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Clinton River Mouth Wetland



from **Engineering With Nature: An Atlas, Volume 2.**

by US Army Engineer Research and Development Center



Harrison Township, Michigan, United States

Innovating a new approach to wave breaks at the edge of an open lake.

Since the 1987 Great Lakes Water Quality Agreement between Canada and the United States, restoring Lake St. Clair has been an international priority. Converted to a dredged sediment disposal facility in the 1960s, the site had become covered with invasive phragmites (*Phragmites australis*), creating a low-quality habitat; and the construction of the facility itself had destroyed a large portion of the wetland complex. Starting in 2015, the project team began the process of improving the quality and resiliency of coastal wetland for fish and wildlife species in an area that experiences extreme lake level fluctuations and ice scour. Continuing through 2021, the team has used traditional measures such as removing invasive species and planting native ones as well as nontraditional measures like installing root-wad wave breaks and using dredged sediment to create emergent wetland habitat. The eventual goal—delisting the Clinton River as an Area of Concern— will promote significant new real estate and commercial development interest, allow for increased use of the area for recreational

activities, improve the quality of life for the local community, and serve as a recruiting tool for local businesses.

Article cover: Root wads for anchoring to the lake bottom as a wave break. (Photo by Keith Kropfreiter, U.S. Army Corps of Engineers (USACE)–Detroit District)

Producing Efficiencies

The root wads used as wave breaks for the project were secured to the lake bottom with earth anchors and then, for further stability, buried with dredged sediment from the nearby channel. Designs including permanent features, in contrast, would have increased the initial project cost and, over time, required more long-term maintenance than the nature-based features used. This beneficial use of dredged sediment increases project efficiency by using existing operations and maintenance funding for multiple benefits.

Using Natural Processes

Fluctuating lake levels in Lake St. Clair, and across the Great Lakes in general, makes sustainable wetland restoration benefits difficult to consistently maintain through time. Using the root wads, which will degrade naturally, gives native wetland vegetation time to establish, providing long-term stabilization. The project team intentionally placed the wetland on the south side of the site to provide additional protection from wind and waves and therefore encourage its successful establishment. They also constructed the wetlands at two different elevations, increasing longterm resiliency to fluctuating lake levels.





Placing dredged sediment from the navigation channel in the wetland.

(Photo by Keith Kropfreiter, USACE Detroit District)

Broadening Benefits

Transformed from a monoculture of phragmites with very little ecological value to a diverse landscape, the site now includes a variety of coastal and wetland species, such as pickerelweed (*Pontederia cordata*) and swamp milkweed (*Asclepias incarnata*). These wetlands provide nursery habitat for juvenile fish and valuable resting habitat along the globally significant Mississippi Flyway. Clinton River Mouth Wetland Restoration Project is also adjacent to one of the busiest boat launches in southeast Michigan, improving local housing values and bringing in additional tourism revenue to the region.



Vegetation stabilizing the beneficially placed dredged sediment.

(Photo by Keith Kropfreiter, USACE Detroit District)



Earth anchors securing the root wads to the lake bottom.
(Photo by Keith Kropfreiter, USACE Detroit District)

Promoting Collaboration

In addition to the Environmental Protection Agency providing guidance and Great Lakes Restoration Initiative funding, the state of Michigan, Clinton River Watershed Council, and the Clinton River Public Advisory Council made major contributions to the project's success. Additionally, the local sheriff's office provided invaluable assistance, keeping boaters away from the discharge pipeline and pump. The beneficial use of dredged sediment to create nearshore wetland habitat was a first for Michigan and has led to the development of best management practices that can be used for future projects.



Seeding the site with native plants after removing invasive species.

(Photo by Keith Kropfreiter, USACE Detroit District)



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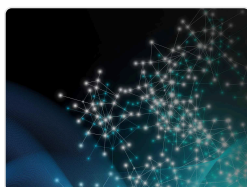
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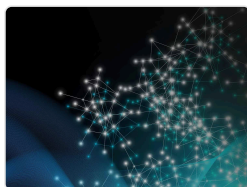
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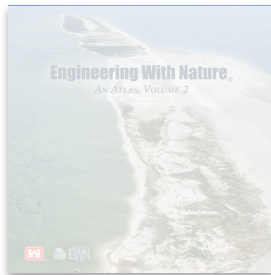
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