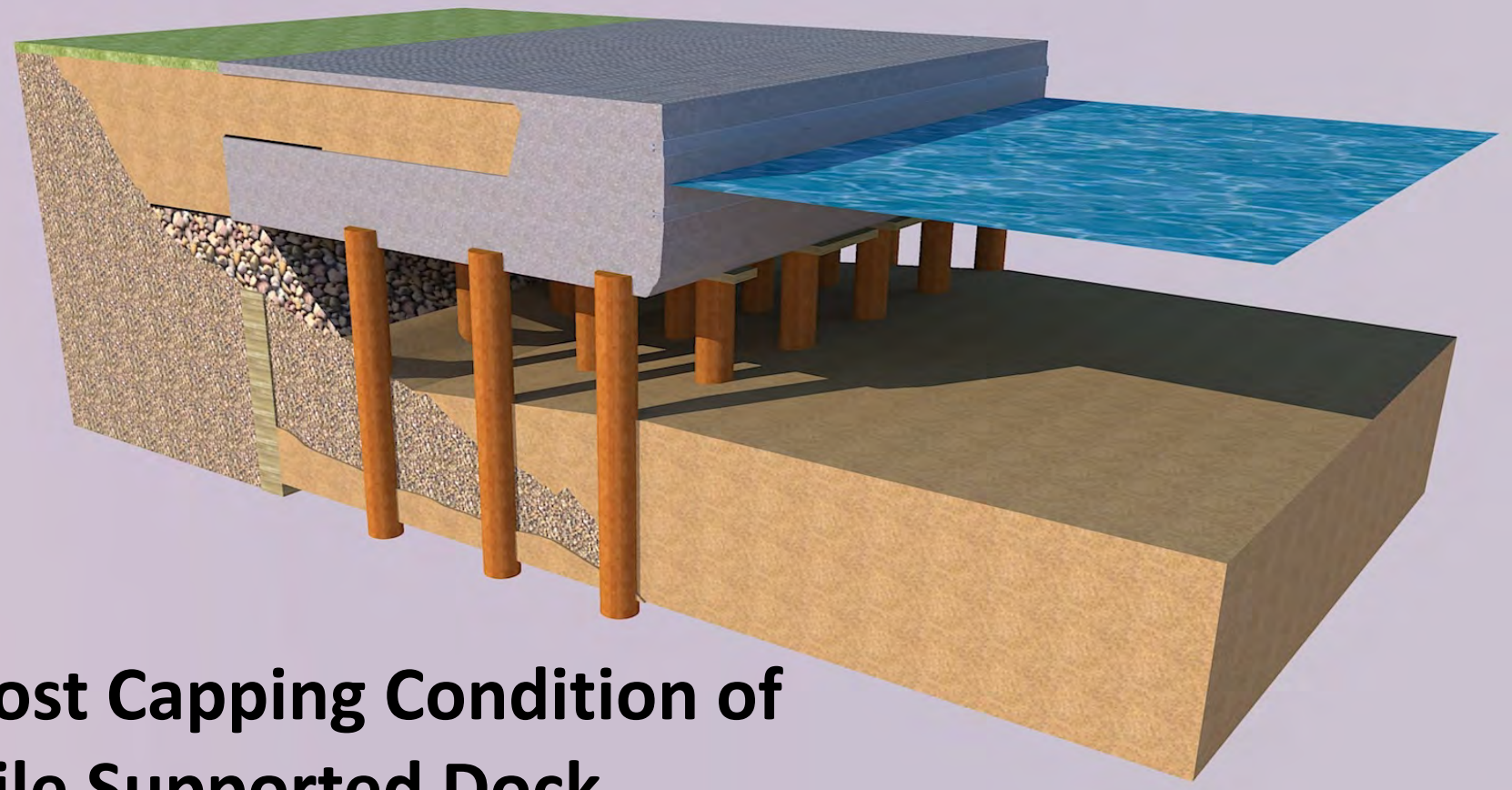


A Bubble Curtain was used to contain suspended solids and allow for frequent barge transport

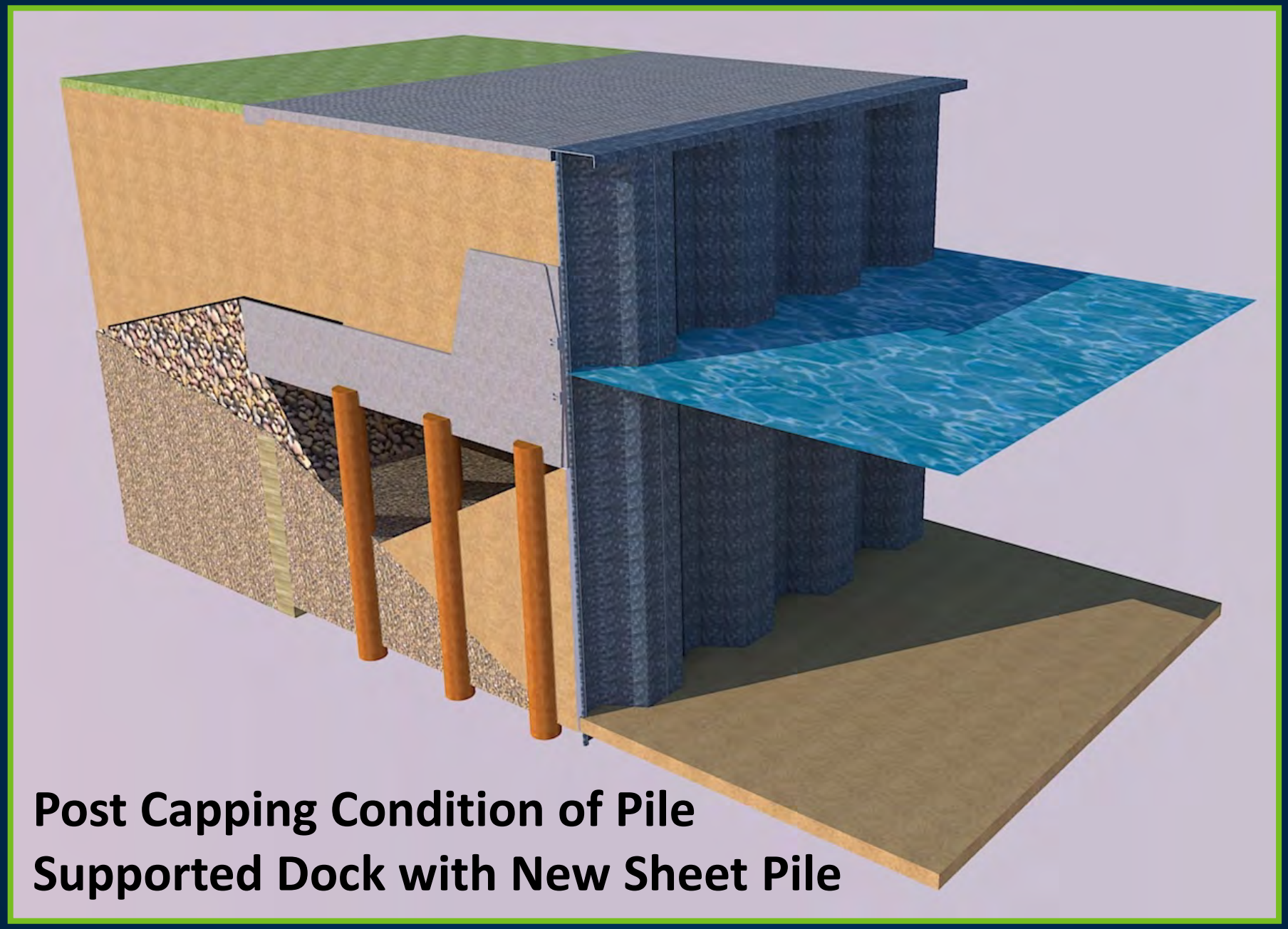


Dock Wall Stabilization and Remedial Capping

- Pile supports are stabilized
- Gaps are filled and stabilized
- Tie-backs are installed as needed
- Remedial cap at a minimum of 10 foot thickness is placed



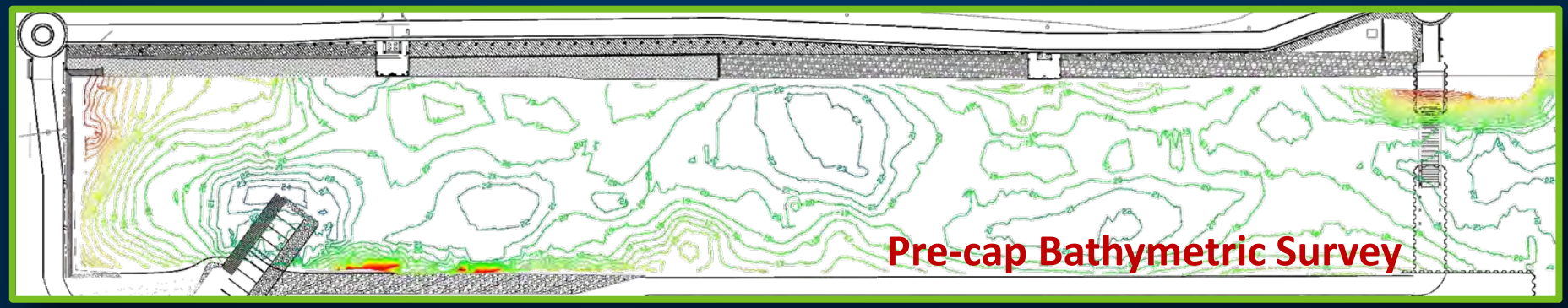
Post Capping Condition of Pile Supported Dock

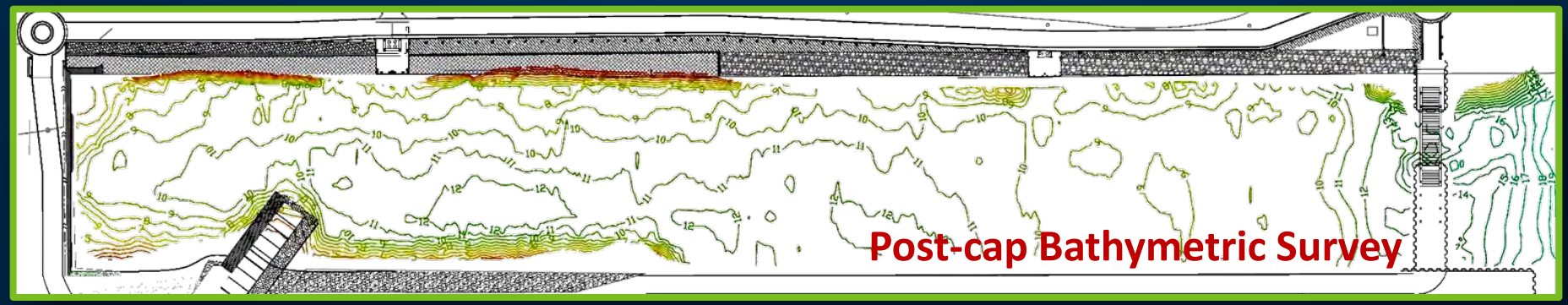


Post Capping Condition of Pile Supported Dock with New Sheet Pile

Post-Cap Slip Conditions

- Depth reduced to an average of 10 feet form original 20+ feet
- Cap thickness averages 10 feet
- Cap sampled and no significant levels of contaminants detected
- Armor material placed near new bridge and on slope to channel
- Boat ramp and zero-height access constructed
- Marina docks and walkways installed





PIER·B RESORT

Minnesota Pollution Control Agency

AMI Consulting Engineers P.A.

ROEN SALVAGE CO. STURGEON BAY, WI

Minnesota DEPARTMENT OF NATURAL RESOURCES

US Army Corps of Engineers

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

NORDIC GROUP

Bay West
Customer-Focused Environmental & Industrial Solutions

WIN

Developer received no-cost material reducing cost of dock wall repair allowing project to be viable

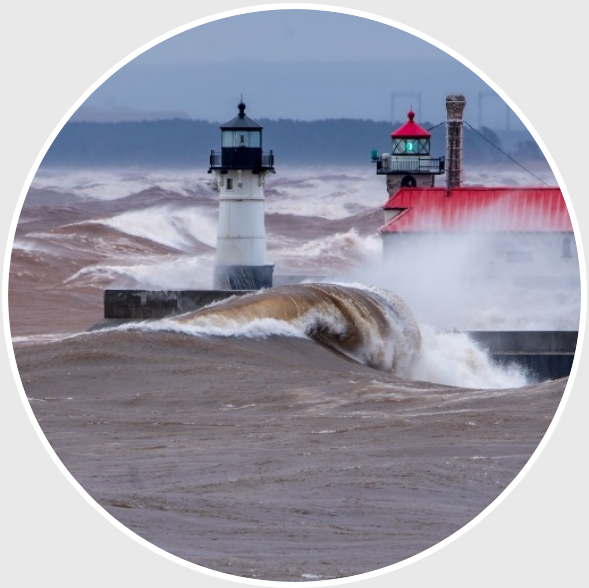
WIN

USACE dredge contractor delivers navigation dredge material to nearby project reducing transport time & cost

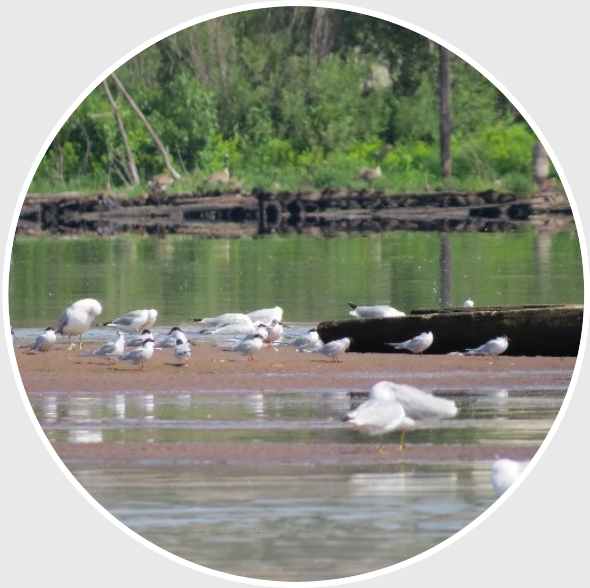
WIN

Contaminated Sediments are remediated with thick cap with no cost to City, State, or Fed. government

Beneficial Use in a Sustainable Dredge Management Plan



Beach Nourishment & Shoreland Reclamation



In-Water Estuary Habitat Maintenance & Sediment Remediation

Land-Based Construction

Processing and Reuse Facility (Erie Pier)

Mine Land Reclamation

PRF and State Incentives

Investing in placement alternatives

Concepts Making Beneficial Use Successful

- **Early Coordination**
- **Partnerships -** *define roles and responsibilities*
- **Participation -** *involved and innovative*
- **Pilot-scale projects -** *manageable investments & show success*
- **Data-driven approach -** *analyze alternatives & effectiveness*

Thank you!

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