UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

26 AUG 2015

REPLY TO THE ATTENTION OF:

Mr. Jon W. Allan
Director, Office of the Great Lakes
Michigan Department of Environmental Quality
525 West Allegan Street
P.O. Box 30473
Lansing, Michigan 48909-7973

Dear ~~Mr. Allan~~: Jon

Thank you for your July 22, 2015, request to remove the "Degradation of Fish and Wildlife Populations" and "Loss of Fish and Wildlife Habitat" Beneficial Use Impairments (BUIs) from the River Raisin Area of Concern (AOC), in Monroe Michigan. As you know, we share your desire to restore all of the Great Lakes AOCs and to formally delist them.

Based upon a review of your submittal and the supporting data, the U.S. Environmental Protection Agency hereby approves your two BUI removal requests for the River Raisin AOC. In addition, EPA will notify the International Joint Commission of this significant positive environmental change at this AOC.

We congratulate you and your staff, as well as the many federal, state, and local partners who have worked so hard and been instrumental in achieving this important environmental improvement. Removal of these BUIs will benefit not only the people who live and work in the River Raisin AOC, but all the residents of Michigan and the Great Lakes basin as well. We look forward to working with you and your staff to formally delist this AOC.

We look forward to the continuation of this important and productive relationship with your agency and the local River Raisin Public Advisory Council (PAC) as we work together to fully restore all of Michigan's AOCs. If you have any further questions, please contact me at (312) 353-4891, or your staff may contact John Perrecone, at (312) 353-1149.

Sincerely,

Chris Korleski, Director
Great Lakes National Program Office

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cc: Rick Hobrla, MDEQ, Office of Great Lakes
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RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
OFFICE OF THE GREAT LAKES
LANSING

JON W. ALLAN
DIRECTOR

July 22, 2015

Mr. Chris Korleski, Director
Great Lakes National Program Office
United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard (G-17J)
Chicago, Illinois 60604-3507

Dear Mr. Korleski:

The purpose of this letter is to request the United States Environmental Protection Agency (USEPA), Great Lakes National Program Office's (GLNPO) concurrence with the removal of the Loss of Fish and Wildlife Habitat and the Degradation of Fish and Wildlife Populations Beneficial Use Impairments (BUIs) from the River Raisin Area of Concern (AOC). The Michigan Department of Environmental Quality (MDEQ), Office of the Great Lakes (OGL) has assessed the status of this BUI in accordance with the state's *Guidance for Delisting Michigan's Great Lakes Areas of Concern*, and recommends that the BUI be removed from the list of impairments in the River Raisin AOC.

Enclosed please find documentation to support this recommendation, including the BUI removal Briefing Paper prepared by the OGL's technical staff. The River Raisin Public Advisory Council provided a letter supporting this recommendation, dated May 15, 2015. A copy is enclosed.

Also note that a public comment period was held between June 15, 2015, and July 15, 2015. No comments, either written or verbal, were received during the comment period.

We value our continuing partnership in the AOC Program and look forward to working with the GLNPO in the removal of BUIs and the delisting of AOCs. If you need further information concerning this request, please contact Ms. Melanie Foose, OGL, at 517-897-3244, or you may contact me.

Sincerely,

Jon Allan, Director
Office of the Great Lakes
517-284-5035

Enclosures
cc/enc: Mr. Tom Short, USEPA
Mr. John Perrecone, USEPA
Mr. Scott Cieniawski, USEPA
Mr. Rick Hobrla, MDEQ
√ Ms. Melanie Foose, MDEQ

Removal Recommendation
Loss of Fish and Wildlife Habitat
Degradation of Fish and Wildlife Populations
River Raisin Area of Concern

Michigan Office of the Great Lakes
Great Lakes Management Unit
Michigan Department of Environmental Quality
July 17, 2015

Photo Credit: Dan Stefanski,
River Raisin AOC Public Advisory Council

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Removal Recommendation
Loss of Fish and Wildlife Habitat
Degradation of Fish and Wildlife Populations
River Raisin Area of Concern

Issue

Michigan Department of Environmental Quality (MDEQ), Office of the Great Lakes (OGL), Areas of Concern (AOC) program staff recommends the removal of the Loss of Fish and Wildlife Habitat and the Degradation of Fish and Wildlife Populations Beneficial Use Impairments (BUI) in the River Raisin AOC pursuant to the process and criteria set forth in the *Guidance for Delisting Michigan's Great Lakes Areas of Concern (Guidance)* (MDEQ 2008). This recommendation is made with the support of staff from the United States Environmental Protection Agency (USEPA) Great Lakes National Program Office (GLNPO), the Michigan Department of Natural Resources (MDNR) Parks and Recreation Division and Fisheries Division, the MDEQ Water Resources Division (WRD), and the River Raisin Public Advisory Council (PAC).

Background

The boundary of the River Raisin AOC is defined as "the lower (2.6 miles) portion of the River Raisin, downstream from Dam No. 6 at Winchester Bridge in the City of Monroe, extending one-half mile out into Lake Erie following the Federal Navigation Channel and along the nearshore zone of Lake Erie, both north and south, for one mile" (MDNR 1987) (Figure 1). The River Raisin was identified as an AOC primarily due to "heavy metals contamination of the sediments and PCB contamination of the fish and sediments" with the major impaired beneficial uses related to "toxic and physical impacts on the biota, toxic impacts on human health due to PCB contamination of fish and sedimentation effects on navigation" (MDNR 1987).

Figure 1: Boundary of the River Raisin Area of Concern

Habitat loss was also a concern following decades of industrial development. "Prior to 1946, this area was renowned for the hunting and fishing opportunities it had to offer" and the area "once forested with mature hardwoods or wetlands" became "mostly cleared or filled and used for a mixture of urban, suburban, and agricultural land uses" (MDNR 1987). Following the establishment of the Port of Monroe Authority (PMA), over 800 acres of wetland was lost due to industrial development. Furthermore, in 1947, the PMA "decided that filling the wetland with commercial fill (topsoil, sand and gravel) would be too expensive and opted instead to use industrial waste as fill material" (MDNR 1987) further compounding the degradation of the area.

Following the removal of the Loss of Fish and Wildlife Habitat and Degradation of Fish and Wildlife Populations BUIs, four BUIs will remain in the River Raisin AOC: Restrictions on Fish and Wildlife Consumption, Bird or Animal Deformities or Reproduction Problems, Degradation of Benthos, and Restrictions on Dredging Activities.

Removal Criteria

According to the state's *Guidance for Delisting Michigan's Great Lakes Areas of Concern*, the Loss of Fish and Wildlife Habitat and Degradation of Fish and Wildlife Populations Beneficial Use Impairments (BUI) will be assessed together due to the direct link between these two BUIs.

The *Guidance* states:

Restoration of the BUI requires that a local aquatic habitat or population restoration plan be developed and implemented. The plan must be part of the RAP for the AOC, and contain at least the following components:

A. *A short narrative on historical fish and wildlife habitat or population issues in the AOC, including how habitat or populations have been impaired by water quality.*

B. *Description of the impairment(s) and location for each aquatic habitat or population site, or for multiple sites where determined appropriate at the local level to address all habitat or population issues identified in the RAP and RAP updates.*

C. *A locally derived restoration target for each impacted habitat or population site. Sources of information for targets may include data from social science surveys, if appropriate. Habitat restoration targets may be based on restoration of fish and wildlife populations, if appropriate.*

D. *A list of all other ongoing habitat or population planning processes in the AOC, and a description of their relationship to the restoration projects proposed in the plan.*

E. *A scope of work for restoring each impacted aquatic habitat or population site. The scope or work should describe specific habitat or population restoration action(s) to be completed, including:*

    1. *Timetable*
    2. *Funding*
    3. *Responsible entities*
    4. *Indicators and monitoring*

5. *Evaluation process based on indicators*
6. *Public involvement*

F. *A component for reporting on habitat or population restoration implementation action(s) to the MDEQ.*

Restoration of this BUI will be based on achievement or full implementation of actions in the steps above, including monitoring conducted according to site plans and showing consistent improvement in quantity and quality of habitat or populations addressed in the criteria. Habitat values and populations need not be fully restored prior to delisting, as some may take years to recover after actions are complete. Actions already implemented in AOCs may be reported and evaluated as long as the reports contain all the elements above.

The attached excerpt from the *Guidance* (pages 47-51) includes the rationale for the delisting criteria (Attachment A).

Analysis

On December 2, 2008, the River Raisin PAC finalized their plan to remove the Loss of Fish and Wildlife Habitat and Degradation of Fish and Wildlife Populations BUIs. This plan, titled *Delisting Targets for Fish/Wildlife Habitat & Population Related Beneficial Use Impairments for the River Raisin Area of Concern* included four restoration projects within the River Raisin and the surrounding wetland areas. The goal of the habitat plan was to "identify all areas for restoration that would increase the availability of habitat for spawning, nursing and feeding within the AOC while working within the limitations of the AOC" (ECT 2008).

Likewise, the Stage 2 RAP declared that the "removal of the fish and wildlife BUIs will be based on achievement of full implementation of remedial actions, including monitoring conducted according to site plans" (MDEQ 2012). This document also included a spreadsheet with a list of six projects requiring completion in order to remove the two BUIs, including: Sterling State Park Marsh Project, Sterling State Park Prairie Restoration Project, Phase 1 and 2 Fish Passage Habitat Projects, Sterling Island Habitat Project, and the River Raisin Wetland Enhancement and Habitat Evaluation Project (MDEQ 2012).

The attached Attachment D is a map showing all the projects and the extensive range of the restorations completed; Attachment E is a table of all projects, project partners and grant funding; and Attachment F includes site photographs from the projects.

<u>Restoration Project 1: North River Raisin Wetland Enhancements</u>

The North River Raisin Wetland Enhancements was a very large-scale project with four major components: Lakeplain Prairie Restoration, Shallow Water Marsh Restoration, Hunt Club Marsh Restoration, and Union Camp Marsh Restoration (Figure 2). Completion of the project resulted in the restoration of a total of 383 acres of habitat restoration. All four areas of restoration were within the boundary of the William C. Sterling State Park (Sterling State Park) and were implemented by the Michigan Department of Natural Resources Parks and Recreation Division (MDNR PRD).

Figure 2: Location of North River Raisin Wetland Enhancements

Lakeplain Prairie Restoration:

In the 1980s, the United States Army Corps of Engineers (USACE) created a Confined Disposal Facility (CDF) within the boundary of Sterling State Park by removing uncontaminated material from the Lake Erie shoreline and bottomland and placing it in several locations in the park. At one of these locations, spoils were placed 35 feet high within lakeplain prairie, specifically lakeplain wet mesic prairie, and the area became known as the *Volcano* due to the aesthetic configuration of the fill.

Lakeplain wet mesic prairie is a globally rare natural community, defined as "a native lowland grassland that occurs on moist, level, seasonally inundated glacial lakeplains in the southern Lower Peninsula. Today, lakeplain wet-mesic prairie is nearly extirpated from Michigan due to changes in land use, colonization by shrubs and trees, and competition from invasive plants" (Cohen et al 2015).

To facilitate restoration of the lakeplain wet mesic prairie, fill material was moved from the *Volcano* to the north lagoon in the Sterling State Park as part of the Shallow Water Marsh Restoration project discussed later in this document.

The original plans were to restore 25 acres of lakeplain wet mesic prairie; however, the MDNR PRD was able to expand the project area and removed enough fill material to result in a final 33 acres of lakeplain wet mesic prairie restoration, eight acres more than originally planned for. Through the removal of fill material, the historic grade and hydrology of the area was reestablished. Furthermore, MDNR PRD staff completed an initial planting of lakeplain wet mesic prairie vegetation using local-genotypes.

Restoration of the wetland was completed in 2012 and because this area is owned and managed by the State of Michigan, long-term stewardship and maintenance of the restored 33 acres is expected to occur to further the establishment of this rare plant community.

Shallow Water Marsh Restoration:

In the 1950s, within the boundary of Sterling State Park, areas of Great Lakes marsh were dredged in order to obtain soils used to create upland for the park day-use and campground areas. One of these areas of impact is two lagoons in the shape of an hourglass, and referred to as the North and South Lagoon (Figure 3). The North Lagoon is the location of the shallow water marsh restoration project and is connected to the South Lagoon under a footbridge approximately 140 feet in length.

Figure 3: Location of the North and South Lagoons at Sterling State Park

Before the project, the area of the shallow water marsh restoration was as deep as nine feet. The project was designed to include undulating areas of marsh including deeper water inlets between the areas of shallow water marsh restoration (Figure 4). These differences in depth provide bathymetric variation for fish habitat as well as recreational benefits for shore fishermen.

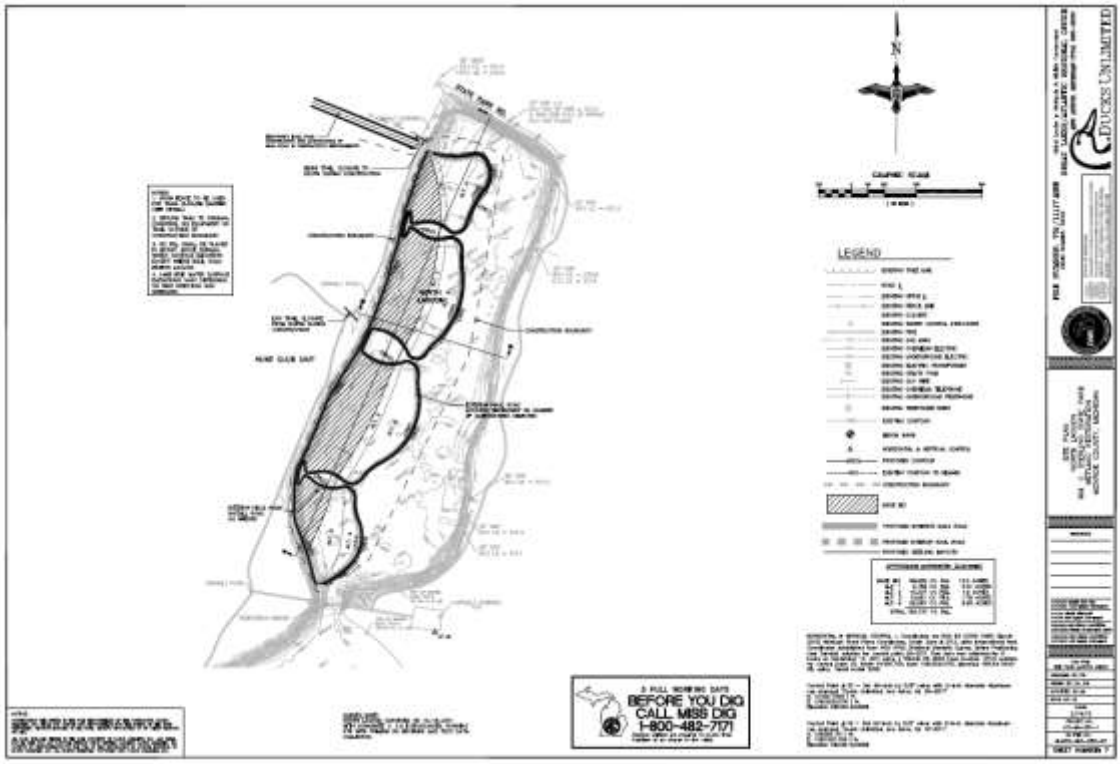


Figure 4: Area of Shallow Water Marsh Restoration in the North Lagoon

To construct the project, a temporary dike/haul road was created surrounding the area of restoration. Following completion of the dike/haul road, the area inside the dike was dewatered allowing the construction to be completed on dry ground. After construction on the inside area of the dike was completed, the dike/haul road was demolished by placing that amount of fill also within the area of wetland restoration.

Construction was completed in 2012 with a total of 19 acres of shallow water marsh restoration, not including the deep-water inlets. The depth of the wetland averages 3 to 4 feet depending on the daily fluctuations due to Lake Erie water levels and seiches.

To measure the success of the project, the DNR Fisheries Division (MDNR FD) sampled fish in the South Lagoon in 2011 and sampled again in both the North and South Lagoons in 2014. Even though pre-construction sampling was not done in the North Lagoon, the pre-construction data from the South Lagoon can be generally used as a comparison to the post-construction data since both the lagoons had nearly identical habitat before any construction was undertaken.

In 2011, the fish sample was dominated by bluegill and largemouth bass with very few individuals of other species found. The sample from 2014 also showed a dominance of bluegill and largemouth bass and a significant increase in individuals of other species, notably pumpkinseed; gizzard shad, a Great Lakes species; and pugnose minnow, a state endangered species. Furthermore, post-construction

sampling found young of year of many species in the wetland restoration area indicating these areas may now be serving as spawning habitat, specifically for species such as longnose gar and yellow perch. (J. Braunscheidel, personal communication, November 26, 2014). "The fish diversity was greater in the north than the south lagoon, and both lagoons had higher diversity than the preconstruction survey with the nearby presence of the shallow water habitat in the north lagoon likely contributing to the increase in both lagoons" (J. Braunscheidel, personal communication, April 7, 2015).

Hunt Club and Union Camp Marsh Restoration:

The Hunt Club Marsh is an area of diked wetland 215 acres in size and the Union Camp Marsh is an area of diked wetland 116 acres in size. The two wetland areas are being invaded by multiple invasive species, particularly phragmites (*Phragmites australis*), narrow-leaved cattail (*Typha angustifolia*) and glossy buckthorn (*Rhamnus frangula*).

Construction in both marshes took place in 2012. The project goals were accomplished at the Hunt Club Marsh by repairing a 250 foot breach in the dike on the south side of the wetland and installation of two new water control structures: one to connect the Hunt Club marsh to the South Lagoon and one to connect the marsh to the Clearwater Drain (Figure 5). In the Union Camp marsh, at least five breaches in the dike were repaired, one water control structure was installed connecting the marsh to the Mason Run drain, and a second connection was made by creating a break in the dike separating the Mason Run Drain and the Clearwater Drain to allow fish passage between the two drains (Figure 6).

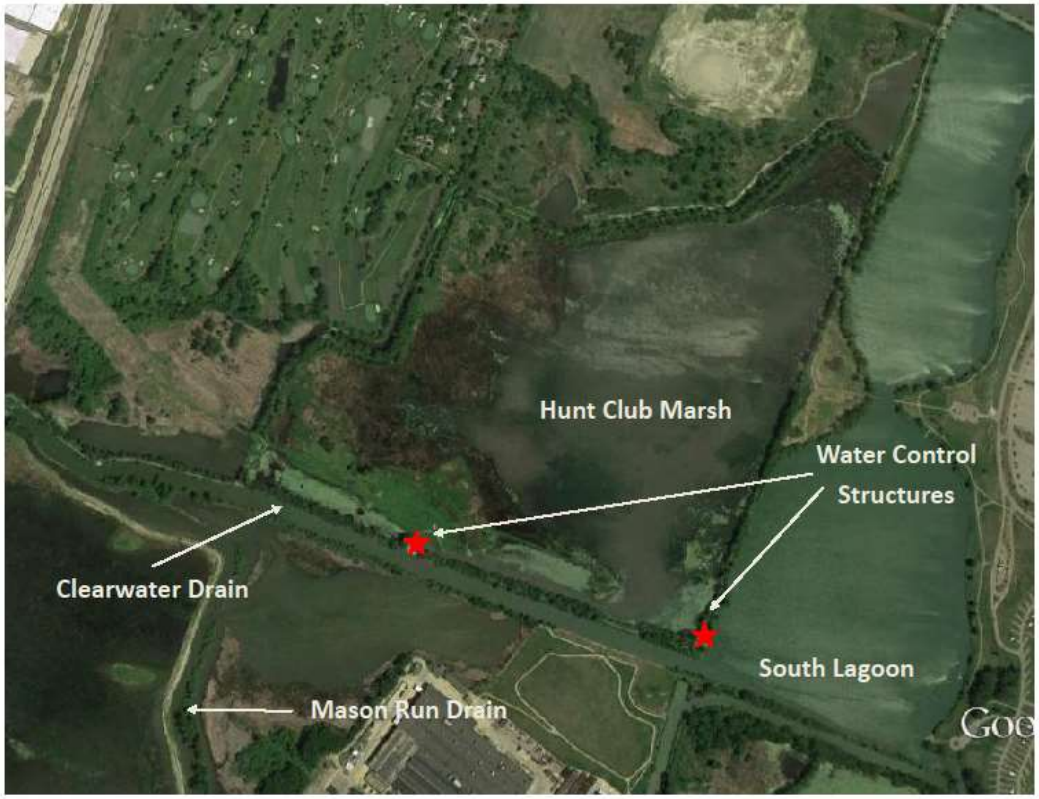


Figure 5: Location of the Hunt Club Marsh and Associated Water Control Structures

Figure 6: Location of Union Camp Marsh and Associated Water Control Structures

The intent of the project was to allow for long-term management of the Hunt Club and Union Camp marshes for passage of fish and other aquatic organisms in and out of the diked wetland, management of the wetland for control of invasive species, and for the manipulation of the water levels to provide habitat for migrating shorebirds.

Pre-construction monitoring took place in both marshes in 2011 for fish and shorebirds. Likewise, post-construction monitoring for fish and shorebirds was conducted in 2014. Due to issues with low water levels, it is difficult to make any conclusions regarding the fish monitoring. However, of particular note were the observation of 12 pugnose minnows, a state endangered species, found during post-construction monitoring in the Hunt Club Marsh. On the other hand, the shorebird monitoring clearly demonstrates an abundance of habitat has been created. Prior to the restoration, monitoring of shorebirds was conducted with "few shorebirds observed during surveys relative to numbers of waterfowl and waterbirds" (MNFI 2011). In fact, only 60 individual shorebirds of five species were observed (G. Palmgren, personal communication, December 1, 2014). In contrast, during post construction monitoring in 2014, a total of 2,355 individuals of 21 species of shorebirds were observed indicating that "the habitat enhancement efforts appear to have succeeded" (HRM 2014).

It should be noted that in the original 2008 habitat plan, the North River Raisin Wetland Enhancements project was intended to include restoration of the Ford Marsh (formally named Eagle Island Marsh). However, in 2009 this project was "considered out of scope due to land acquisition negotiations" (Selzer 2009). Ford Marsh is now part of the Detroit River International Wildlife Refuge managed by the United States Fish and Wildlife Service (USFWS). A Ford Marsh project is currently underway and additional discussion of the project will follow in the section of this document on continuing restoration projects.

Restoration Project 2: Sterling Island Improvements

Sterling Island is a man-made island located near Hellenberg Park in the City of Monroe and approximately 2.5 miles upstream from the mouth of the River Raisin (Figure 7). The island had been experiencing erosion due to ice scour and boat traffic causing downstream sedimentation. In 2012, a shoreline stabilization project was undertaken by the City of Monroe.

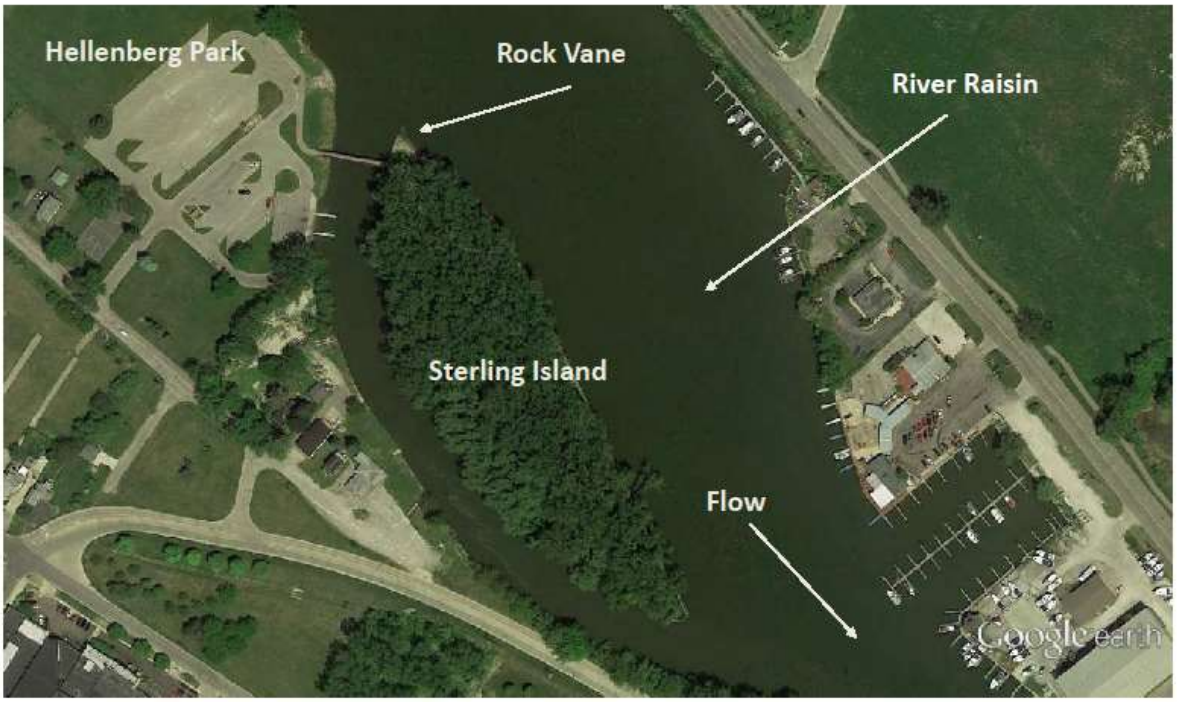


Figure 7: Location of Sterling Island in the River Raisin

To stabilize the island, rock riprap was placed along 1,020 linear feet of shoreline and planted with native shrubs. In addition, a rock deflector (rock vane) was constructed at the northwest side of the island to further protect the shoreline by deflecting flow, debris, and ice away from the island while also providing a protected area ideal for waterfowl, reptiles and amphibians. By stabilizing the shoreline of Sterling Island, it was anticipated that it would provide benefit both to the immediate area surrounding the island, but also to improve fish habitat throughout the lower River Raisin by reducing sediment.

Pre-construction and post-construction monitoring was conducted in June 2012 and June 2013 respectively. The monitoring included an assessment of submergent aquatic vegetation, the fish community, and velocity measurements and showed that while the "fish community structure differed between 2012 and 2013… habitat was abundant in 2012 and 2013 in the vicinity of Sterling Island." Overall, the goals of the project were met, and "stabilizing the river side shoreline of Sterling Island will stabilize the near-shore habitats available to fish and reduce sediment loading (ECT 2013)."

Restoration Project 3: Low Head Dam Improvements

In the 1930s, the City of Monroe installed six low-head dams (Dams 1 through 6) within the River Raisin in order to encase gravity sewer lines over the limestone bedrock river bottom. Two additional dams exist upstream, the Waterloo Dam at Veterans Park in the City of Monroe and the Grape Dam in Raisinville Township (Figure 8).

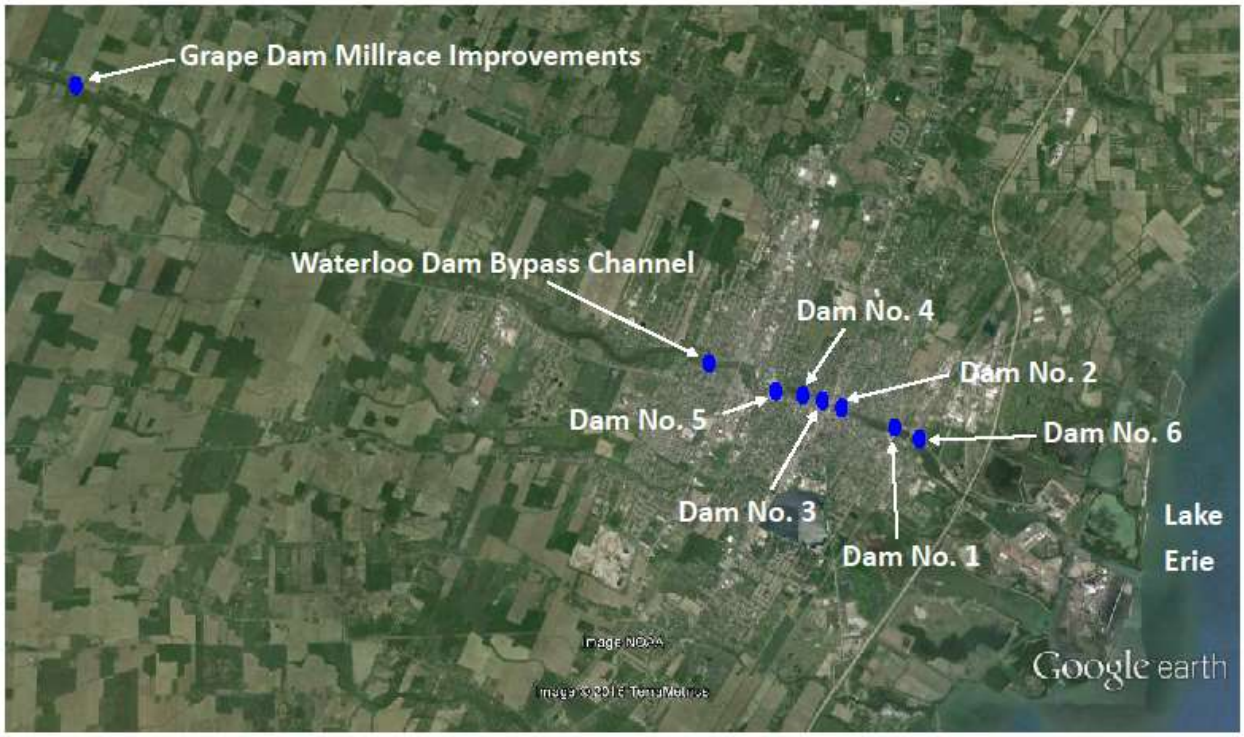


Figure 8: Location of Fish Passage Projects in the River Raisin

Beginning in 2012, the City of Monroe implemented a series of projects on these eight dams to open up Lake Erie to the lower 23 miles of the River Raisin. The significance of this project cannot be overstated. The River Raisin was known to the Native Americans as "Nummasepee" or *River of Sturgeon*, but for the better part of the last century the River Raisin was unavailable to most fish migrating from the Great Lakes due to the dams.

Two of the six low head dams (Dam 2 and 3) no longer had active sewer lines and in 2012 were removed completely. The remaining four low head dams (Dam 1, 4, 5, and 6) still have active sewer lines in them and an alternative to removal was necessary. These dams were retrofitted to provide fish passage by creating a series of rock arch ramps (Figure 9).

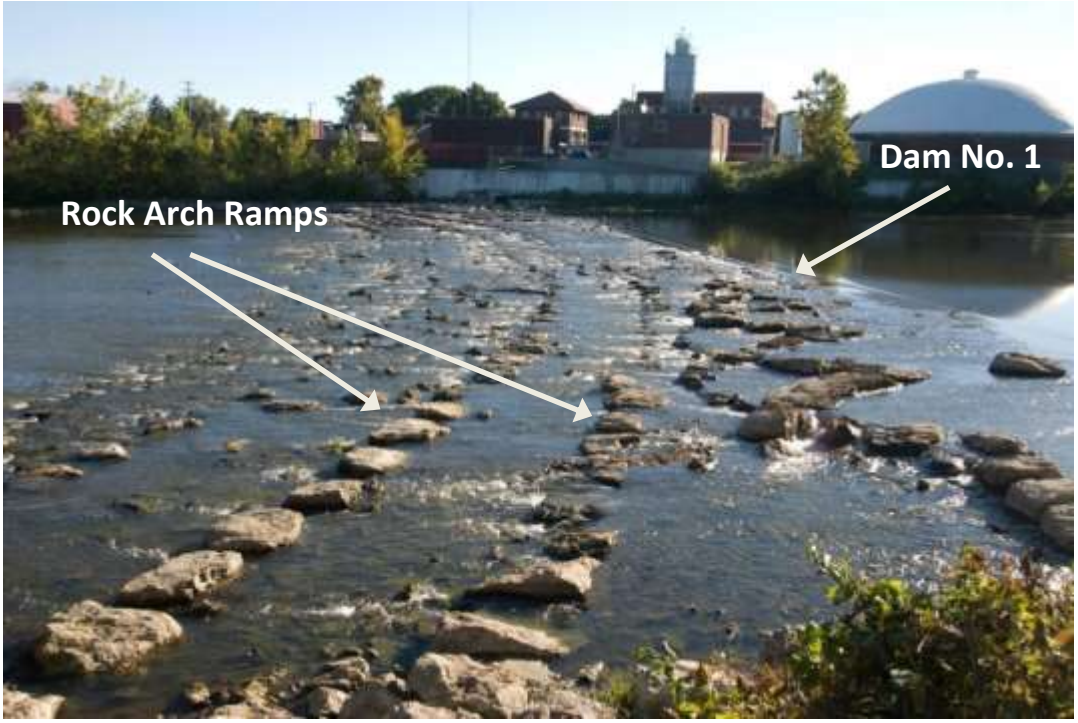


Figure 9: Rock Arch Ramps at Dam No. 1

There was an excessive amount of sediment upstream of the Waterloo Dam which would have been prohibitively expensive to remove, so again an alternative was sought to provide fish passage but at a lower cost. The alternative was to build a low flow bypass channel around the Waterloo Dam (Figure 10).

Figure 10: Low Flow Bypass Channel at the Waterloo Dam at Veterans Park

The Grape Dam, the most upstream dam is privately owned and was unable to be completely removed. However, the existing millrace channel was enhanced to provide fish passage around the dam.

The eight dam projects were constructed in two different phases. During Phase 1 in 2012, Dams 2 and 3 were removed and rock arch ramps were constructed at Dams 1 and 6. During Phase 2 in 2013, rock arch ramps were constructed at Dams 4 and 5 while the bypass channel was constructed around the Waterloo Dam and the millrace was enhanced at the Grape Dam. Following the winter of 2013-2014, the ice caused some damage to the rock arch ramps at Dams 4 and 5 and they were repaired in the summer of 2014.

A pre and post construction ecological assessment was performed to evaluate the conditions upstream and downstream of the dams. Multiple ecological parameters were assessed including mussels, macroinvertebrates, fish and aquatic vegetation. The post ecological assessment was conducted only weeks after the repair of Dams 4 and 5; therefore the results "did not indicate drastic changes in the fish community since pre-construction monitoring; however, there is evidence to suggest that some fish are using the new fish passage structures to access a longer stretch of the river" (Cardno JFNew 2014).

In addition to the pre and post construction assessment conducted by Cardno JFNew, the Michigan DNR Fisheries Division (MDNR FD) also conducted monitoring in 2014. Since 2002, the MDNR FD has sampled between the Waterloo and Grape Dams at Raisinville Road (Figure 11). During July of 2014, the DNR FD surveyed this area and found two species never before encountered at this location, gizzard shad and blackside dace (J. Braunscheidel, personal communication, November 26, 2014). Of particular note is the presence of gizzard shad, a migratory species and a strong indication that the Waterloo Dam bypass channel is functioning and providing a means for Great Lakes fish to migrate into the upper River Raisin.

Figure 11: Michigan DNR Fish Division Sampling Location in the River Raisin

Restoration Project 4: River Raisin AOC Aquatic Habitat Evaluation

In 2011, the Michigan DNR Parks and Recreation Division (MDNR PRD) mapped wetland habitat types in the areas north of the River Raisin. The goal of the mapping project was to "identify, evaluate, and prioritize the remaining aquatic habitat within and immediately adjacent to the AOC for preservation through land acquisition, conservation easements, development agreements, or other mechanisms" (ECT 2008).

The wetlands were "classified using three systems: Cowardin et al.'s *Classification of Wetlands and Deepwater Habitats of the United States* to Subclass, Michigan Department of Natural Resources' *Integrated Forest Monitoring, Assessment, and Prescription* (IFMAP) to Level 4, and Michigan Natural Features Inventory's *Michigan's Natural Communities*" (HRM 2011).

The wetland areas were identified first through a desktop analysis using 2010 aerial photographs followed by field visits to verify "wetland boundaries, classification of wetland habitats, and identification of dominant and invasive plants" (HRM 2011). A series of maps were created for each wetland classification system (Figure 12).

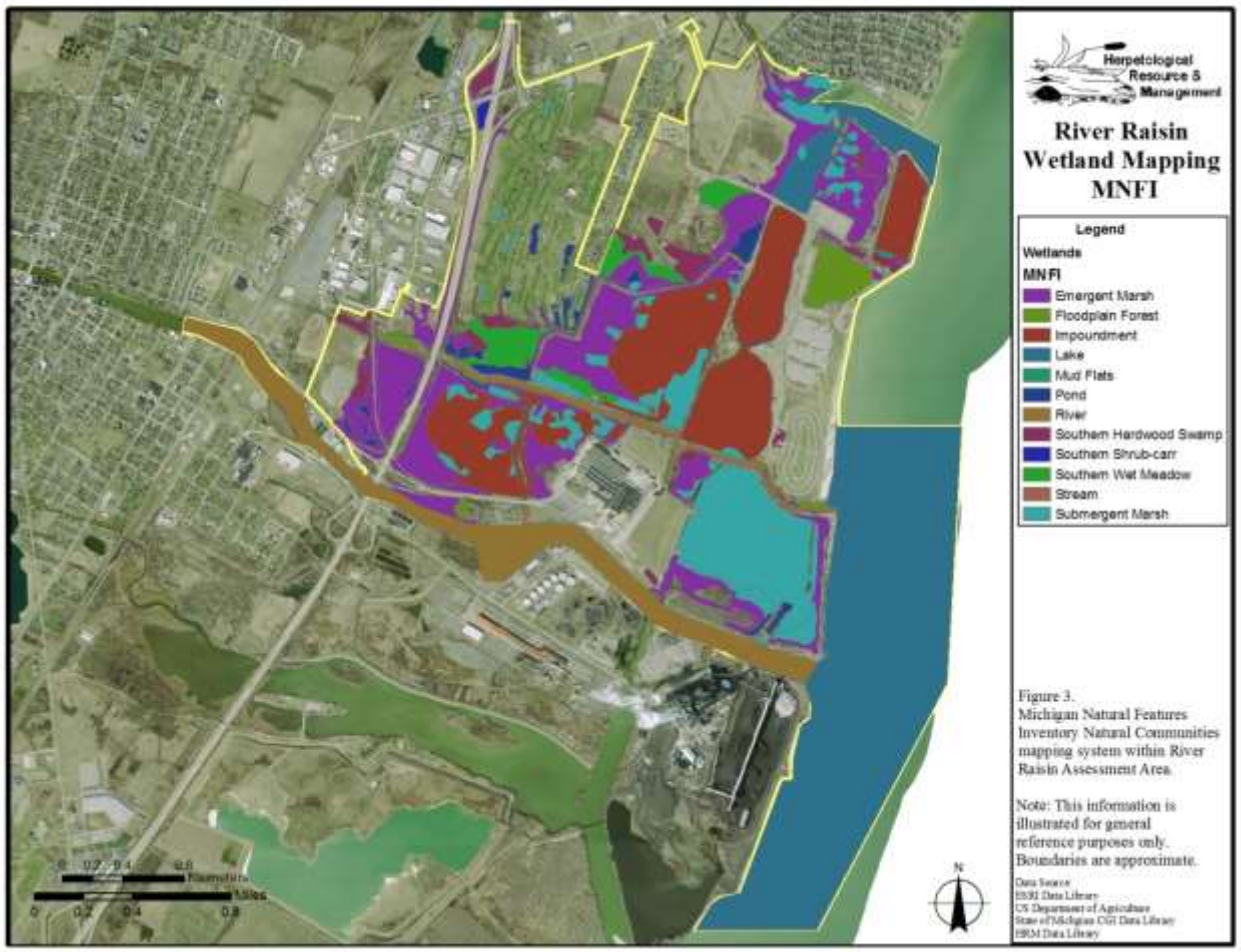


Figure 12: One of Three Maps Created to Evaluate Habitat in the Area of the River Raisin AOC

While no rare wetland habitat types were found, during field surveys two state threatened species were observed, the Eastern Fox Snake (*Pantherophis gloydi*) and American Lotus (*Nelumbo lutea*).

Continuing Restoration Work in the River Raisin AOC

Ford Marsh Restoration

The 241 acre Ford Marsh is owned and managed by the U.S. Fish and Wildlife Service (USFWS) and is part of the Detroit River International Wildlife Refuge (DRIWR). The marsh is located north of the River Raisin along the shoreline of Lake Erie (Figure 13). The goal of the Ford Marsh Restoration project is to provide for management of 175 acres of the marsh classified as palustrine emergent wetland via installation of a water control structure along the Clear Water Drain. A smaller second agri-drain water control structure will be placed on the northwestern berm for management of the small wetland in the northwest area of the project. Management of this important coastal wetland area will provide habitat for a number of species include waterfowl, shorebirds and songbirds, reptiles and amphibians. Construction began in late 2014 and is expected to be completed by the fall of 2015.

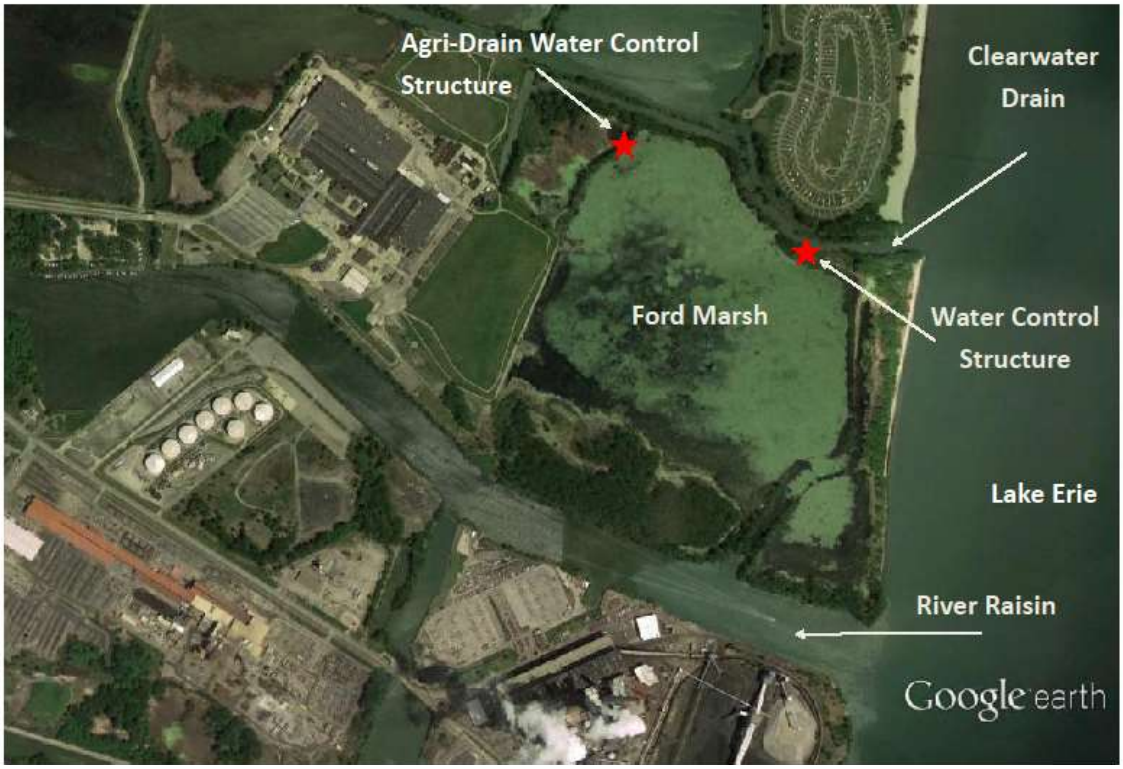


Figure 13: Location of the Ford Marsh Restoration Project

Sullivant's Milkweed Relocation

Sullivant's Milkweed (*Asclepias sullivantii*) is a state threatened species and one of eleven milkweed species native to Michigan. In 2014, the MDNR PRD worked together with the Michigan Department of Transportation (MDOT) to transplant 1,500 individuals of Sullivant's milkweed into areas of lakeplain prairie at Sterling State Park. These plants will now provide a vital food and nectar source for the Monarch butterfly (*Danaus plexippus*) along an important migration corridor.

Flowering Rush (FRED):

Flowering Rush (*Butomus umbellatus*) is an invasive species that has formed dense stands within the River Raisin through the City of Monroe. In 2008, the City developed a program called the Flowering

Rush Eradication Days (FRED). During the summer of 2008, volunteers worked at hand pulling the vegetation from infested areas of the river.

Following the aforementioned fish passage projects throughout the River Raisin, the City of Monroe through their River Raisin Commission on the Environment (COTE) decided to resume the work on control of flowering rush in the river. Currently the City is partnering with the Detroit-Western Lake Erie Cooperative Weed Management Area (CWMA) for monitoring and treatment of flowering rush in several locations of the River Raisin (Figure 14). The project to treat these areas is due to commence in the summer of 2015.

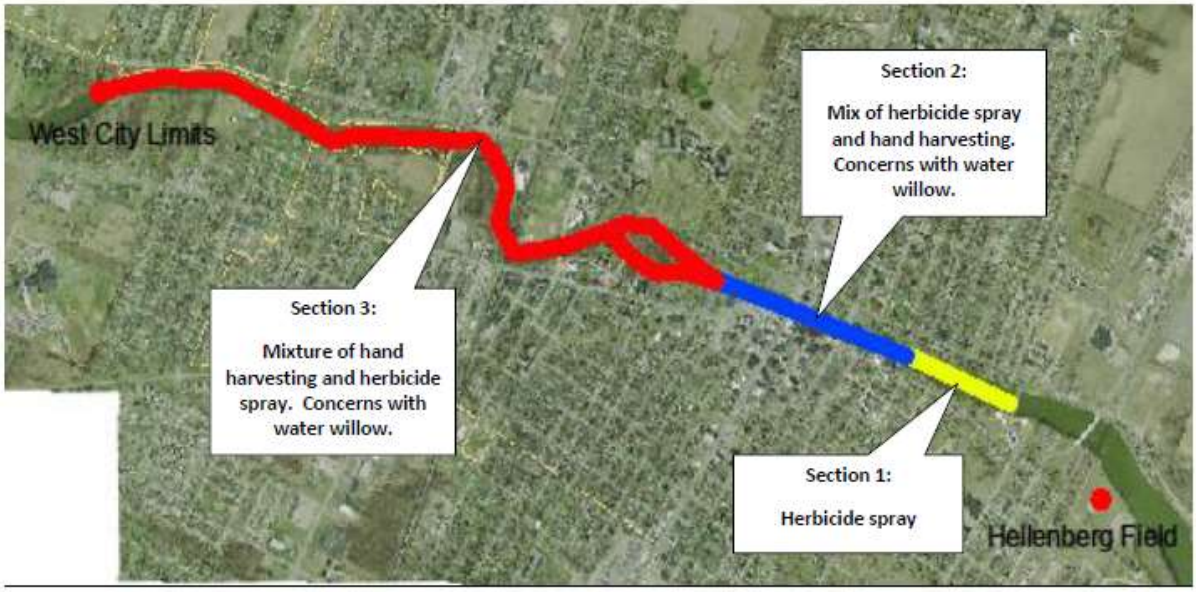


Figure 14: Locations of Upcoming Flowering Rush Invasive Species Treatment

Conclusion and Recommendation

As required in the state's *Guidance for Delisting Michigan's Great Lakes Areas of Concern*, the four projects outlined in the River Raisin PAC's 2008 plan, *Delisting Targets for Fish/Wildlife Habitat & Population Related Beneficial Use Impairments for the River Raisin Area of Concern* have all been completed and monitored. Based on the data available from the pre and post monitoring reports, there is sufficient evidence to indicate success of the four projects. There is now spawning, nesting, feeding and breeding habitat available for a variety of fish and wildlife species that was unavailable or inaccessible prior to 2008. Therefore, MDEQ AOC Program staff request approval of the recommendation to remove the Degradation of Fish and Wildlife Populations and the Loss of Fish and Wildlife Habitat BUIs from the River Raisin AOC.

Prepared by: Melanie Foose, River Raisin AOC Coordinator
Great Lakes Management Unit
Office of the Great Lakes
Michigan Department of Environmental Quality
July 17, 2015

Attachments

A – Loss of Fish and Wildlife Habitat and Degradation of Fish and Wildlife Populations, pages 47-51 of the Guidance for Delisting Michigan's Great Lakes Areas of Concern

B –River Raisin AOC PAC Meeting Minutes, April 9, 2015

C – River Raisin AOC PAC Letter of Support

D – Map of Restoration Projects in the River Raisin AOC

E – List of Projects Required for the Removal of the Loss of Fish and Wildlife Habitat and Degradation of Fish and Wildlife Populations Beneficial Use Impairments

F – Site Photographs

References

Braunscheidel, Jeffrey, personal communication, November 26, 2014.

Braunscheidel, Jeffrey, personal communication, April 7, 2014

Brotkowski, Lesley, William B. Mueller and Cindy Burtley. 2011. Fall 2011 Shorebird Surveys & Habitat Monitoring. BHE Environmental, Inc./Cedarburg Science, LLC. Submitted to the Michigan Department of Natural Resources, Parks and Recreation Division, Lansing, Michigan.

Cardno JF New. 2014. Restoring Fish Passage in the River Raisin AOC Ecological Assessment Report.

Cardno JFNew. 2014. Restoring Fish Passage in the River Raisin AOC Great Lakes Restoration Initiative Final Grant Report for Phases 1 and 2 Grant ID: 00E00473

Chartier, Allen T. Shorebird Surveys and Habitat Monitoring at Sterling State Park, Monroe County, Michigan. Herpetological Resource and Management Report 2014.

Cohen, Joshua. G., Michael A. Kost, Bradford S. Slaughter and Dennis A. Albert. *A Field Guide to the Natural Communities of Michigan*. East Lansing, Michigan: Michigan State University Press, 2015.

Environmental Consulting & Technology, Inc. 2008. Delisting Targets for Fish/Wildlife Habitat & Population Related Beneficial Use Impairments for the River Raisin Area of Concern. Submitted to the Michigan Department of Environmental Quality December 2, 2008.

Environmental Consulting & Technology, Inc. 2012. Restoration of Basis of Design Report Sterling Island Restoration. Revised April 30, 2012.

Environmental Consulting & Technology, Inc. 2013. Sterling Island Shoreline Stabilization Project Monitoring Report

Environmental Consulting & Technology, Inc. 2012. Sterling Island Restoration Project Pre-Construction Monitoring Summary

Gaulke, Greg, Marty Boote. 2014. Sterling State Park 2014 Fish Survey June and September Fyke Net Sampling. Environmental Consulting & Technology, Inc.

Herpetological Resource and Management, LLC. 2011. North River Raisin Delta Wetland Mapping Report.

Michigan Department of Environmental Quality. 2008. Guidance for Delisting Michigan's Great Lakes Areas of Concern, revised. MI/DEQ/WB-06-001.

Michigan Department of Environmental Quality. 2012. Stage 2 Remedial Action Plan for the River Raisin Area of Concern.

Michigan Department of Natural Resources. 1987. Remedial Action Plan for River Raisin Area of Concern.

Monfils, M. J. 2011. River Raisin Wetland Enhancement and Habitat Evaluation: spring 2011 shorebird and habitat monitoring. Michigan Natural Features Inventory, Report Number 2011-09. Submitted to the Michigan Department of Natural Resources, Parks and Recreation Division, Lansing, Michigan.

Murray, Brent. A., Daelyn Woolnough and Donald Uzarski. 2011. Final report: Sterling Park fyke-net fisheries survey, spring and fall 2011. Institute for Great Lakes Research and Biology Department Central Michigan University, Mt. Pleasant, Michigan.

Palmgren, Glenn, personal communication, December 1, 2014.

Palmgren, Glenn R. 2013. River Raisin AOC EPA Assistance ID Number: GL-00E01041-0 Final Report. Michigan Department of Natural Resources, Parks and Recreation Division, Lansing, Michigan.

Palmgren, Glenn R. 2014. Wm. C. Sterling State Park Marsh & Prairie Restoration EPA Assistance ID Number: GL-00E00507-0 Final Report. Michigan Department of Natural Resources, Parks and Recreation Division, Lansing, Michigan.

Selzer, Michelle. 2009. The River Raisin Area of Concern Proposed Fish and Wildlife Restoration Project Summaries. Last Updated October 7, 2009.

Attachment A

2008 Guidance for Delisting
Michigan's Great Lakes Areas of Concern

Loss of Fish and Wildlife Habitat
Degradation of Fish and Wildlife Populations

These 2 BUIs are being considered together in recognition of the integral relationship between them. For the purpose of assessing restoration, both of these BUIs will use the same criteria-setting process.

Significance in Michigan's Areas of Concern

Twelve AOCs in Michigan have identified Loss of Fish and Wildlife Habitat as a BUI in their RAPs (all except Deer Lake and Torch Lake). Nine AOCs in Michigan have identified Degradation of Fish and Wildlife Populations as a BUI including: Kalamazoo River, Muskegon Lake, White Lake, Menominee River, St. Marys River, Saginaw River/Bay, Clinton River, Rouge River, and River Raisin. Little quantitative information was available in the 1980s regarding habitat loss and population degradation, when impairments were first determined. Therefore, there is wide variability in these impairments among the AOCs due to both real variability in habitat and populations as well as variability in initial assessments.

Michigan Restoration Criteria and Assessment

Restoration of this BUI requires that a local aquatic habitat or population restoration plan be developed and implemented. The plan must be part of the RAP for the AOC, and contain at least the following components:

A. A short narrative on historical fish and wildlife habitat or population issues in the AOC, including how habitat or populations have been impaired by water quality.

B. Description of the impairment(s) and location for each aquatic habitat or population site, or for multiple sites where determined appropriate at the local level to address all habitat or population issues identified in the RAP and RAP updates.

C. A locally derived restoration target for each impacted habitat or population site. Sources of information for targets may include data from social science surveys, if appropriate. Habitat restoration targets may be based on restoration of fish and wildlife populations, if appropriate.

D. A list of all other ongoing habitat or population planning processes in the AOC, and a description of their relationship to the restoration projects proposed in the plan.

E. A scope of work for restoring each impacted aquatic habitat or population site. The scope of work should describe specific habitat or population restoration action(s) to be completed, including:

1. Timetable
2. Funding
3. Responsible entities
4. Indicators and monitoring
5. Evaluation process based on indicators
6. Public involvement

F. A component for reporting on habitat or population restoration implementation action(s) to the MDEQ.

Removal of this BUI will be based on achievement of full implementation of actions in the steps above, including monitoring conducted according to site plans and showing consistent improvement in quantity or quality of habitat or populations addressed in the criteria. Habitat values and populations need not be fully restored prior to delisting, as some may take many years to recover after actions are complete. Actions already implemented in AOCs may be reported and evaluated as long as the reports contain all the elements above.

Rationale

Practical Application in Michigan

While most Michigan AOCs have habitat impairments and/or populations degradation, none were designated as impaired primarily as a result of these. The AOCs vary widely in their levels of habitat or population degradation, historical habitat or population types, and current needs for habitat or population restoration. The extent of habitat or population restoration necessary in an AOC will be determined at the local level and documented in the RAP. The habitat or population restoration plan will determine the type and extent of the restoration necessary to address habitat loss or population degradation issues identified in the RAPs. Individual, AOC-specific restoration plans and criteria will be developed and implemented through a federal/state/local partnership.

Sources of water quality contamination must be controlled before habitat or population restoration is conducted. In some circumstances, habitat degradation is actually contributing to water quality problems, rather than vice versa. In those instances, the workplan should discuss this issue and the remedial actions should be targeted accordingly.

1991 IJC General Delisting Guideline: Loss of Fish and Wildlife Habitat

When the amount and quality of physical, chemical, and biological habitat required to meet fish and wildlife management goals have been achieved and protected.

IJC Delisting Guideline: Degradation of Fish and Wildlife Populations:

When environmental conditions support healthy, self-sustaining communities of desired fish and wildlife at predetermined levels of abundance that would be expected from the amount and quality of suitable physical, chemical and biological habitat present. An effort must be made to ensure that fish and wildlife objectives for AOCs are consistent with Great Lakes ecosystem objectives and Great Lakes Fishery Commission fish community goals. Further, in the absence of community structure data, this use will be considered restored when fish

and wildlife bioassays confirm no significant toxicity from water column or sediment contaminants.

The IJC general delisting guideline for the BUI is presented here for reference. The Practical Application in Michigan subsection above describes application of specific criteria for restoration based on existing Michigan programs and authorities.

State of Michigan Program and Authorities for Evaluating Restoration

Habitat or population restoration projects to address these use impairments will be implemented by a variety of programs at the federal, state, and local level, as determined in the restoration planning process. For the development of local habitat or population restoration plans and criteria, the MDEQ, in consultation with MDNR Fisheries and Wildlife Divisions, commits to partnering with local AOC groups to determine what those actions should be, and make available to the PACs the existing monitoring and reporting elements in state programs as applicable.

Michigan assesses water bodies throughout the state on a 5-year basin rotation plan according to the MDEQ's "Strategic Environmental Quality Monitoring Program for Michigan's Surface Waters" (MDEQ, 1997) and "Michigan Water Quality Strategy Update" (MDEQ, 2005). Each year, a set of targeted watersheds are sampled at selected sites for conventional and toxic pollutants, and biological and physical habitat/morphology indicators. The set of watersheds sampled rotates each year, with each major watershed in the state revisited every 5 years (see Appendix 1 for maps of the basin rotations). One element of the strategy is expanded and improved monitoring of biological integrity and physical habitat. This element includes all monitoring conducted for fish and benthic invertebrate community structure, nuisance aquatic plants, algae, and slimes, and assessment of physical habitat. Because biological communities integrate the cumulative effects of multiple environmental stresses, this element is an important tool for evaluating water quality. The MDEQ's goal in conducting the watershed surveys is to assess 80% of the stream and river miles in Michigan over a 5 year period. The specific objective of biological integrity and physical habitat monitoring are to:

1. Determine whether waters of the state are attaining standards for aquatic life.

2. Assess the biological integrity of the waters of the state.

3. Determine the extent to which sedimentation in surface waters is impacting indigenous aquatic life.

4. Determine whether the biological integrity of surface waters is changing with time.

5. Assess the effectiveness of best management practices and other restoration efforts in protecting and/or restoring biological integrity and physical habitat.

6. Evaluate the overall effectiveness of MDEQ programs in protecting the biological integrity of surface waters.

7. Identify waters that are high quality, as well as those that are not meeting standards.

8. Identify the waters of the state that are impacted by nuisance aquatic plants, algae, and bacterial slimes.

The biological integrity and physical habitat element consists of several components that, in combination, provide data necessary to achieve the following objectives:

- Rapid biological assessment of wadeable streams;
- Rapid assessment procedure for nonwadeable rivers; and
- Trend monitoring procedure for biological communities.

Rapid, qualitative biological assessments of wadeable streams and rivers are conducted using the SWAS Procedure 51, which compares fish and benthic invertebrate communities at a site to the communities that are expected at an un-impacted, or reference, site. This is a key tool used by the MDEQ to determine whether waterbodies are attaining Michigan WQS. However, this procedure cannot be used on nonwadeable rivers. The MDEQ has been partnering with Michigan State University to develop and validate a procedure for assessing aquatic communities in nonwadeable rivers which the State plans to begin implementing in 2006.

Attachment B:
River Raisin PAC Meeting Minutes

The City of Monroe
Commission on Environment and Water Quality
MINUTES
April 9, 2015 7:00 pm
The following minutes are not taken verbatim and only reflect an overall representation of the meeting.

Call to Order: Commissioner LaRoy called the meeting to order at 7:04 pm

Members Present: A roll call of members was taken and a quorum was present.

Barry LaRoy
Isaac Owens
Richard Micka
Brian Egen
Gloria Rafko
Dan Stefanski via phone

Excused
Maureen Pfund
Bonnie Finzel-Doster
Bob Potter

Special Guests:
Melanie Foose MDEQ

Approval of minutes from March 12, 2015. Motion was made by Dick to approve minutes, seconded by Brian, motion passed.

PROJECT UPDATES:

A) Flowering Rush Grants: Commission discussed current project status and the City match commitment to the International Wildlife Refuge Alliance on behalf of the Detroit River-Western Lake Erie Cooperative Weed Management Area. Project is for 2 years with 3 applications per year to begin the eradication of the flowering rush in the river.

B) 2014 PAC Grant Educational Outreach / Signs: Brian went over brochure, poster, & placemat info, content and selected for the public outreach items to obtain prices on. Also, reviewed signs for dams 1, 4 & 6 that Brian had put together for approval. Sign vendor will hold their 2014 price. Project needs to be completed by the end of May 2015, grant ends May 31.

C) 2015 PAC Grant: Dan went over the grant application content including media outreach for DNAPL, River Cleanup/Flowering Rush Pull, outreach booklet development, printing

& mailing, web hosting, Strategic Planning Workshop and BUI Celebration. Motion was made by Brian to move forward with Grant Application, seconded by Gloria Rafko, motion passed.

MDEQ Update – Melanie Foose

- BUI Removal Document: Went over draft BUI removal document, comments received and asked PAC for support for removal of BUIs (Loss of Fish and Wildlife Habitat and Degradation of Fish and Wildlife Populations). Motion was made by Ike to move forward with BUI removal, seconded by Gloria, motion passed.
- Final version will be forthcoming. Hoping for removal by summer 2015. With these removals 5 BUIs will be removed of 9. 4 BUIs remain once removed.
- April 6 DEQ press release-to be emailed to COTE
- Info on sediment remediation, see greatlakesmud.org – Raisin to have a page added to website, will be added to RR Legacy website once available.
- BUI document to map all projects to be finalized – draft map provided.
- Next SPAC meeting in Port Huron, May 4 & 5, 2015.
- DNAPL – no update.

UPDATES from MEMBERS-

- Dan-State Representative, Bill LaVoy to host the June 4 Legislative SPAC meeting in Lansing.
- Brian – shared ice break up footage in the river, Civil War ended April 9, 1865 with Robert E. Lee surrendering
- Dick-provided SPAC info from conference in Toledo, OH, shared footage of ice breakup in river

Motion to Adjourn by Ike and supported Brian – 8:39 pm

Attachment C:
River Raisin PAC Letter of Support

The River Raisin Remedial Action Plan
Public Advisory Council
And
The City of Monroe
Commission on the Environment and Water Quality

May 15, 2015

Mr. Rick Hobrla
Michigan Department of Environmental Quality
Office of the Great Lakes
535 West Allegan Street
P.O. Box 30473
Lansing, MI 48909-7973

Dear Mr. Hobrla,

The River Raisin Public Advisory Council (PAC), operating through the City of Monroe's Commission on the Environment (COTE) has reviewed and discussed the Removal Recommendation for the Loss of Fish and Wildlife Habitat and Degradation of Fish and Wildlife Populations Beneficial Use Impairments (BUI). The River Raisin PAC members voted unanimously in support of the removal of these two BUIs at the COTE meeting held on April 9, 2015.

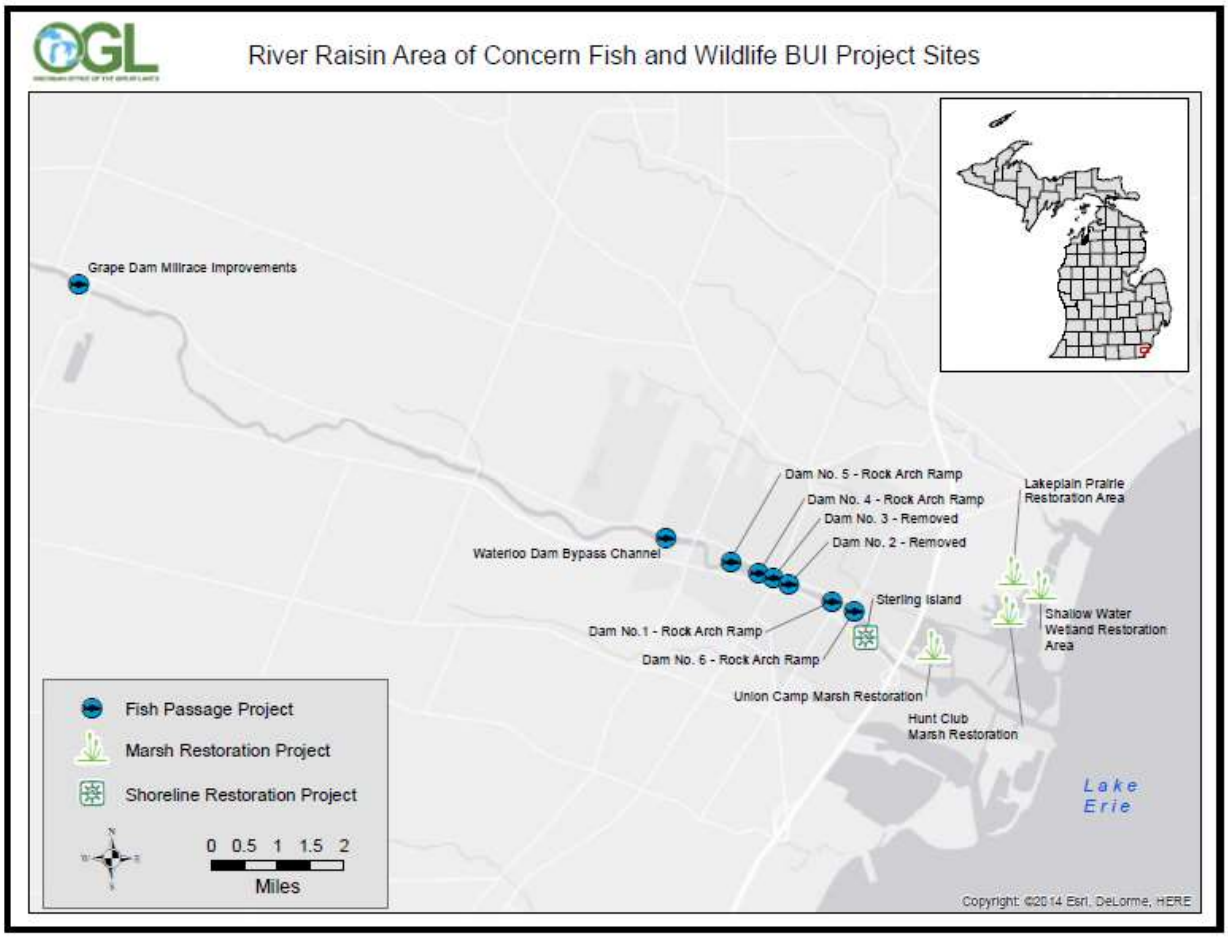
In 2008, the PAC habitat plan, titled *Delisting Targets for Fish/Wildlife Habitat & Populations Related Beneficial Use Impairments for the River Raisin Area of Concern* was finalized. The plan included a total of four projects. This plan has now been fully implemented, and all projects have been monitored. Therefore, the PAC supports removal of the two BUIs.

The River Raisin PAC is pleased to partner with the Michigan Department of Environmental Quality in the removal of the Loss of Fish and Wildlife and Degradation of Fish and Wildlife Populations BUIs as we continue to work towards the delisting of the River Raisin as an Area of Concern.

Sincerely,

Daniel W. Stefanski
Chairman, River Raisin Public Advisory Council

Attachment D:
Map of Restoration Projects in the River Raisin AOC



Attachment E:

List of Projects Required for the Removal of the Loss of Fish and Wildlife Habitat and Degradation of Fish and Wildlife Populations Beneficial Use Impairments

Project Name		**Partner**	**Funding Source**	**Funding Amount**
Restoration Project No. 1	Lakeplain Prairie Restoration	Michigan DNR	U.S. EPA (GLRI)	$1,498,291.46
	Shallow Water Marsh Restoration	Michigan DNR	U.S. EPA (GLRI)	
	Hunt Club Marsh Restoration	Michigan DNR	U.S. EPA (GLRI)	$654,928.18
	Union Camp Marsh Restoration	Michigan DNR	U.S. EPA (GLRI)	$825,209.50
Restoration Project No. 2	Sterling Island Improvements	City of Monroe	U.S. EPA (GLRI)	$479,742.55
Restoration Project No. 3	Low Head Dam Improvements: Phase 1	City of Monroe	U.S. EPA (GLRI)	$1,333,220.91
	Low Head Improvements: Phase 2	City of Monroe	U.S. EPA (GLRI)	$1,731,101.53
Restoration Project No. 4	River Raisin AOC Aquatic Habitat Evaluation	Michigan DNR	U.S. EPA (GLRI)	$71,904.77
Total				$6,594,398.80

Attachment F:

Site Photographs

The *Volcano at Sterling State Park*

Planting of the Lakeplain Prairie Restoration Area

Construction of Union Camp Marsh Dike

Union Camp Marsh – Looking South

Hunt Club Marsh

Installation of “Stop-Log” at Water Control Structure

Looking South at the Temporary Dike/Haul Road at the Shallow Water Restoration at Sterling State Park

Kayakers at the Shallow Water Marsh Restoration at Sterling State Park

Construction Sign at the Shallow Water Restoration in Sterling State Park

Installation of Live Stakes at Sterling Island

Rock Vane at Sterling Island

Looking West (Upstream) at Rock Arch Ramp at Dam No. 6

Snake at Rock Arch Ramp at Dam No. 6

Looking South (and Upstream) at Rock Arch Ramp at Dam No. 1

Fisherman upstream of Rock Arch Ramps at Dam No. 1

Dam No. 2 Prior to Complete Removal

Dam No. 3 during Demolition

Fisherman in area of Removed Dam No. 3

Rock Arch Ramps at Dam No. 4

Rock Arch Ramps at Dam No. 5

Looking West (Upstream) at the Waterloo Dam (Bypass Channel is to the right of Dam)

Looking East (Downstream) at the Waterloo Dam Bypass Channel at Veterans Park

Monarch Nectaring on Aster spp at the Waterloo Dam Bypass Channel at Veterans Park

Interpretive Signage at the Waterloo Dam

Looking East (Downstream) at the Grape Dam Millrace Improvements