

## **U.S. Habitat Restoration Under the Detroit River Remedial Action Plan**

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### **Background**

The Detroit River is a 45.3-km connecting channel through which the entire upper Great Lakes (i.e., Lakes Superior, Michigan, and Huron) flow to the lower Great Lakes (i.e., Lakes Erie and Ontario). In 1985, the Detroit River was identified as a Great Lakes Area of Concern (AOC) by the International Joint Commission's Great Lakes Water Quality Board where Canada-U.S. Great Lakes Water Quality Agreement objectives or jurisdictional standards, criteria, or guidelines, established to protect beneficial uses, were exceeded and remedial actions were necessary to restore beneficial uses (International Joint Commission, 1985).

Following the 1985 Great Lakes Water Quality Board recommendation, the eight Great Lakes states and the Province of Ontario, in cooperation with the federal governments of Canada and the United States, committed in 1985 to developing and implementing a remedial action plan (RAP) to restore beneficial uses in each AOC within their political boundaries. Each RAP was to identify the specific measures necessary to control existing sources of pollution, abate existing contamination (e.g., contaminated sediments), and restore all impaired uses.

A RAP for the Detroit River was initiated in 1986 with the establishment of a team of representatives from the federal, state, and provincial governments (Michigan Department of Natural Resources and Ontario Ministry of the Environment, 1991). Loss of fish and wildlife habitat and degradation of fish and wildlife populations are long-standing issues in the Detroit River and represent two of eleven identified use impairments. The Detroit River RAP noted that a significant loss of fish and wildlife habitat, including a 97% loss in coastal wetlands, occurred as a result of human activities like diking, dredging, construction of bulkheads, and filling (Michigan Department of Natural Resources and Ontario Ministry of the Environment, 1991).

### **U.S. Habitat Restoration Through the RAP**

Early efforts focused on quantifying the severity and geographic extent of habitat loss and degradation, followed by efforts to set habitat restoration goals and objectives (Michigan Department of Natural Resources and Ontario Ministry of the Environment, 1991). Initially, lack of a clear habitat problem definition and scientifically-sound restoration options along with lack of funding were obstacles to realizing habitat improvements. However, in the late 1990s, habitat rehabilitation projects started to receive funding.

On the Detroit River's U.S. side, Michigan Department of Environmental Quality (MDEQ) and the Detroit River Public Advisory Council (PAC) went through a multi-stakeholder input process to reach agreement on a habitat problem definition (MDEQ and Ontario Ministry of the Environment, 1991), including identifying geographic extent, evaluating habitat restoration options, and prioritizing projects (Manny, 2002, 2003; Esman, 2008). Initially, habitat work under the RAP was largely aspirational and made little tangible progress. In 2005, in an effort to re-energize the Detroit River PAC, the Friends of the Detroit River (FDR) took over fiduciary responsibilities to move the process beyond aspiration and into the realm of implementation. Shortly thereafter, in 2009, the Great Lakes Restoration Initiative (GLRI) was

established as a funding mechanism to protect and restore the Great Lakes. FDR successfully submitted three proposals to GLRI, launching the beginning of large-scale restoration projects.

In 2014, as part of developing a “guidance plan” to remove fish and wildlife related beneficial use impairments (BUIs), the Detroit River PAC identified 14 projects, which when completed, would constitute removal of “loss of fish and wildlife habitat” and “degradation of fish and wildlife populations” as impaired beneficial uses (Table 1). These diverse projects involved existing shoal, nearshore, and wetland habitat restorations, in addition to creating new reproductive habitats for birds and fishes. The planning work that was done to identify these projects clearly helped advance concepts into reality. Very little funding would have been allocated to the Detroit River if the strategic planning and guidance plan for removal of fish and wildlife related BUIs had not been in place.

While GLRI funding for the first several large-scale restoration projects came through competitive grants from the U.S. Environmental Protection Agency, the National Oceanic and Atmospheric Administration became a consistent source for FDR to obtain GLRI grant funding and technical support. It is important to note that the GLRI has provided over \$2 billion to accelerate restoration efforts, particularly in AOCs.

Table 1. Fourteen projects identified by the U.S. Detroit River Public Advisory Council, which when completed, would constitute removal of “loss of fish and wildlife habitat” and “degradation of fish and wildlife populations” as impaired beneficial uses on the U.S. side of the Detroit River (Detroit River Public Advisory Council, 2014).

<b>Delisting Project</b>	<b>Brief Description</b>	<b>Status</b>
Detroit River Reefs	Construct four fish spawning reefs: (NE of Belle Isle, NE of Grassy Island, Fort Wayne, and Fort Wayne Expansion)	Completed in 2017
Detroit Upper Riverfront Parks	Restore shoreline and upland habitat at Lakewood East Park, and A.B. Ford Park, targeting fish, birds, pollinators, reptiles and amphibians	Design phase complete; Construction could begin in 2020 pending existing high water and flooding conditions
Belle Isle Hydrological Analysis and Pre-Design	Investigate the internal waterways and surface drainage patterns of Belle Isle in order to effectively design habitat restoration projects in the wet-mesic flatwoods forest and Lake Okonoka	Completed in 2016
Belle Isle Flatwoods Forest	Implement a variety of surface drainage improvements to restore degraded hydrology associated with 80.9 ha of wet-mesic flatwoods forest complex. Enhancing conditions for the forest’s rich diversity of plants, which is unique and globally rare, will restore habitat for diverse wildlife populations	Design phase complete; Construction to begin in fall of 2020
Lake Okonoka	Enhance water quality and restore habitat for fish, birds, amphibians, and reptiles by making	Construction is underway

	hydrologic connections between the Blue Heron Lagoon and the lake, and between the lake and the Detroit River, allowing flow of Great Lakes water and fish into and through the lake	
Milliken State Park	Restore .4 ha of urban upland along the Detroit River to a wet meadow and prairie complex including native shrubs and trees, targeting pollinators (with emphasis on monarch butterflies), birds, reptiles and amphibians	Completed in 2018
Hennepin Marsh	Protect and enhance two areas of existing submergent wetlands for fish spawning and nursery habitat by restoring and newly constructing a series of stone shoals, offering diverse habitat structure and protection to 16 ha of calm backwater area	In design phase
Stony Island Shoal	Restore 185 m of existing shoal and create over 850 m of new shoals to protect the island from further loss of coastal wetlands and to create conditions for new wetland habitat evolution, further enhancing 20 ha of fish nursery and spawning area (Figure 1; Figure 2a and b)	Completed in 2018
Sugar Island	Stabilize the island's south end from severe erosion with protective wildlife habitat shoals that can potentially create up to 12 ha of calm fish spawning and nursery habitat	In design phase
Celeron Island	Stabilize coastal wetlands at the island's south end and north bay by constructing 1,200 m of protective, wildlife habitat shoals, enhancing fish and wildlife habitat (Figure 3; Figure 2a and b)	Completed in 2019
Blue Heron Lagoon	Reconnect the Blue Heron Lagoon to the Detroit River, restoring fish access to 15.6 ha of existing wetlands and other wildlife habitats within the lagoon along with the eventual connection to 3.5 km of canal habitat, including coastal wetlands in Lake Okonoka designed for spawning and nursery habitat (Figure 4)	Completed in 2013
Belle Isle South Fishing Pier	Provide connectivity between fish spawning and nursery areas by creating 1 ha of protected coastal wetlands downstream of new and existing spawning reefs and creating deep and shallow water habitats in the flat bottomland between the pier and shoreline	Completed in 2013
U. S. Steel Shoreline	Restored 335 m of riparian shoreline habitat and 1.9 ha of upland habitat adjacent to the shoreline with native forbs, shrubs, trees and habitat structures, targeting birds, reptiles and	Completed in 2013

	amphibians	
Wayne County's Refuge Gateway	Stabilized 365 m of shoreline using soft engineering and restored 4.2 ha of emergent marsh, 1.7 ha of submergent marsh, and 4.8 ha of upland buffer habitats, targeting a diversity of wildlife populations	Completed in 2010



Figure 1. A new habitat shoal off the south shore of Stony Island protects a fragile coastal wetland from further erosion and creates over 20 ha of calm backwater for fish spawning and nursery (credit: Friends of the Detroit River).



A.



B.

Figure 2a and b. Diverse bird populations make use of new habitat shoals created at Stony and Celeron Islands, including gulls, terns, eagles and herons (credit: Friends of the Detroit River).



Figure 3. A new habitat shoal protects fragile coastal wetlands at Celeron Island's north bay from further erosion and enhances this backwater area for fish spawning and nursery activity (credit: Friends of the Detroit River).



Figure 4. The Blue Heron Lagoon was opened to the Detroit River, allowing Great Lakes water and fish to pass into a calm spawning and nursery area (credit: Friends of the Detroit River). A connection to Lake Okonoka is in the far background.

Conclusions and Recommendations

Since the creation and on-going implementation of the Detroit River RAP, following the 1987 amendment to the Great Lakes Water Quality Agreement, much progress has been made to address the loss of fish and wildlife habitat and populations along the Detroit River. However, the reversal of impacts from decades of unregulated discharges of industrial and municipal waste, the disposition of tens of thousands of cubic meters of contaminated legacy sediment along the bottom of the Detroit River, and the destruction of 97% of the river’s historical coastal wetlands have brought significant challenges to the habitat restoration process.

A constant and reliable source of funding is one of the primary reasons for recent, successful implementation of habitat restoration projects, since the approval of the Great Lakes Restoration Initiative in 2010. The long-term success of completed work and future efforts will need some form of long-term dedicated funding.

Many of the habitat restoration projects implemented to date were accomplished on public properties owned by local, state, or federal entities. However, large blocks of property along the Detroit River, owned by private concerns and individuals, present a great opportunity to expand the habitat restoration process. Strategies to engage these private property owners should be developed in the future.

Along with continued funding for long-term support of habitat restoration work in the Detroit River, funding for monitoring efforts will be essential to understand how the river’s fish and wildlife populations utilize newly restored areas as these sites continue to mature. Long-term monitoring will influence what additional improvements can be implemented at these sites to make them even more productive in the future.

Important lessons learned from the habitat restoration projects completed so far include the need to use an adaptive management approach in design and implementation and the need to establish strong working relationships with project partners. FDR and our project teams have fortunately adapted to new conditions brought about by climate change in recent years, but the future is very unpredictable. If water elevations continue to rise, a new emphasis on saving existing infrastructure might become a priority. If this occurs, it will be our responsibility, in working with our partners, to conduct this work in a manner that benefits the needs of wildlife as well.

## References

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