RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
OFFICE OF THE GREAT LAKES
LANSING

JON W. ALLAN
DIRECTOR

March 12, 2014

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:

I am writing to request the United States Environmental Protection Agency (U.S. EPA), Great Lakes National Program Office's (GLNPO) concurrence with the removal of the Degradation of Fish and Wildlife Populations and Loss of Fish and Wildlife Habitat Beneficial Use Impairments (BUIs) from the White Lake Area of Concern (AOC). The Michigan Department of Environmental Quality (MDEQ), Office of the Great Lakes (OGL) has assessed the status of the BUIs in accordance with the state's *Guidance for Delisting Michigan's Great Lakes Areas of Concern* and the locally-developed criteria that were approved by the MDEQ. The OGL recommends that the BUIs be removed from the list of impairments in the White Lake AOC.

Enclosed, please find documentation to support the recommendation, including BUI Removal Recommendation documents prepared by MDEQ staff. The White Lake Public Advisory Council (PAC) submitted a letter supporting the recommendation, which is included with this package. The proposed BUI removals were public noticed via the Mich-RAP listserv, the MDEQ Calendar, the MDEQ AOC program Web site, and the PAC's e-mail list. No written comments were received in response to the public notice period, from February 10, to March 11, 2014.

These are the final BUIs associated with the White Lake AOC. We value our continuing partnership in the AOC Program and look forward to working with the GLNPO in the final delisting of the White Lake Area of Concern. Delisting documents should be forthcoming within the next few weeks. If you need further information concerning this request, please contact Mr. John Riley at 517-284-5045, or at rileyj@michigan.gov, or you may contact me.

Sincerely,

Lynelle Marolf
Deputy Director
517-284-5035

Enclosures
cc: Mr. Greg Mund, White Lake PAC
Mr. Dave Cowgill, U.S. EPA
Mr. Marc Tuchman, U.S. EPA
Mr. John Perrecone, U.S. EPA
Mr. Richard Hobrla, MDEQ
Mr. John Riley, MDEQ

Removal Recommendation
Degradation of Fish and Wildlife Populations and Loss of Fish and Wildlife Habitat Beneficial Use Impairments for the White Lake Area of Concern

Issue

The Michigan Department of Environmental Quality (MDEQ), Office of the Great Lakes Areas of Concern (AOC) program recommends removal of: 1) the Degradation of Fish and Wildlife Populations, and 2) the Loss of Fish and Wildlife Habitat Beneficial Use Impairments (BUIs) from the White Lake AOC. This recommendation is being made with the support of the White Lake Public Advisory Council (PAC), and in accordance with the process and criteria set forth in the *Guidance for Delisting Michigan's Great Lakes Areas of Concern* (Guidance) (MDEQ, 2008).

Background

In the 1987 Remedial Action Plan (RAP) for the White Lake AOC, the Michigan Department of Natural Resources (MDNR) noted a historic loss of fish production as an impairment in White Lake, attributing it to the loss of benthic organisms as a result of sediments contaminated with heavy metals, chlorides and organic chemicals. Specifically, the RAP states, "(s)urveys conducted since 1952 indicated that White Lake experienced conditions causing the occurrence of nuisance algal blooms, tainted fish flesh, loss of white bass fishery, reduction of walleye, perch and northern pike populations, fish contamination, sediment contamination, nutrient enrichment, dissolved oxygen depletion and degradation of the benthic community" (MDNR, 1987).

When the MDNR updated the White Lake RAP in 1995, it indicated that fish populations had begun to improve. "White Lake is described by some as one of the most popular and valuable fisheries in west Michigan. The lake maintains an excellent fishery for northern pike, largemouth bass, small mouth bass, walleye, yellow perch, redhorse sucker, white sucker, bluegill, crappie, and carp" (MDNR, 1995). At the same time, the 1995 RAP recognized that problems persisted and indicated fish populations had yet to fully recover. "Despite the excellence of the current AOC fishery, there has been some degradation. Populations of walleye, lake sturgeon, Great Lakes muskellunge, and white bass in White Lake have declined, are severely depleted, or have disappeared. This could be due to a combination of factors, such as historically elevated pollution levels, introduction of exotic species, loss of habitat or competition. The walleye population seems to be improving; its recovery has been augmented by a program of the MDNR and the White Lake Area Sport Fishing Association to restock walleye in the lake. The program is having success, and some natural reproduction is occurring. White bass were released into the lake in the mid-1980s, but natural reproduction does not appear to be occurring at this time. The MDNR is seeking wild stocks of white bass for introduction to the lake" (MDNR, 1995).

Causes of the loss of fish populations in White Lake are well documented and are largely attributable to industrial discharges of toxics, shoreline development leading to habitat loss and depletion of dissolved oxygen in deep water areas.

The following information is paraphrased from the Muskegon Conservation District's 2010 Great Lakes Restoration Initiative (GLRI) Habitat Restoration proposal:

> Habitat loss in the White Lake area resulted from historical shoreline hardening, waste disposal, wetland filling and aquatic substrate alteration. The losses were exacerbated by shoreline residential development and inappropriate land uses, which altered and eliminated critical habitat in the White Lake area. Historically, White Lake supported a diverse system of shoreline habitats including coastal wetlands, freshwater marshes, wetland bays, aquatic plant beds and quality shoreline vegetation. Over time, settlement and habitat loss in the area gradually changed the assemblage of plants and animals, increasing fragmentation and degradation of the shoreline, leading to a decrease in fish and wildlife populations.
>
> In 2005, the White Lake PAC and the Muskegon Conservation District developed the White Lake Shoreline Habitat Management Plan to facilitate a strategic plan for achieving specific fish and wildlife restoration targets to remove the habitat and populations BUIs. Utilizing existing research, surveys, scientific studies, and through new data acquisition, priority shoreline and aquatic habitat areas were mapped for the plan, which identified remaining critical habitat to protect and degraded habitat to restore within the White Lake system.
>
> Building on the White Lake Shoreline Management Plan, the Muskegon Conservation District and the White Lake PAC identified priority parcels for restoration and summarized the data in the White Lake Shoreline Habitat Blueprint. The blueprint provides an overview of acreage, shoreline footage, ownership (public vs. private, number of landowners), habitat conditions, basic restoration activities and initial cost estimates for habitat restoration. The Muskegon Conservation District and White Lake PAC also developed restoration criteria for the habitat and populations BUIs, which were approved by MDEQ in 2009.

This removal recommendation addresses two separate, but related BUIs: Degradation of Fish and Wildlife Populations and Loss of Fish and Wildlife Habitat. The PAC developed site-specific criteria for these BUIs by considering fish populations and habitat separately from wildlife populations and habitat. Using layers of Geographic Information Systems (GIS) mapping technology, the PAC was able to establish restoration priority rankings for several parcels of property (both privately- and publicly-owned), based on habitat value and other relevant characteristics. This process was especially critical to the creation of the wildlife restoration criteria. Now that targets have been met for both fish and wildlife, the GLWQA-identified BUIs can be removed. Throughout this document, text formatted in italics indicates direct quotation of the local criteria developed by the White Lake PAC.

"Fish Habitat and Populations" Removal Criteria

In 2009, the White Lake PAC submitted and the MDEQ approved local criteria, consistent with the *Guidance*, focusing on restoration of Fish Habitat and Populations, as follows:

- ***Maintain an average IBI score of 43 ± 4 for three consecutive years.*** *This numerical target is based on the mean and standard deviation IBI score for White Lake during the past three years (2004, 2005 & 2006, Figure 1). On average, 68% of observations should be within one standard deviation of the mean, assuming the population is normally distributed (Sokal and Rohlf 1995).*
- ***If target is not achieved*** *(i.e., average IBI score <39),* ***then fish monitoring will continue for an additional 3 years to determine whether the numerical target is achieved.***
- ***Fish sampling will occur in other drowned river mouth lakes to provide an opportunity to determine whether temporal trends in IBI scores are specific to White Lake or associated with regional fluctuations in biotic and abiotic factors****; especially Pentwater and Kalamazoo (Figure 1). For instance, if regional fluctuations, not associated with human-induced disturbance, caused multiple drowned river mouth lakes to experience declines in IBI scores, then the numerical target for White Lake should be reassessed to determine its scientific validity (i.e., the numerical target may need to be shifted).*

A multi-metric index—termed an index of biotic integrity or IBI—will be used to set quantitative delisting targets for White Lake based on annual fish-sampling records collected by the Annis Water Resources Institute (AWRI) between 2004 and 2006. The IBI approach is widely used across the United States to monitor water quality. Fish that live in the water body are integrators of the overall habitat and water quality; they also reveal both episodic and cumulative human-induced disturbance in a system. Fish sampling for calculating IBI scores only will be required annually because the fish themselves are integrators of time (i.e., the fish community is there continuously). A fish-based IBI can be used to address questions concerning both fish populations and fish habitat because it is an indicator of both fish community health and the overall ecological health of the lake.

A typical IBI includes metrics such as number and composition of species sampled, focuses on indicator species that are particularly sensitive to water quality and habitat alterations, and considers groups of organisms that have similar feeding modes. Once the sampling is completed, scientists calculate a "score" for each metric in the IBI. The final IBI score is the total of all metrics and is indicative of ecosystem health. A high score suggests a "healthier" ecosystem, whereas a low score is indicative of a "degraded" ecosystem.

The IBI proposed for use in setting delisting targets in White Lake is modified from a fish-based IBI developed for Great Lakes coastal wetlands (Uzarski et al. 2005). The IBI developed by Uzarski et al. (2005) was modified to better represent human-induced disturbance (based on land use and water quality) across a gradient of drowned river mouth lakes[1]. The disturbance gradient

[1] Note that only the 2004 fish data was used to re-calibrate the IBI proposed by Uzarski *et al*. (2005). There was a significant correlation ($r = 0.92$, $P = 0.076$, $n = 4$) between disturbance gradient and IBI score for 2004. The disturbance gradient was calculated using the approach described by Uzarski *et al*. (2005).

suggested that Pentwater Lake was indicative of a "healthier" ecosystem and Kalamazoo Lake was more indicative of a "degraded" ecosystem among the lakes sampled by AWRI (see Figure 1 for list of lakes). The newly-modified, fish-based IBI consists of 11 metrics (Table 1) and also is being used to set delisting targets for fish populations and habitat in the Muskegon Lake AOC.

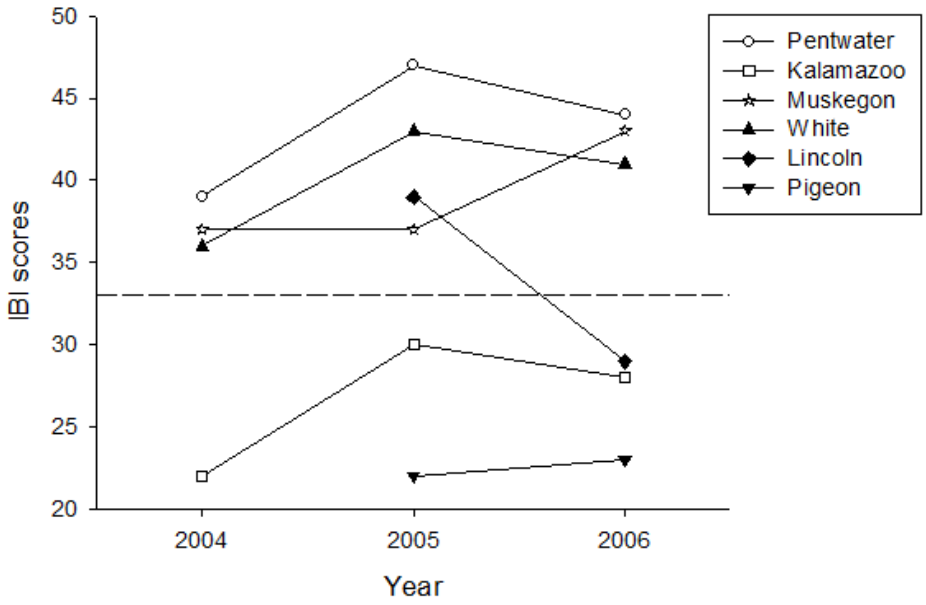

Figure 1. Scores from fish-based index of biotic integrity (IBI) for six drowned river mouth lakes. Data from 2004 was used to build the IBI. The dashed line represents the break (at an IBI score of 33) between relatively "healthy" and "degraded" ecosystems among the six lakes studied. Metrics used in the IBI are described in Table 1 (WLPAC, 2008).

The IBI scores calculated during 2005 and 2006 suggest two clusters of lakes in the sample (Figure 1): a group with scores >33 indicative of "healthier" ecosystems and another with scores ≤33 representing "degraded" ecosystems.[2] Moreover, Pentwater Lake has been used as a reference system when setting targets for other beneficial use impairments in the White Lake AOC (i.e., restriction of fish and wildlife consumption and eutrophication or undesirable algae). Therefore, the finding that Pentwater, Muskegon, and White lakes form a group among the lakes AWRI sampled (Figure 1) suggests that they are "healthier" than Kalamazoo and Pigeon lakes.

At least two pieces of evidence suggest that fish populations and, therefore, habitat are no longer severely degraded in White Lake. First, the fish-based IBI calculated from recent years suggests that the ecosystem health of White Lake is comparable to Pentwater Lake, a drowned river mouth lake that did not suffer the types of severe environmental degradation experienced by White Lake. Second,

Data collected from 2005 and 2006 provide evidence for relatively high precision of the IBI and suggest that inter-annual variation is not driving IBI scores (see Figure 1).

[2] The IBI score of 33 was arbitrarily defined based on visual interpretation of Figure 1.

> *White Lake has a popular and valuable sport fishery, which was noted in the 1987 RAP and both the 1995 and 2002 RAP updates.*

Preliminary Drowned River Mouth Lake IBI – Submerged Aquatic Vegetation habitat only

1. Percent omnivore abundance:
   >70% score = 0 50 to 70% score = 3 <50% score = 5

2. Percent piscivore richness:
   <25% score = 0 25 to 35% score = 3 >35% score = 5

3. Percent carnivore (insectivore+piscivore+zooplanktivore) richness:
   <70% score = 0 70-80% score = 3 >80% score = 5

4. Smallmouth bass (*Micropterus dolomieu*) mean catch per net-night:
   0 score = 0 >0 to 5 score = 3 >5 score = 5

5. Insectivorous Cyprinidae richness:
   >3 score = 0 >1 to 3 score = 3 0 to 1 score = 5

6. Percent Centrarchidae abundance:
   0-30 score = 0 >30 to 60 score = 3 >60 to 80 score 5 >80 score = 7

7. Centrarchidae richness:
   0 to 1 score = 0 >1 to 3 score = 3 >3 score = 5

8. Mean evenness:
   <0.2 score = 0 0.2 to 0.6 score = 3 >0.6 score = 5

9. Rock Bass (*Ambloplites rupestris*) catch per net-night:
   0 to 1 score = 0 >1 to 5 score = 3 >5 score = 5

10. Bluegill (*Lepomis macrochirus*) abundance per net-night:
    0 to 3 score = 0 >3 to 20 score = 3 >20 to 30 score = 5 >30 score = 7

11. *Lepomis* catch per net-night:
    >50 score = 0 >20 to 50 score= 3 >5 to 20 score = 5 0 to 5 score = 7

Table 1. Metrics for fish-based index of biotic integrity (IBI) for drowned river mouth lakes. The IBI is modified from Uzarski *et al*. (2005). Fish sampling should be conducted with fyke nets (Cooper *et al*. 2007) at shallow (depth ≤1 m) sites with submerged vegetation. At least three fyke nets should be fished at each site. The catch of fish is then standardized across nets at a site to calculate IBI scores (WLPAC, 2008).

"Fish Habitat and Populations" Monitoring Results and Analysis

The following are excerpts from Dr. Carl Ruetz' 2011 report, *Evaluating Targets for Delisting Two Beneficial Use Impairments: Loss of Fish Habitat and Degradation of Fish Populations*, and details monitoring results:

> *Sampling was done in July and August of 2009, 2010, and 2011. In each lake, we set three 4-mm mesh fyke nets at each site overnight (approximately 24*

hours). The dimensions of the fyke nets are described by Breen and Ruetz (2006). Two of the fyke nets were set parallel to shore with mouths facing each other and connected at the lead. The third fyke net was placed about 30-50 m from the parallel nets, perpendicular to shore, with the mouth facing the shore. Wings of all nets were set at a 45^{o} angle and leads were placed at the center of the mouth of the net.

Fish collected from fyke nets were identified to species, measured for total length (cm), and released at the point of capture (except for round gobies Neogobius melanostomus, which were euthanized). Any fish that could not be identified in the field was euthanized or a digital photo was taken for identification in the laboratory. For each fish species encountered, a digital photograph was taken for the reference collection. The IBI score was calculated for each site.

A total of 1,100 fish consisting of 23 different species was collected from White Lake over the sampling period. The five species that accounted for most of the fyke-net catch were round goby (26.6%), largemouth bass (25.4%), pumpkinseed (14.9%), yellow perch (13.4%), and bluegill (6.2%). White Lake varied the least among years (compared to the other drowned river mouth lakes) with the same species dominating each year in similar proportions.

The mean IBI score for White Lake during 2009-2011 was 40.0 (Figure 2), which exceeded the numerical delisting target of 39 set for the loss of fish habitat and degradation of fish populations beneficial use impairments. Moreover, there was not a declining trend in the IBI score for White Lake during 2009-2011, which was a secondary criteria set for the delisting target. Therefore, the numerical delisting target regarding fish IBI scores was achieved (Ruetz, 2011).

Following review of the final report and a presentation by Dr. Ruetz, the White Lake PAC agreed that the fish habitat and populations target had indeed been met.

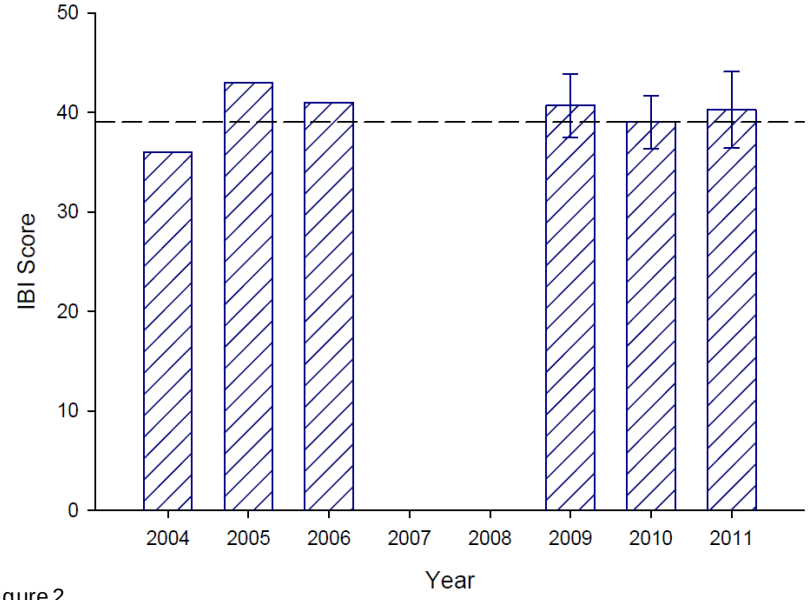

Figure 2. Scores from fish-based index of biotic integrity (IBI) for White Lake. The dashed line represents the numerical delisting target of 39. Error bars represent ± 1 standard error.

"Wildlife Habitat and Populations" Removal Criteria and Results

In 2009, the PAC submitted and MDEQ approved local criteria, consistent with the *Guidance,* focusing on the restoration of Wildlife Habitat and Populations. The local criteria describe a number of impairments and prescribe activities that were intended to address and correct those impairments. Activities 1 through 3 in the criteria below correspond to specific locations indicated in Figure 3. Following each of the listed targets are completed actions describing how those targets were met.

> ***Description of Impairment:*** *Loss of habitat primarily at northeast end of White Lake, near Whitehall and Montague, due to residential development, marina construction, dredging, seawall construction, "weed control", wetland filling, and industrial development.*
>
> ***Activity 1:*** *Critical shoreline areas owned by the City of Montague and City of Whitehall (Fig. 3).*
>
> > *Restoration Target: Critical areas (30.9 acres)[3] owned by the City of Montague and City of Whitehall are restored and protected through a charter designation or via a conservation easement (see Activity 5 for total restoration acreage).*
>
> Completed Actions:
> All identified Activity 1 locations in both cities were restored as part of the GLRI habitat project and are protected through long term management agreements, or may soon be covered by charter park designations. The total acreage amounts to 31.59 acres and includes the following sites:
>
> - Montague Dump Site, **3.83 acres**
> - Svensson Park, **7.88 acres**
> - Causeway, **3.32 acres**
> - Montague Boat Launch – Shoreline, **1.51 acres**
> - Montague Boat Launch – Two Track, **3.5 acres**
> - Maple Beach, **3.45 acres**
> - Mill Pond Park, **5.2 acres**
> - Weathervane Inn Property, **2.9 acres** (This area was originally thought to belong to the City of Montague and was included in the acreage calculated above, but was subsequently determined to be owned by the Weathervane. It now enjoys a 30 year protective management agreement.)

[3] Acreage calculations include upland buffers, shoreline, and aquatic bottomlands for sites designated in the White Lake Shoreline Habitat Management Plan.

Target Acreage

At the time the PAC was developing specific criteria for restoration of the wildlife habitat and populations BUI, critical habitat areas (both public and private) were identified for restoration and protection at the northeast end of the lake. The identified critical habitat areas (referred to as Activity 1 and 2 locations) were restored through the GLRI-funded shoreline habitat restoration project, and with additional remediation at the former tannery property. However, it now appears that there were minor discrepancies in the original acreage figures as approved in the local criteria.

Specifically, the total correct acreage for the combined Activity 1 and 2 locations is 40.9 acres. Of that total, the public sites (Activity 1) comprise 30.9 acres, while the private lands (Activity 2) make up 10 acres. The restoration target identified in the local criteria for private lands incorrectly listed the total acreage number, rather than the correct figure.

With regard to Activity 3 locations, areas owned by DuPont and Occidental, the approved restoration target acreage listed is 46.8 acres. According to the Muskegon Conservation District, it was determined during GLRI project implementation that this was an overestimate based on GIS data available at the time and an inability to perform field verifications during criteria development. Keeping in mind that the anticipated restoration work was successfully implemented at the critical habitat areas, the actual areas restored amount to 12.5 acres at the DuPont property and 17.8 acres at Occidental, totaling 30.3 acres.

While these discrepancies may make it appear that site restoration fell short of achieving the intended targets, this is not the case. Restoration targets were determined by identifying parcels of critical shoreline habitat area for protection, all of which were successfully completed, regardless of the acreages specified for each.

Activity 2: *Private lands designated as critical habitat[3] (Fig. 3).*

<u>Restoration Target:</u> *Private lands designated as critical habitat (40.9 acres)[3]* [this should be 10 acres, as noted above in the Target Acreage box] *are restored and protected through municipal planning processes, voluntary conservation easements, or deed restrictions. (see Activity 5 for total restoration acreage).*

<u>Completed Actions:</u>

Activity 2 parcel locations were defined as part of the White Lake Shoreline Habitat Blueprint and GLRI Shoreline Habitat Restoration project planning process. All the habitat restoration sites (public and private) originally proposed for inclusion in the GLRI project totaled 40.9 acres, including 10 acres of restored wetlands on the south end of the former tannery property. All private sites are now protected or are in process through conservation easements, deed restrictions, or long term management agreements.

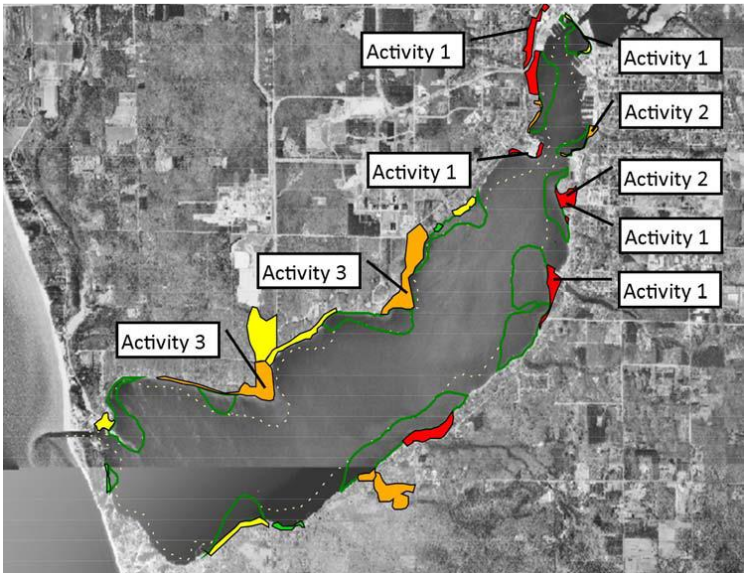

Figure 3. Delisting Target Areas for Activities 1 through 3 with Blueprint ranking criteria map.

Description of Impairment: *Protect large contiguous tracts of shoreline habitat already existing and avoid fragmentation of natural habitat throughout the landscape that is critical to reproduction, growth, and survival of fish and wildlife. With continued sediment and groundwater clean-up activities associated with DuPont and Occidental Chemical, and increased public awareness, the PAC continues to revisit and discuss the same issues (toxicity impacts to habitat and populations, sedimentation, habitat fragmentation, exotic species, and shoreline alteration). Designated areas are two of the largest "natural" shoreline sections remaining.*

Activity 3: *Shoreline areas owned by DuPont and Occidental (Fig. 3).*
Restoration Target: Evaluate shoreline areas as part of Activity 4, and restore anthropogenic/industrial impacts at sites owned by DuPont and Occidental (46.8 acres – shoreline/wetland areas only) [This should be 30.3 acres, as noted above in the Target Acreage box]. *Long term objective to have shoreline acreage donated to local municipalities for public use, and placed in conservation easements.*

Completed Actions:
A site inspection revealed that all industrial impacts and debris at DuPont were removed, with the exception of a cement 10' x 10' docking platform, which is now privately owned. The Muskegon Conservation District performed invasive species control on the site. The Occidental property was part of the GLRI restoration project and is protected via conservation easement. Restoration and invasive species control work at these two Activity 3 locations were completed, totaling 30.3 acres.

Description of Impairment: *Lack of relevant scientific data on wildlife for White Lake AOC in previous RAP documents. Establish a baseline database of wetland / marsh species within the White Lake AOC which quantifies and qualifies key*

wildlife species and locations. Utilize database to determine AOC impacts in relation to other Great Lakes marsh sites.

Activity 4: *Marsh Monitoring*

Restoration Target: Monitoring data[4] indicates that White Lake "marsh" habitats and populations do not significantly vary from other Great Lakes coastal sites[5].

Completed Actions:

Baseline population studies have been conducted since 2006. Pre-restoration data trends showed the need for restoration in shoreline areas. Muskegon Conservation District staff conducted monitoring beginning in 2010. In 2011 and 2012, both reference and GLRI restoration sites were monitored.

Population dynamics may not show beneficial trends for some time following the completed restoration work at those sites. MDEQ has agreed to fund an additional three years (2014, 2015 and 2016) of monitoring to fully establish population and community trends at each restoration site and in the AOC as a whole, based on recommendations from Bird Studies Canada. Restoration work is complete and a funded monitoring plan is in place.

Description of Impairment: *Shoreline hardening and filling, alteration of native vegetation, elimination of wetland, shoreline, and littoral habitat, deposition of industrial / construction debris, and habitat fragmentation have all steadily increased during the last 60 years. Original fish and wildlife population decreases and habitat loss have been part of the legacy of industrial contamination on White Lake. Since that period, issues caused by other urban growth have been more dramatic and been exacerbated because populations and habitats have yet to rebound from original impacts. Restoration work must include areas of original industrial impact as well as other sites indirectly impacted to ensure sustainable habitat and population recovery.*

Activity 5: *Shoreline and Littoral Zone Restoration*

Restoration Target: Initiate restoration and enhancement work on "immediate", "high", and "intermediate" ranked sites and defined in the White Lake Shoreline Habitat Management Plan and delineated in the

[4] Monitoring data will be according to Bird Studies Canada - Marsh Monitoring Program's protocols and be collected by White Lake volunteers and Muskegon Conservation District staff. All volunteers will be trained by Bird Studies Canada trainers.

[5] Comparisons will be made between White Lake and three other non-AOC Great Lakes coastal sites with similar habitat characteristics and sampling points. Habitat characteristics will be determined by Bird Studies Canada - Marsh Monitoring Program's – Habitat Description protocols; "Monitoring and Assessing Marsh Habitats in Great Lakes Areas of Concern Final Project Report - December 2006". This report summarizes and interprets the final results of a two-year Marsh Monitoring Program project which assessed the health of coastal and inland marsh habitats within and among 12 U.S. and binational Great Lakes Areas of Concern (AOCs). Using a multiparameter approach, marsh health assessments were made to assess the status of five wetland and aquatic-related Beneficial Use Impairments at several selected sites within each AOC and surrounding watershed. http://www.bsc-eoc.org/mmpaocreport2007.html.

White Lake Shoreline Habitat Restoration Blueprint. Implement the following restoration work delineated in the blueprint including:

- *Soft engineering work (11.7 acres total)*
- *Shoreline and littoral zone enhancement / re-establishment (25.6 acres total)*
- *Removal of debris (5.6 acres total)*
- *Conservation easement and shoreline protection workshops (2 sessions)*
- *One-on-one landowners assistance (119 acres total)*
- *Establishing shoreline buffers (17.5 acres total)*
- *Exotic species control (29.6 acres total)*

Completed Actions:

Work completed as part of the GLRI shoreline habitat restoration project, Fish and Wildlife Landowner Assistance project, and other efforts by the Muskegon Conservation District include:

- Soft engineering work (53.03 acres)
- Shoreline and littoral enhancement (38.16 acres)
- Removal of debris (51,851 cubic yards, over 7.9 acres)
- Conservation easement and shoreline protection workshops (2 sessions as part of the Fish and Wildlife Landowner Assistance project)
- One-on-one Landowner Assistance (236 acres, not including phragmites control work in the summer of 2013)
- Establishing shoreline buffers (24.27 acres)
- Exotic species control (34.62 acres, not including phragmites control work in the summer of 2013)

In almost every case as noted above, the actions completed were in excess of the target acreages listed in the restoration criteria.

"Wildlife Habitat and Populations" Restoration Efforts

In 2010, the Muskegon Conservation District was awarded a $2.1 million GLRI grant from the US EPA, to implement a seven-site White Lake Shoreline Habitat Restoration project, consistent with the 2005 White Lake Shoreline Habitat Management Plan and subsequent Restoration Blueprint documents. Construction was completed at the end of 2012, and due to a number of contingencies that occurred during the project period, a total of ten shoreline habitat sites were restored, as opposed to the original seven that were proposed.

Restoration goals for the project were exceeded within the allocated budget. Successful completion was specifically intended to be the final restoration work leading to the removal of the Loss of Fish and Wildlife Habitat and Degraded Fish and Wildlife Populations BUIs, as prescribed by the PAC's local restoration criteria.

The final ten restoration sites included:

- Former Montague Dump Site
- Svensson Park
- Causeway
- Montague Boat Launch – Shoreline
- Montague Boat Launch – Two Track
- Maple Beach
- Mill Pond Park
- Weathervane Inn
- Occidental Chemical
- Ravenswood

During the same period, the Muskegon Conservation District was the beneficiary of US Fish and Wildlife funds for a Landowner Assistance project, to assist in the development of long-term shoreline plans to protect and enhance habitat and manage for native species. These efforts enhanced the achievement of the established restoration targets.

In total, 8,007 lineal feet of shoreline has been restored, 38.16 acres of wetlands and aquatic habitat were created or restored, 14.87 acres of riparian and upland habitat corridors were reconnected and restored, and 51,851 cubic yards of shoreline/ marine debris were removed.

Conclusion

As set forth in Annex 2 of the 1987 Amendments to the Great Lakes Water Quality Agreement, the BUIs addressed in this document are: 1) Degradation of Fish and Wildlife Populations and 2) Loss of Fish and Wildlife Habitat. The MDEQ approved site-specific criteria as including all components required by the state's *Guidance*. This removal recommendation reiterates the local criteria and summarizes assessment data, concluding that acreage of completed restorations and long-term preservation planning all contribute to the successful restoration of the fish and wildlife beneficial uses.

Recommendation

Based on review of the data and technical input from the Muskegon Conservation District, MDEQ and US EPA staff, removal of the Degradation of Fish and Wildlife Populations and Loss of Fish and Wildlife Habitat BUIs from the White Lake AOC is recommended. The White Lake PAC discussed the issue in detail at its January 9, 2014 meeting. Members voted to support removal of the BUI. The PAC submitted a letter dated ____, 2014 expressing support for this action.

References

Breen, M. and Ruetz, C., 2006. Gear Bias in Fyke Netting: Evaluating Soak Time, Fish Density and Predators. *North American Journal of Fisheries Management* 26:32-41.

Cooper, M.J., C.R. Ruetz III, D.G. Uzarski, and T.M. Burton. 2007. Distribution of round gobies in coastal areas of Lake Michigan: are wetlands resistant to invasion? *Journal of Great Lakes Research* 33(2):*In press*.

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

Michigan Department of Natural Resources, 1987. Remedial Action Plan for White Lake Area of Concern.

Michigan Department of Natural Resources, 1995. Remedial Action Plan for White Lake Area of Concern.

Ruetz, C., 2011. White Lake Area of Concern Evaluating Targets for Delisting Two Beneficial Use Impairments: Loss of Fish Habitat and Degradation of Fish Populations.

Sokal, R.R., and F.J. Rohlf, 1995. Biometry, 3rd edition. Freeman, New York.

Uzarski, D. et al, 2005. Fish Habitat Use Within and Across Wetland Classes in Coastal Wetlands of the Five Great Lakes: Development of a Fish-Based Index of Biotic Integrity. *Journal of Great Lakes Research* 31 (Suppl. 1):171-187.

White Lake Public Advisory Council, 2005. White Lake Shoreline Habitat Management Plan.

White Lake Public Advisory Council, 2009. White Lake Shoreline Habitat Restoration Blueprint.

White Lake Public Advisory Council, 2008. Targets for Delisting Two Beneficial Use Impairments: Loss of Fish Habitat and Degradation of Fish Populations.

Prepared by: John Riley
Great Lakes Management Unit
Office of the Great Lakes
Michigan Department of Environmental Quality
December 2013

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

2 APR 2014

REPLY TO THE ATTENTION OF:

Mr. Roger Eberhardt
Acting Deputy Director, Office of the Great Lakes
Michigan Department of Environmental Quality
525 West Allegan Street
P.O. Box 30473
Lansing, Michigan 48909-7973

Dear Roger:

Thank you for your March 12, 2014, request to remove the "Degradation of Fish and Wildlife Populations" and "Loss of Fish and Wildlife Habitat" Beneficial Use Impairments (BUIs) from the White Lake Area of Concern (AOC) in 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 White Lake 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 White Lake AOC, but all the residents of Michigan and the Great Lakes basin as well. With the removal of these final two BUIs, all eight of the White Lake AOC BUIs will have been removed. 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 coordinating committee 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