

Perspectives on the beneficial use of dredged materials for habitat restoration projects for Duluth/Superior harbor

Joseph P. Kreitinger, PhD

US Army Engineer Research and
Development Center

Ithaca, NY

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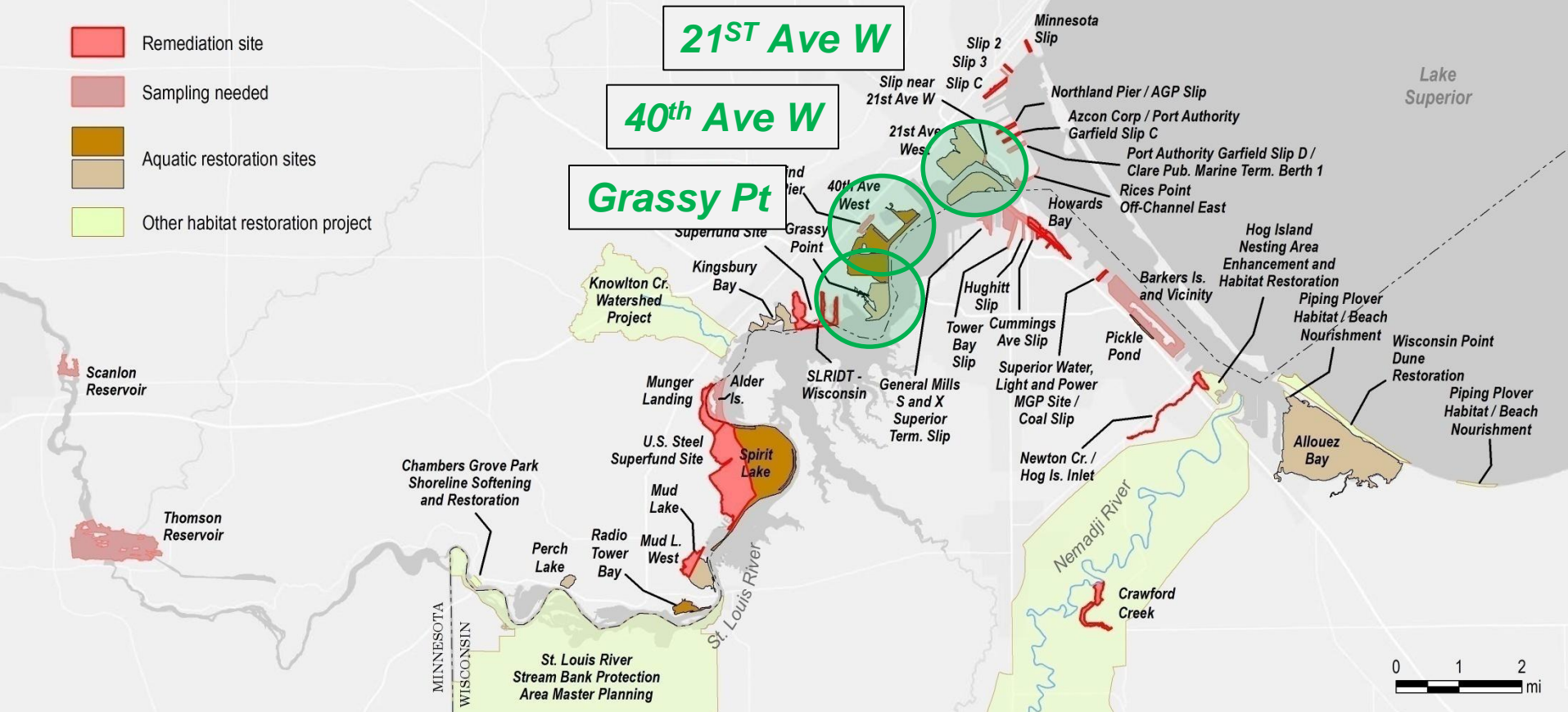
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USEPA Great Lakes Restoration Initiative

"The Big Three" Restoration Sites Under The USACE/MPCA AOC Agreement

- Remediation site
- Sampling needed
- Aquatic restoration sites
- Other habitat restoration project

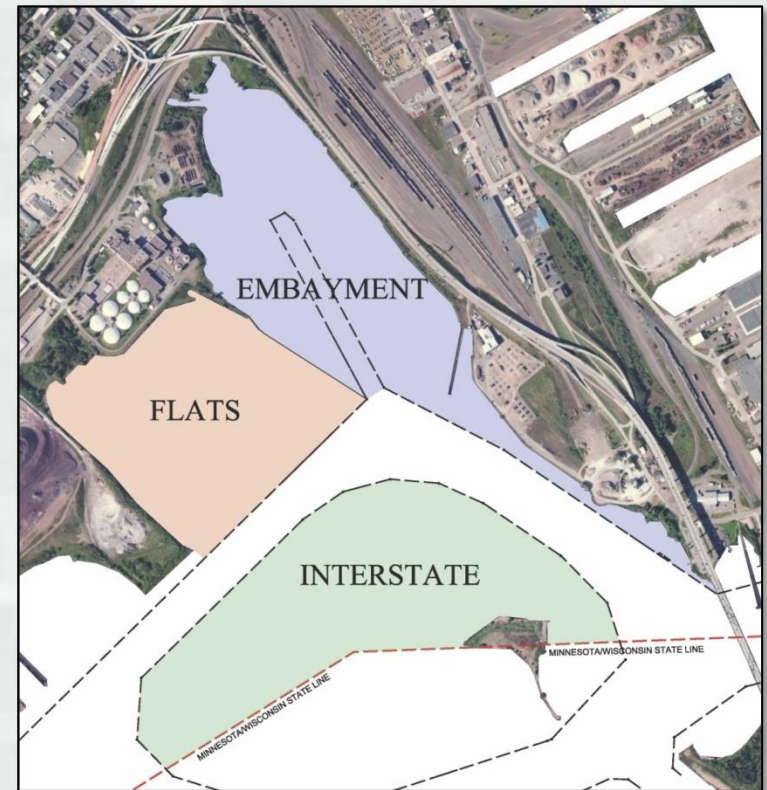


Beneficial use of dredged material planned for two and being considered for a third site



Recreate Shallow-water Sheltered Bay Habitat

- 401 WQC construction area shown on map.
- 401 WQC states that appropriate BMPs must be used to ensure dredged material placement at the project site will not, to the extent practicable, exceed state water quality standards outside of the project area



21st Avenue West Construction Management Zones

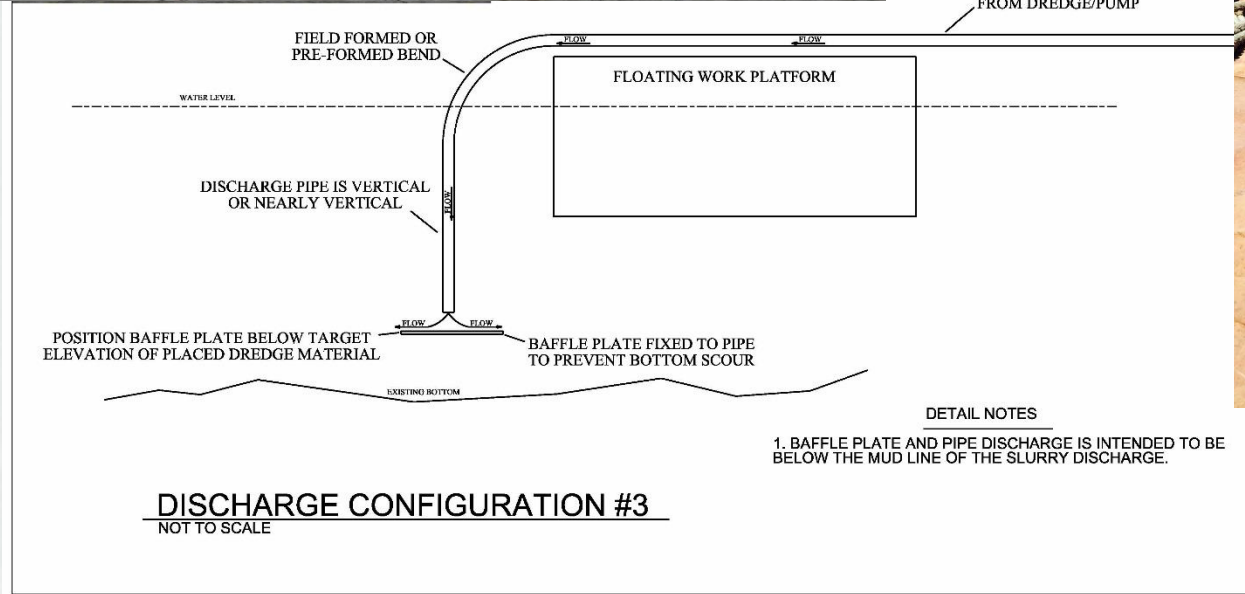


USACE/MPCA Pilot Project To Evaluate Engineering Technology and Regulatory Process

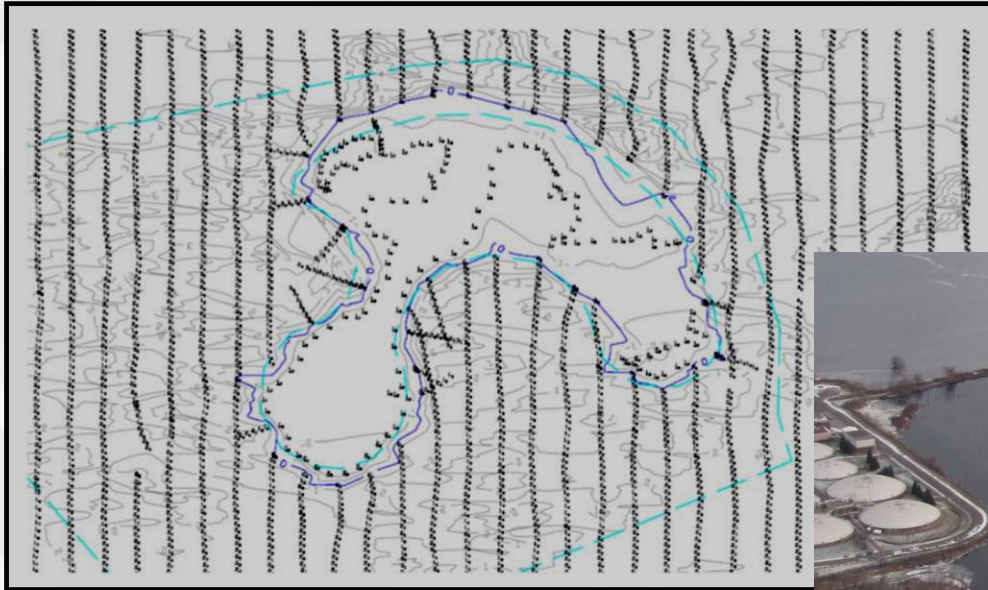


Pilot Project Allowed Flexibility to Evaluate New Construction Methods

Vertical Discharge at Sediment Surface with Plate



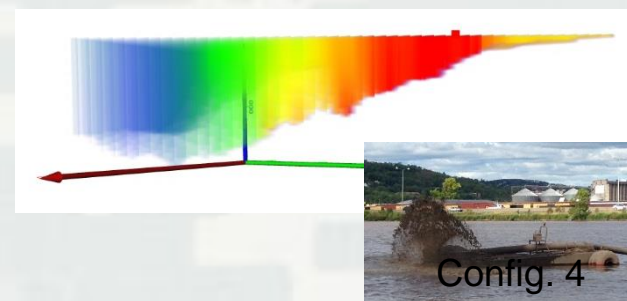
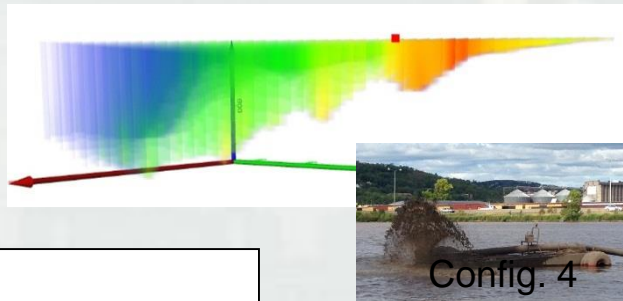
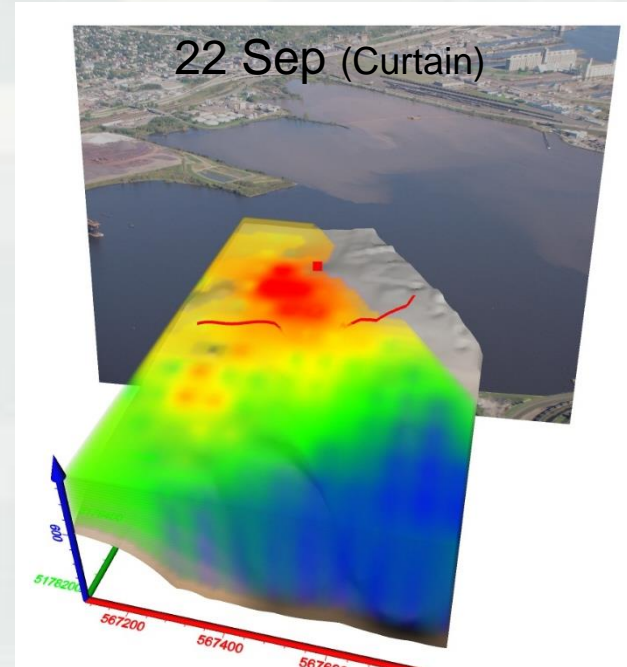
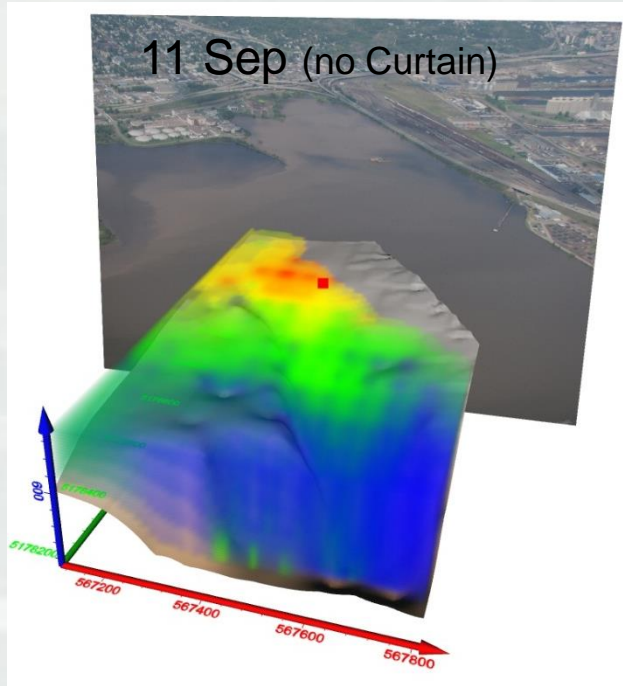
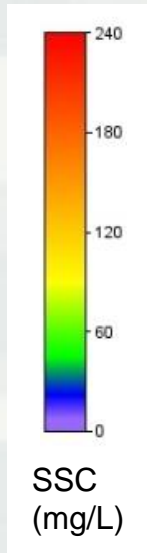
Detailed Engineering Plans and Specifications Define what Success Looks Like



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Coordination with Other Federal Partners to Assess Project Outcomes

USGS 3D Turbidity Modeling with and without Curtain



LEGEND

- End of Discharge Pipe
- Silt Curtain



Review of FY17 Turbidity Reducing BMPs

- Manage contracts to limit multiple hydraulic placement operations
- Equipment size and configuration specification
 - ▶ Mechanical placement where feasible
 - ▶ Vertical discharge at sediment surface where feasible
- Apron for spill control between scow and pump
- Daily visual inspection
- Minimize pump operation
- Limit vessel traffic over placed material



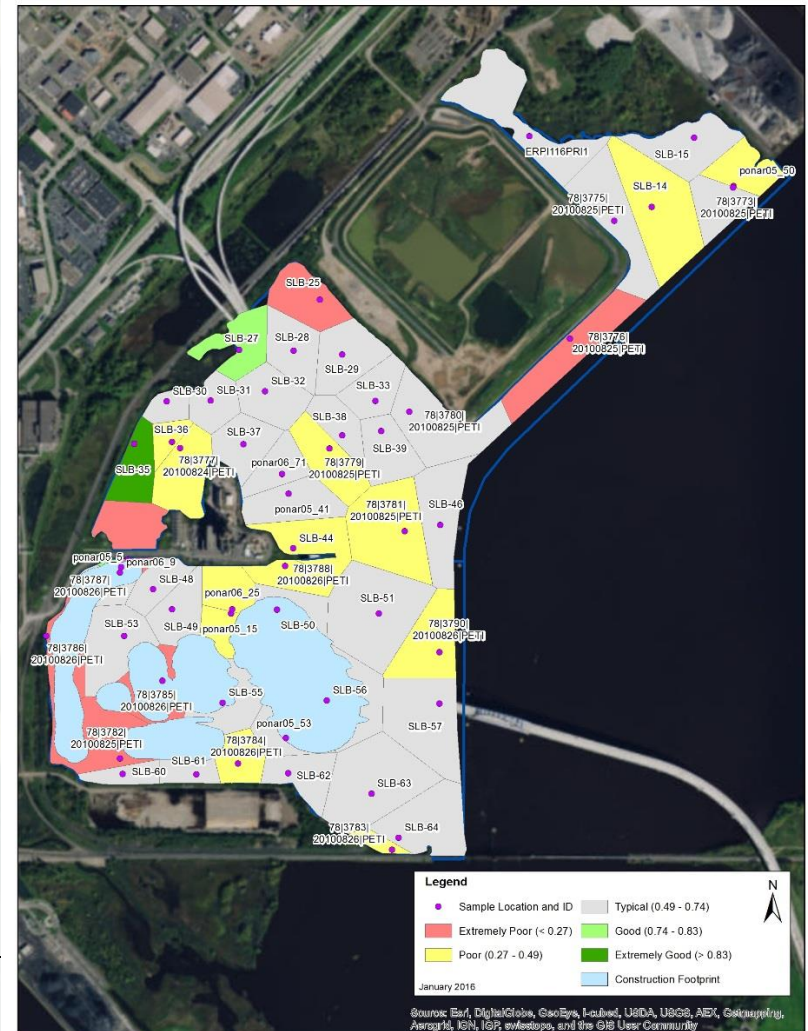
Spatial Analysis to Understand and Balance Risks vs Benefits

Spatial distribution of macroinvertebrate quality index (SLRLCI) in surface sediments at the 40th Ave West Habitat restoration site.

A) Pre Construction



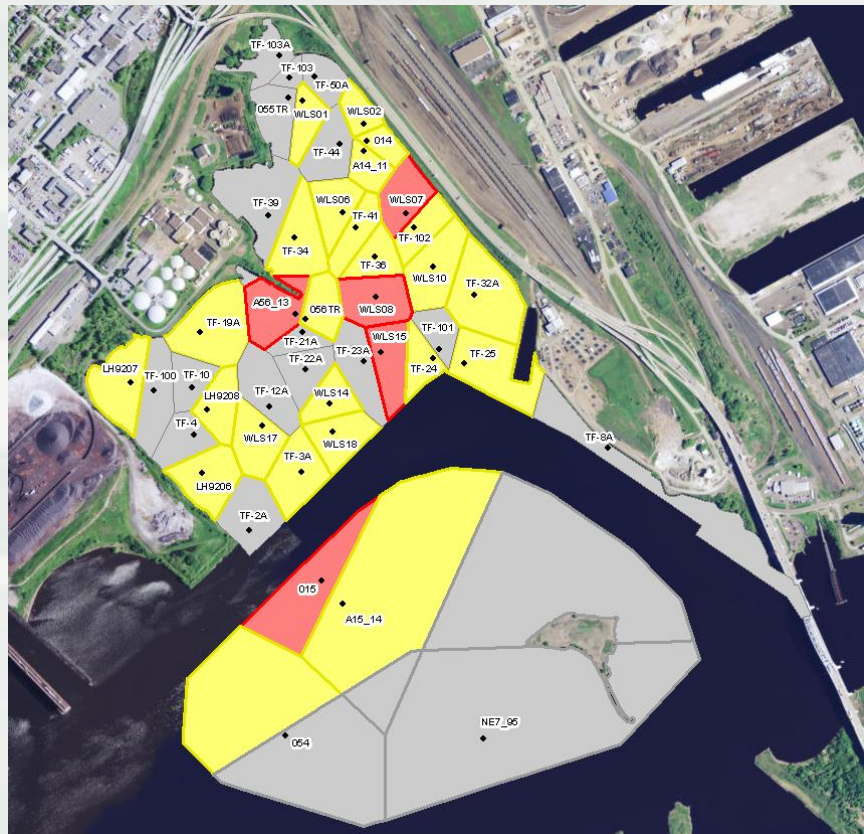
B) Post Construction



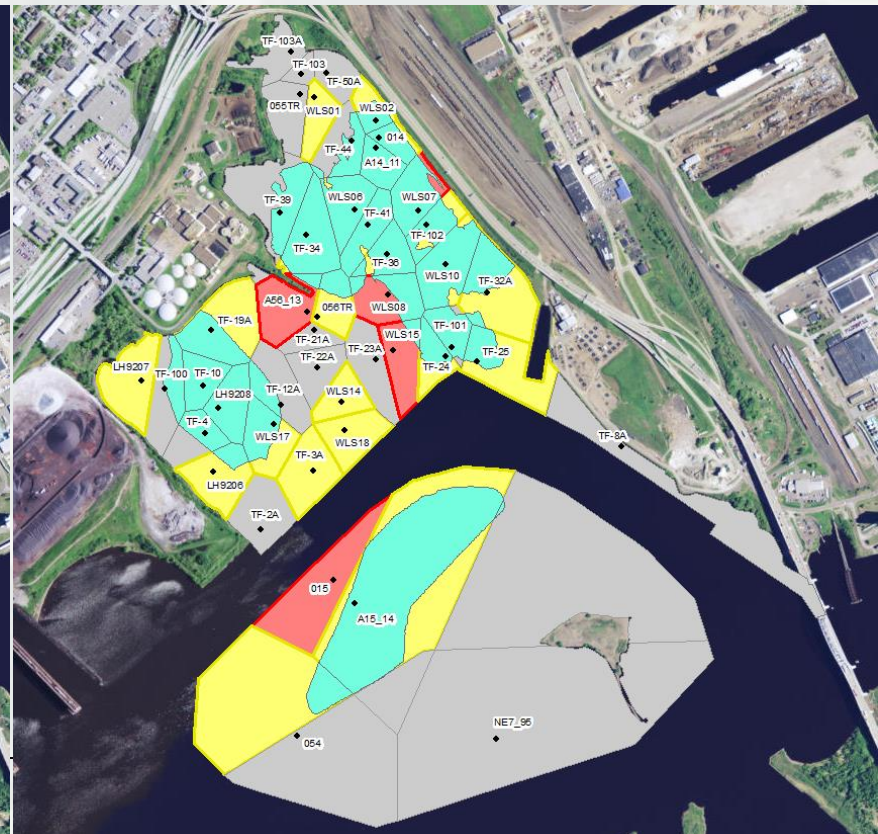
Engineering with Nature to Improve Project Outcomes ~ Defining Strategies for Risk Reduction ~

Spatial distribution of Mercury in surface sediments at the 21st Avenue West Habitat restoration site.

21st Ave Preconstruction



21st Post Construction



Recommendations for future beneficial use projects?

- ✓ **Create a partnership agreement that defines project goals and objectives**
- ✓ **Develop a sediment quality assurance project plan (QAPP) that harmonizes federal and state guidance and guidelines**
- ✓ **Engage other technical groups when needed to help address short and long term risk concerns**
- ✓ **Design a pilot project to address uncertainty and address remaining risk/benefit concerns**
- ✓ **Take advantage of engineering with nature strategies to manage risk and obtain better project outcomes**

