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

REPLY TO THE ATTENTION OF:

G-9J

Jon W. Allan, Director
Office of the Great Lakes
Michigan Department of Natural Resources
525 W Allegan St.
P.O. Box 30028
Lansing, MI 48909-7528

FEB 07 2019

Dear Mr. Allan: Jon

Thank you for your December 3, 2018 request to remove the "Degradation of Fish and Wildlife Populations" and "Loss of Fish and Wildlife Habitat" Beneficial Use Impairments (BUIs) at the Lower Menominee River Area of Concern (AOC) located within the cities of Menominee, MI and Marinette, WI. As you know, we share your desire to restore all 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 (EPA) approves your request to remove these BUIs from the Lower Menominee River AOC. EPA will notify the International Joint Commission (IJC) 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 been instrumental in achieving this environmental improvement. Removal of these BUIs will benefit not only the people who live and work in the Lower Menominee River AOC, but all residents of Michigan, Wisconsin, and the Great Lakes Basin as well.

We look forward to the continuation of this important and productive relationship with your agency and the Wisconsin Department of Natural Resources as we work together to delist this AOC in the year to come. If you have any further questions, please contact me at (312) 353-8320 or your staff can contact Leah Medley at (312) 886-1307.

Sincerely,

Chris Korleski, Director
Great Lakes National Program Office

cc: Richard Hobrla, MDNR
Stephanie Swart, MDNR
Steve Galarneau, WDNR
Kendra Axness, WDNR
Brie Kupsky, WDNR
Cheryl Bougie, WDNR
Raj Bejankiwar, IJC

STATE OF MICHIGAN
OFFICE OF THE GREAT LAKES
LANSING

RICK SNYDER
GOVERNOR

MICHIGAN OFFICE OF THE GREAT LAKES
JON W. ALLAN
DIRECTOR

December 3, 2018

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 (USEPA), Great Lakes National Program Office's (GLNPO) concurrence with the removal of the Restrictions on Fish and Wildlife Habitat and Populations Beneficial Use Impairments (BUIs) from the Lower Menominee River Area of Concern (AOC). The Michigan Department of Natural Resources (MDNR), Office of the Great Lakes (OGL) and the Wisconsin Department of Natural Resources (WNDR), Office of Great Waters have assessed the status of these BUIs in accordance with the delisting targets established in 2008. These are the final two BUIs for the Lower Menominee River AOC and we recommend that they be removed from the list of impairments.

Enclosed please find documentation to support this recommendation, including the BUIs Removal Recommendation prepared by OGL and WDNR staff. The Lower Menominee River Citizens Advisory Committee provided a letter of support for this action, dated June 8, 2018. A copy is included. Please note that a public comment period was held from October 29 to November 21, 2018. Comments received during the comment period were addressed and incorporated into the document.

We value our continuing partnership in the AOC Program and look forward to continuing to work with GLNPO in the removal of other BUIs and the delisting of AOCs. If you need further information concerning this request, please contact Ms. Stephanie Swart at 517-284-5046, or you may contact me.

Sincerely,

Jon W. Allan, Director
Office of the Great Lakes
(517) 284-5035

Enclosure
cc/enc: Mr. Marc Tuchman, USEPA
Ms. Leah Medley, USEPA
Mr. Steve Galarneau, WDNR
Ms. Kendra Axness, WDNR
Ms. Brianna Kupsky, WDNR
Ms. Cheryl Bougie, WDNR
Mr. Rick Hobrla, MDEQ
Mr. Stephanie Swart, MDEQ

Removal Recommendation for the Degradation of Fish and Wildlife Populations and Loss of Fish and Wildlife Habitat Beneficial Use Impairments in the Lower Menominee River Area of Concern

Submitted to
U.S. EPA-Region 5
Great Lakes National Program Office
77 West Jackson Boulevard
Chicago, Illinois 60604

By:
Wisconsin Department of Natural Resources and
Michigan Department of Natural Resources

December 6, 2018

Acknowledgements

Prepared by:

Laurel Last, Wisconsin's Lower Menominee River AOC Coordinator
Office of Great Waters
Wisconsin Department of Natural Resources

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Office of the Great Lakes
Michigan Department of Natural Resources

Cheryl Bougie, Lake Michigan Sediment and Water Quality Monitoring Coordinator
Office of Great Waters
Wisconsin Department of Natural Resources

The Wisconsin Department of Natural Resources and the Michigan Department of Natural Resources would like to acknowledge the many contributions and support by the members of the Lower Menominee River Area of Concern (AOC) Citizens Advisory Committee (CAC) and Technical Advisory Committee (TAC) in the development of this Lower Menominee River AOC Degradation of Fish and Wildlife Populations and Loss of Fish and Wildlife Habitat Beneficial Use Impairments (BUIs) Removal Package. CAC and TAC collaboration with state and federal agencies has resulted in materials and activities that reflect local issues and concerns.

Cover Photo by Ecology and Environment, Inc., Strawberry Island Colonial Waterbird Rookery

Disclaimer

The Great Lakes Water Quality Agreement is a non-regulatory agreement between the U.S. and Canada, and criteria developed under its auspices are non-regulatory. The actions identified in this document are needed to meet BUI removal targets leading to the delisting of the Lower Menominee River AOC. These actions are not subject to enforcement or regulatory action.

Executive Summary

In 1987, the lower three miles of the Menominee River, along with Green Island and the Green Bay shoreline three miles north and south of the river mouth, were designated a Great Lakes Area of Concern (AOC), primarily due to toxic chemical contamination. Polycyclic aromatic hydrocarbons (PAHs), heavy metals (specifically arsenic), and paint sludge associated with industrial activities were present in river and bay sediments at elevated levels within the AOC. Over the years, fish and wildlife habitat was lost and degraded due to wetland destruction, shoreline hardening, spread of invasive plants, and limited access to spawning and juvenile habitat for lake sturgeon.

Six impairments were assigned to the AOC, including the "Degradation of Fish and Wildlife Populations" and "Loss of Fish and Wildlife Habitat" BUIs. A *Fish and Wildlife Population and Habitat Management and Restoration Plan* (Plan) was developed for the AOC in 2011 and updated in 2013 (WDNR and MDEQ, 2014). This Plan provides a strategy for the removal of the habitat and populations BUIs. Specifically, the Plan outlines goals, objectives, and activities necessary to remove the BUIs. All the activities have been completed, and all the objectives and goals have been achieved. Therefore, the Wisconsin Department of Natural Resources (WDNR) Office of Great Waters and Michigan Department of Natural Resources (MDNR) Office of the Great Lakes are proposing to remove these impairments.

This BUI removal is supported by the Lower Menominee River AOC Technical Advisory Committee (TAC) and the Lower Menominee River AOC Citizens Advisory Committee (CAC). This document describes the required activities and the objectives and goals that have been achieved and the public involvement in the process.

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Issue

The Wisconsin Department of Natural Resources (WDNR) Office of Great Waters and the Michigan Department of Natural Resources (MDNR) Office of the Great Lakes recommend removal of the Degradation of Fish and Wildlife Populations and Loss of Fish and Wildlife Habitat Beneficial Use Impairments (BUIs) in the Lower Menominee River Area of Concern (AOC). This recommendation is made with the support of staff from the MDNR Fisheries Division, the WDNR Fisheries Management Program, the WDNR Wildlife Management Program, the Lower Menominee River Citizens Advisory Committee (CAC), and the Lower Menominee River AOC Technical Advisory Committee (TAC). This document provides information supporting the recommendation and documents the actions completed to meet the locally established criteria set forth in the *Lower Menominee River AOC BUI Restoration Targets* (*Restoration Targets*) [WDNR and Michigan Department of Environmental Quality (MDEQ), 2008]. Note that Michigan's Office of the Great Lakes was part of MDEQ and became part of MDNR on December 28, 2017.

Background

The Lower Menominee River AOC is the lower three miles of the river from the Park Mill Dam (Upper Scott Dam) to the river's mouth in northeast Wisconsin and in the southwest portion of Michigan's Upper Peninsula. The boundary extends approximately three miles north of the river mouth to John Henes Park and approximately three miles south of the river mouth past Seagull Bar along the bay of Green Bay. The AOC includes Seagull Bar as well as Green Island in the bay of Green Bay. The AOC includes portions of Marinette County, Wisconsin and Menominee County, Michigan (Figure 1).

The Lower Menominee River became an AOC primarily due to arsenic-contaminated sediment found in the turning basin of the river (Figure 1) during the U.S. Army Corps of Engineers (USACE) navigational dredging sampling between 1980 and 1989 (WDNR and MDNR, 1990). The 1990 Stage One Remedial Action Plan (RAP) identified the scope of contamination in the Menominee River and adjacent Green Bay shore (WDNR and MDNR, 1990). The RAP recognized two additional sites in the immediate area that contained legacy sediment contamination requiring remedial action: the Lloyd-Flanders paint sludge site along the Green Bay shoreline in Menominee, Michigan and the Wisconsin Public Service Corporation (WPSC) coal tar site in the Menominee River near Boom Landing in Marinette, Wisconsin (WDNR and MDNR, 1990). An additional sediment remediation site, Menekaunee Harbor, was identified later and added to the list (WDNR and MDEQ, 2011).

The Degradation of Fish and Wildlife Populations and Loss of Fish and Wildlife Habitat BUIs were listed because of the loss of historic wetlands and localized toxicity caused by contaminated sediment. An extensive wetland complex near the mouth of the river was destroyed by logging activities in the 1800s (WDNR and MDNR, 1990). Afterward, land near the mouth of the river was filled for industrial expansion, and the shorelines hardened to prevent erosion or provide cargo vessel docking facilities. Remaining quality habitat and wetlands were threatened by encroaching invasive plants, and several Lake Michigan fish species, including lake sturgeon, had severely limited access to their historic spawning and juvenile habitat in the Menominee River due to the lack of a safe passage beyond five hydroelectric dams (Figure 2). Sediment contaminated with arsenic, polycyclic aromatic hydrocarbons (PAHs, or coal tars), and other heavy metals impacted fish populations throughout the AOC (WDNR and MDNR,

1990). Sediment was contaminated through industrial activities and storm water discharges that took place throughout the 1900s.

Sediment contamination was listed in the 1990 RAP as impacting the habitat and populations BUIs. All sediment remediation projects required for BUI removal have been completed and are meeting their remediation goals. This includes the Green Bay (Lloyd-Flanders) paint sludge site, the WPSC coal tar site, the Ansul/Tyco arsenic site, and the Menekaunee Harbor legacy site (Baker et al., 2017; Bougie et al., 2017). Sediment remediation activities are detailed in the Restrictions on Dredging Activities and Degradation of Benthos BUI removal recommendations (Baker et al., 2017; Bougie et al., 2017).

Four BUIs—Restrictions on Recreational Contact (Beach Closings; Baker and Galarneau, 2011), Degradation of Benthos (Baker et al., 2017), Restrictions on Dredging Activities (Bougie et al., 2017), and Restrictions on Fish and Wildlife Consumption (Last et al., 2018) have been assessed and removed. This recommendation pertains only to the Degradation of Fish and Wildlife Populations and Loss of Fish and Wildlife Habitat, which are the remaining BUIs for the Lower Menominee River AOC.

Figure 1. Lower Menominee River AOC boundary, habitat restoration sites, and sediment cleanup sites. Green Island, which was included in the AOC in the 1996 RAP, is not visible on this map, and is located approximately five miles east of Seagull Bar (WDNR, 2018).

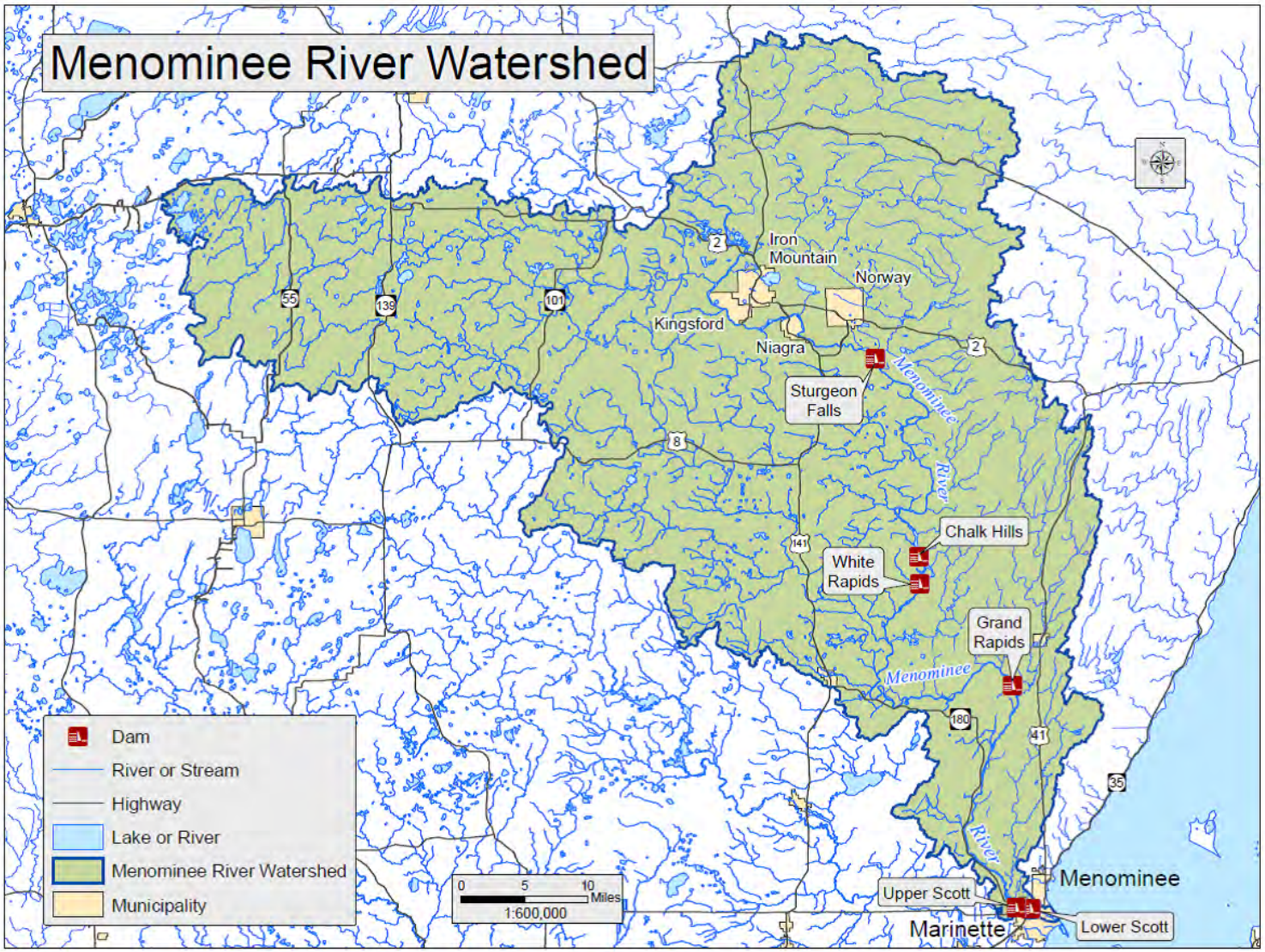


Figure 2. Menominee River Watershed including tributaries and dams. The Upper and Lower Scott Dams are commonly referred to as the Park Mill and the Menominee Dams, respectively (WDNR, 2018).

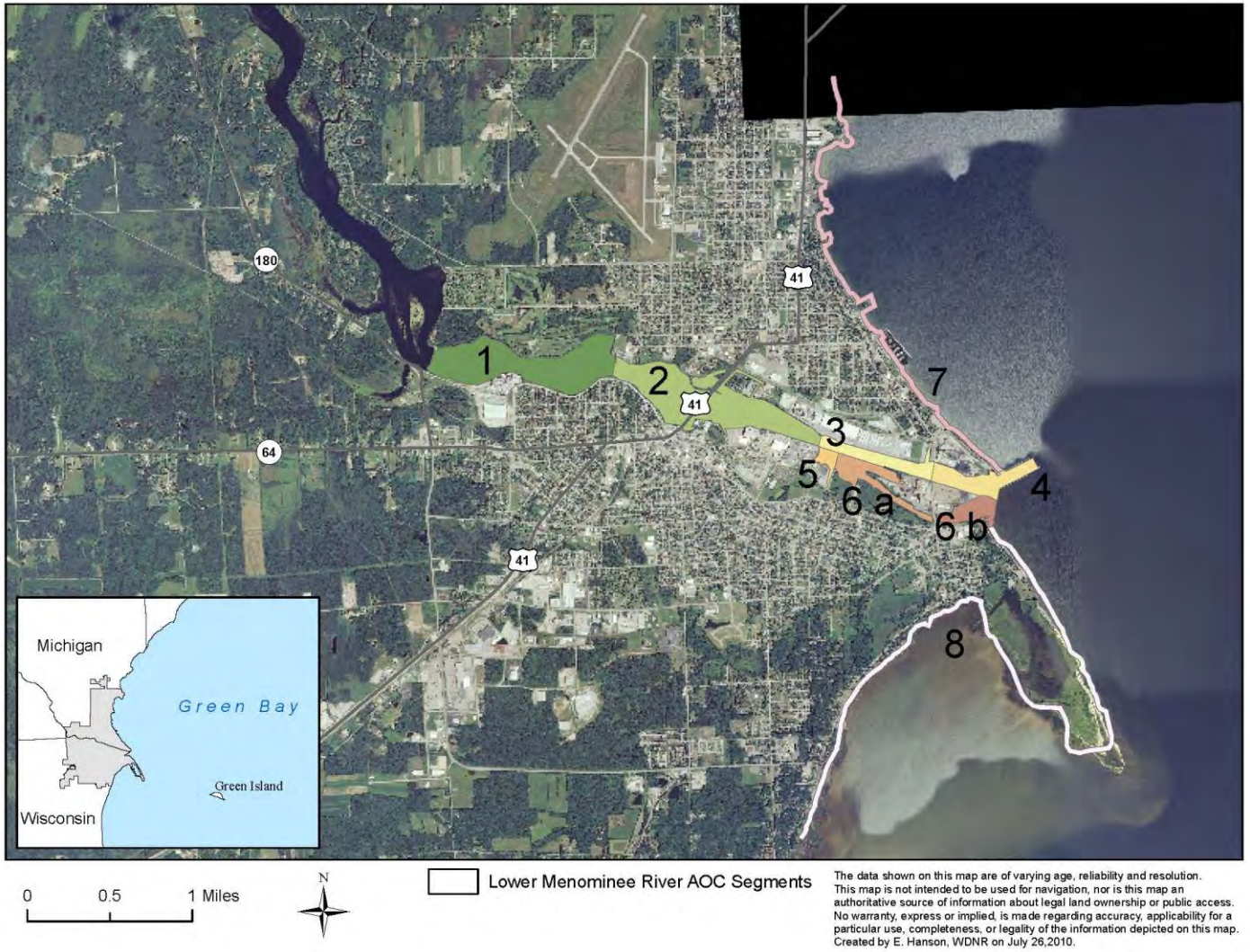


Figure 3. Segments of the Lower Menominee River AOC. Segment numbers are used to describe the general location of a place within the AOC. Green Island, seen in the map inlay, has not been assigned a segment number.

BUI Removal Criteria (2008 Final Delisting Target)

The *Restoration Targets* document lists these removal criteria for the Degradation of Fish and Wildlife Populations and Loss of Fish and Wildlife Habitat BUIs. These BUIs are considered restored when:

A local fish and wildlife habitat management and restoration plan has been developed and implemented for the Lower Menominee River AOC that:

- Defines the causes of fish and wildlife population and habitat impairments within the AOC;
- Establishes site specific habitat and population objectives for fish and wildlife species within the AOC;
- Identifies fish and wildlife population restoration programs and activities within the AOC and establishes a mechanism to assure coordination among states and programs for assessment monitoring, implementation activities and associated monitoring;
- The programs and actions necessary to accomplish the recommendations identified in the fish and wildlife management and restoration plan are implemented; and,
- Monitoring conducted according to the Fish and Wildlife Plan shows consistent improvement in the quality and quantity of habitat or populations identified in the plan.

Fish and Wildlife Population and Habitat Management and Restoration Plan

Per the requirement for restoring the fish and wildlife populations and habitat BUIs, a *Fish and Wildlife Population and Habitat Management and Restoration Plan* (Plan) was developed for the AOC in 2011 and updated in 2013 (WDNR and MDEQ, 2014). This Plan provides a strategy for the removal of the habitat and populations BUIs. Specifically, the Plan outlines goals, objectives, and activities necessary to remove the BUIs. Table 1 lists the goals and objectives and Table 2 the activities from the Plan, along with their status and date of completion. See Figure 3 for the locations of the segments mentioned in Tables 1 and 2. When all the objectives for a goal have been achieved, the goal is considered achieved. Objectives are considered accomplished when the WDNR, MDNR (formerly MDEQ), CAC, and TAC agree that all applicable activities have been completed. The WDNR, MDNR, CAC, and TAC agreed that only the activities listed in Table 2 would be required to achieve the objectives.

The Plan also includes activities that were not mandatory for BUI removal. The WDNR, MDNR, CAC, and TAC agreed that these items were over and above what was needed to restore beneficial uses, not feasible due to cost or ownership, or there were more effective and efficient alternatives (WDNR and MDEQ, 2014).

The Plan is the summation of requirements to restore the BUIs and for the remainder of this document will be the template by which this removal recommendation specifies that the BUIs have been restored. The removal recommendation will describe how the required activities have been completed and the objectives and goals have been accomplished.

Table 1. Goals and Objectives of the Plan for the Lower Menominee River AOC (WDNR and MDEQ, 2014).

<table>
<tr><th colspan="5">GOALS</th></tr>
<tr><td>Long-term protection is in place for natural areas and wetlands within the AOC, including Seagull Bar and riverine islands.</td><td>Nesting populations of a diverse array of wetland-dependent and riparian-associated birds are consistently present within the AOC.</td><td>The lake sturgeon population is enhanced.</td><td>Diverse and functional native fish and mussel assemblages are present in the AOC that sustain natural recruitment.</td><td>A healthy and diverse native vegetation community has been restored.</td></tr>
<tr><th colspan="5">OBJECTIVES</th></tr>
<tr><td rowspan="3">Long-term protections deemed acceptable by the WDNR, MDEQ, TAC, and CAC have been established for all natural areas where habitat improvement work has taken place and contributes to achieving one or more BUI removal objectives.</td><td rowspan="2">Maintain or enhance habitat conducive to colonial waterbird rookery activity on known or prospective rookeries.</td><td rowspan="2">Provide additional spawning and juvenile rearing habitat for lake sturgeon by providing passage upstream of both Menominee and Park Mill Dams (USFWS, 2012).</td><td>There is evidence of recruitment within segments 2-8 for the following fish species: lake sturgeon walleye, yellow perch, muskellunge, smallmouth bass, largemouth bass, and northern pike.</td><td rowspan="4">Invasive, non-native species comprise no more than 33% of the vegetation community in protected natural areas of the AOC.</td></tr>
<tr><td>There is evidence of recruitment in segment 1 for the following fish species: walleye, rock bass, bluegill smallmouth bass, largemouth bass, and northern pike.</td></tr>
<tr><td rowspan="2">Monitor the rookery activity of known or prospective rookeries.</td><td rowspan="2">Provide a means for fish to pass safely downstream of both Menominee and Park Mill Dams (USFWS, 2012).</td><td>There is evidence of recruitment within the AOC for native mussel species.</td></tr>
<tr><td>Monitor for larval lake whitefish to determine necessity of future habitat improvements.</td></tr>
</table>

Table 2: List of activities needed to be completed to achieve all objectives of the Plan for the Lower Menominee River AOC (WDNR-MDEQ, 2014).

Type	Activity	Funded By	Management	Project Start Date	Status/Date Completed	Additional Comments
Review of Existing Data and Restoration Plans	Compile historical monitoring data to establish trends and assess fishery status. Also, assess the potential for existing fisheries programs to provide the needed data regarding fish assemblage and recruitment within the AOC.	USEPA (GLRI)	WDNR	2012	Complete, 2013	Project titled "Fisheries Data Roundup" (WDNR, 2013)
	Analyze the results of the 2010 aquatic vegetation survey and 2011 riparian vegetation survey. Identify aquatic and riparian natural areas.		TAC	2011	Complete, 2011	Completed through TAC discussions
	Identify existing mechanisms in place for wetland, aquatic, and riparian protection. Identify possible gaps and ways to fill protection gaps.		CAC, TAC	2014	Complete, 2014	CAC sent letter to the city of Marinette requesting zoning changes for city-owned habitat restoration areas
	Review results of the 2011 SPMD study and assess implications for habitat restoration.		TAC	2012	Complete, 2012	Indicated Lower Scott Flowage as a potential source of PCBs (Bohr, 2012); however, a GLNPO sediment characterization showed no significant sources (CH2MHill, 2014)
	Review Ansul arsenic site remediation plans and assess the implications for habitat restoration.		TAC	2013	Complete, 2013	Habitat work in segment 6a (South Channel) was not possible until arsenic concentrations were less than 20 ppm
	Review segment 1 (Lower Scott Flowage) GLNPO sediment characterization and assess the implications for habitat restoration.		TAC	2014	Complete, 2014	No sediment remediation was required, so additional habitat work was not needed
	Review the Menekaunee Harbor (segment 6b) sediment remediation plan for habitat restoration implications.		TAC	2013	Complete, 2013	Habitat work was included as part of sediment remediation efforts
	Determine whether or not carp exclusion should be pursued in the Seagull Bar State Natural Area (segment 8) pocket.		TAC	2013	Complete, 2013	Access was largely dependent on water levels; carp exclusion was also outside the AOC goals
	Review WPS coal tar site remediation plans and assess the implications for habitat restoration.		TAC	2013	Complete, 2013	Remediation complete, no habitat implications

Table 2, continued.

Type	Activity	Funded By	Management	Project Start Date	Status/Date Completed	Additional Comments
Field Studies	Conduct an aquatic vegetation survey.	USEPA (GLRI)	WDNR	2010	Complete, 2010	Rio Vista Slough and lakeshore excluded from survey (Onterra, 2010)
	Conduct a riparian vegetation survey. Inventory, map, and ground-truth lands within the AOC, include information about ownership and protection status for these lands.	USEPA (GLRI)	WDNR	2011	Complete, 2012	The survey area was dependent on landowner agreements (NES, 2012)
	Conduct an SPMD study including segment 1 and below the Menominee Dam, and assess the implications for habitat restoration.	USEPA (GLRI)	MDEQ	2011	Complete, 2012	Lower Scott Flowage was suspected as a source of PCBs (Bohr, 2012); however, a GLNPO sediment characterization showed no significant sources (CH2MHill, 2014)
	Conduct a mussel survey upstream of the AOC and segments 1, 2, 3, 4, and 6a. Surveys will assess hydro dam impacts as well as serve as a baseline for evaluating subsequent sediment remediation and habitat enhancement efforts.	ECRE and USEPA (GLRI)	WDNR	2011	Complete, 2012	Provided evidence of recruitment within the AOC for native mussel species (Piette, 2012)
	Conduct additional fish population surveys in the AOC and select reference sites to determine target species recruitment status.	USEPA (GLRI)	WDNR, MDNR	2013	Complete, 2016	Project titled "Fisheries Data Roundup Reference Site Monitoring" (Last, 2016)

Table 2, continued.

Type	Activity	Funded By	Management	Project Start Date	Status/Date Completed	Additional Comments
Habitat Restoration and Protection Projects (For a map of habitat restoration and protection projects, see Figure 1)	Complete safe downstream fish passage around the Park Mill Dam.	NFWF (GLRI) and ECRE	USFWS, ECRE, River Alliance of Wisconsin	2013	Complete, 2015	
	Complete fish lift and research facility construction at the Menominee Dam for upstream fish passage.	ECRE and USEPA (GLRI)	USFWS, ECRE, River Alliance of Wisconsin	2013	Complete, 2015	
	Acquire means and materials to conduct the truck and transfer of lake sturgeon above the Menominee Dam.	ECRE	USFWS, ECRE, River Alliance of Wisconsin	2015	Complete, 2015	Have been using existing truck and trailer but may develop custom transport trailer in future.
	Complete safe downstream passage below the Menominee Dam for adult lake sturgeon and other large fish.	USFWS (GLRI) and ECRE	USFWS, ECRE, River Alliance of Wisconsin	2014	Complete, 2016	These activities constitute one project
	Provide safe downstream passage below the Menominee Dam for juvenile lake sturgeon and other small fish.					
	Improve the vegetation communities of Strawberry, Blueberry, and Boom Islands to maintain habitat conducive to rookery activity.	USACE (GLRI)	USACE	2014	Complete, 2016	USACE aquatic plant control project, monitoring and maintenance 2017-2018. Follow-up to 2013 "Island Rookery Habitat Restoration"
	Protect rookery habitat of Strawberry, Blueberry, and Boom Islands from human development.		CAC, TAC	2014	Complete, 2015	Blueberry and Strawberry Islands protected through respective ownership; Boom Island protected through city of Marinette zoning changes in 2015.
	Increase the hydrologic connection between South Channel and Menekaunee Harbor by removing debris and excess riprap under the Ogden Street Bridge.	USEPA (GLRI)	WDNR, city of Marinette	2016	Complete, 2016	Completed as part of South Channel Habitat Restoration.
	Complete a habitat restoration and protection project in the South Channel for increased fish and wildlife habitat.	USEPA (GLRI), USFWS (GLRI)	WDNR, city of Marinette	2013	Complete, 2016	Monitoring and maintenance 2017-2019.
	Complete a habitat restoration and protection project in Menekaunee Harbor for increased fish and wildlife habitat.	USEPA (GLRI), city of Marinette, WDNR	WDNR, city of Marinette	2014	Complete, 2016	Monitoring and maintenance 2016-2018.
	Complete a fisheries habitat improvement and protection project in the 11th Avenue Pool.				not required	This project was to be included only if sediment remediation was required in this area.

Table 2, continued.

Type	Activity	Funded By	Management	Project Start Date	Status/Date Completed	Additional Comments
Monitoring	Monitor rookery activity on all riverine islands.	WDNR	WDNR	2013	Complete, 2014	TAC agreed that WDNR eBird data analysis (Uvaas and Fayram, 2014) fulfills this requirement. USACE island restoration project also includes rookery monitoring.
	Conduct biological monitoring of the segment 6a (South Channel) to document ecological recovery.				not required	This project was not required as sediment arsenic levels were reduced to 20 ppm through a GLLA betterment project rather than natural recovery. The funds were used for habitat restoration planning.
	Conduct monitoring for larval lake whitefish.	Great Lakes Protection Fund	WDNR	2014	Complete, 2016	Characterized larval whitefish outmigration from Menominee River (Houghton et al., 2016); results will inform the design and operation of other habitat restoration activities.
	Repeat fish recruitment studies, mussel survey, bird survey, and aquatic vegetation survey after the restoration and protection projects have been completed to confirm targets have been achieved.				not required	Vegetation monitoring is included in South Channel, Menekaunee Harbor, and island restoration projects. TAC and CAC agreed that additional bird, mussel, and fish surveys are not required for BUI removal.

Supporting Data and Analysis

Activities

An activity is a specific action or project that, when completed, contributes towards the achievement of one or more objectives. The 2011 Plan attempted to identify what activities affect which goals, but some activities relate to specific objectives and goals, and others impact multiple objectives and goals, so it is clearer to list the activities separately. The 2013 Plan records critical information about each activity (management, status, cost, etc.). Table 2 displays the list of activities from the Plan with updated information, including the dates of completion. Below are details about the activities and how they were attained.

Review of Existing Data and Restoration Plans

The Plan lists nine activities related to the review of existing data and restoration plans. These activities were necessary to help assess the status of the fish and wildlife impairments and plan next steps. For example, to assess the status of fish populations in the AOC, historical monitoring data was reviewed. This assessment, titled the "Fisheries Data Roundup," determined what additional monitoring would be essential to determine whether target fish species were meeting their population (recruitment) objectives (WDNR, 2013).

When the 2013 Plan was published, seven of the nine review activities had been completed. One of the remaining activities was to identify existing mechanisms for wetland, aquatic, and riparian protection and identify possible gaps and ways to fill protection gaps. This activity was completed in 2014, as the CAC reviewed and discussed existing protections for natural areas in the AOC and sent a letter to the city of Marinette requesting zoning and planning changes to three habitat restoration areas. In 2015, the city responded by making the CAC's requested changes, and both the TAC and the CAC agreed that the Natural Areas Protection Objective and Goal had been met (see *Goals and Objectives* section for more details).

The other remaining activity, review of the segment 1 (Lower Scott Flowage) sediment characterization and assessment of the implications for habitat restoration, is also complete. Habitat restoration was necessary only if the GLNPO sediment characterization work in the Lower Scott Flowage found contamination near the 11th Avenue Pool that required remediation. Then, the habitat would be restored after the remediation was complete. Since the sediment characterization final report showed that remediation was not required in the 11th Avenue Pool area, the TAC confirmed in September 2014 that post-remedial habitat restoration would not be required (CH2MHill, 2014).

Field Studies

The Plan also lists five field study activities. The field studies were necessary to collect additional information to help assess the status of the fish and wildlife impairments and plan next steps. For example, a riparian vegetation survey documented existing plant communities in the AOC to help guide future habitat protection and restoration efforts (NES, 2012).

When the Plan was published, four of the five field study activities had been completed. The remaining activity, to conduct additional fish population surveys in the AOC and select reference sites to determine target species recruitment status, was completed in 2016. This project, titled "Fisheries Data Roundup Reference Site Monitoring," included fish surveys in 2013, 2014, and 2015 in the AOC and at two reference sites. The site monitoring determined that the target fish

species in the AOC were meeting their population (recruitment) objectives (Last, 2016; see *Goals and Objectives* section for more details).

Monitoring

In addition, the Plan includes four monitoring activities, which documented fish and wildlife recovery or provided information and education. The first activity, to monitor rookery activity on the riverine islands, was primarily to inventory the number and location of colonial nesting waterbirds, determine the nest-site requirements of heron species, and determine the health and productive success of the population. The data provided focus areas to create and manage habitat on the islands in the AOC that were not supporting a rookery. This activity required the TAC to qualitatively assess existing colonial water-bird populations, determining whether existing datasets were adequate or if new data would need to be collected. In 2014, the TAC considered the WDNR eBird data analysis and decided that the effort fulfilled this activity (Uvaas and Fayram, 2014). In addition, rookery monitoring on Strawberry Island was performed as part of the USACE island restoration project (see *Goals and Objectives* section for more details).

The second monitoring activity, conducting biological monitoring of the South Channel to document ecological recovery, was needed only if natural recovery was the method to bring the sediment arsenic levels from 50 ppm down to 20 ppm. Instead, a Great Lakes Legacy Act (GLLA) betterment project continued the sediment cleanup down to 20 ppm in 2015, rather than wait for natural recovery.

The third monitoring activity, to conduct monitoring for larval lake whitefish, was to understand whitefish recruitment in the AOC, in consideration of strong stakeholder interest in the species. The results informed the development of other habitat restoration activities. This monitoring activity was completed in 2016 (Houghton, et al., 2016; see *Goals and Objectives* section for more details).

The fourth monitoring activity, to repeat fish, mussel, bird, and aquatic vegetation surveys after the restoration and protection projects have been completed to confirm targets have been achieved, was necessary only if additional monitoring was required to confirm that the objectives had been met. The fisheries reference site monitoring project determined that the target fish species in the AOC were meeting their population objectives and thus additional fish monitoring beyond that project was not required (Last, 2016; see *Goals and Objectives* section for more details). The mussel survey provided evidence of recruitment within the AOC for native mussel species, and the CAC and TAC agreed in 2015 that additional mussel surveys were not needed before removing the fish and wildlife BUIs (Piette, 2012; see *Goals and Objectives* section for more details). In 2014, the TAC and CAC agreed that WDNR eBird data analysis fulfilled the rookery monitoring objective, so no additional bird surveys were necessary (Uvaas and Fayram, 2014; see *Goals and Objectives* section for more details). Finally, vegetation monitoring was included in the South Channel, Menekaunee Harbor, and USACE island restoration projects, so no additional vegetation surveys were required for BUI removal (see *Goals and Objectives* section for more details).

Habitat Restoration and Protection Projects

The Plan includes 11 habitat restoration and protection activities, which were necessary to improve, restore, and protect fish and wildlife habitat in the AOC. The first ten activities can be lumped into four habitat restoration categories: Lower Menominee fish passage and protection, Lower Menominee islands, South Channel habitat restoration, and Menekaunee Harbor habitat

restoration. These activities have all been completed and are described below in further detail. The eleventh activity, to complete a fisheries habitat improvement project in the 11th Avenue Pool, was necessary only if the Lower Scott Flowage sediment characterization found a need for remediation in the area. Since the characterization noted that no remediation was required, the habitat restoration project was not included (CH2MHill, 2014).

Lower Menominee Fish Passage and Protection

Description of Impairment

The first five habitat restoration and protection activities listed in the Plan (Table 2) address the impairment of lake sturgeon populations in the Menominee River and Lake Michigan caused by the Menominee and Park Mill Dams (Figure 1). The Menominee River serves as one of the last spawning areas for Lake Michigan lake sturgeon (Thuemler, 1985). Tagged lake sturgeon from the Menominee River have been captured as far south as the Grand River in Grand Rapids, Michigan. The Menominee and Park Mill Dams were constructed in 1925 and 1920, respectively, to serve as sources of hydropower to the growing industry around Marinette and Menominee. These dams limited the migration and spawning of lake sturgeon to the lower two miles of the Menominee River and cut them off from historic breeding grounds. The dams also impaired safe downstream passage of fish. Less available habitat can negatively impact total population size, natural recruitment, species diversity, and genetic diversity. Since the lake sturgeon of the Menominee River are one of the largest breeding populations in Lake Michigan and directly impact Lake Michigan populations, the creation of passage around the dams was necessary for sturgeon restoration.

Activities

The activities to create upstream and downstream fish passage around the Menominee and Park Mill Dams were facilitated by the Menominee Fish Passage Partnership (Partnership). The Partnership is comprised of state and federal agencies, nonprofit conservation organizations, and a private energy company. The owner and operator of both dams is Eagle Creek Renewable Energy (ECRE), formerly North American Hydro. Although the Partnership was interested in developing safe passage around all five dams between Lake Michigan and Sturgeon Falls (the historic range of lake sturgeon in the Menominee River), only passage around the Menominee and Park Mill Dams was required for BUI removal. See Figure 2 for a map of the Menominee River watershed showing the locations of all the dams and Figure 4 for a depiction of the upstream and downstream fish passage around the Menominee and Park Mill Dams.

The first hurdle to upstream lake sturgeon passage was the Menominee Dam. A fish elevator (lift) was constructed and built into one of the existing empty turbine bays. The fish lift and research facility were completed in 2015. When fish enter the elevator, they are moved above the dam to a sorting station. There, biologists assess them for health, take measurements, collect physical samples, and retain only lake sturgeon. The agencies select healthy adult sturgeon over 50 inches long to be passed upstream. The goal is to move 90 sturgeon upstream each year. Biologists are continually evaluating the lift to maximize the effectiveness of this segment of the passage. During spring and fall, biologists are monitoring the fish lift regularly. Although the lift was constructed for sturgeon, other fish species enter the elevator; these are assessed and returned to the lower river.

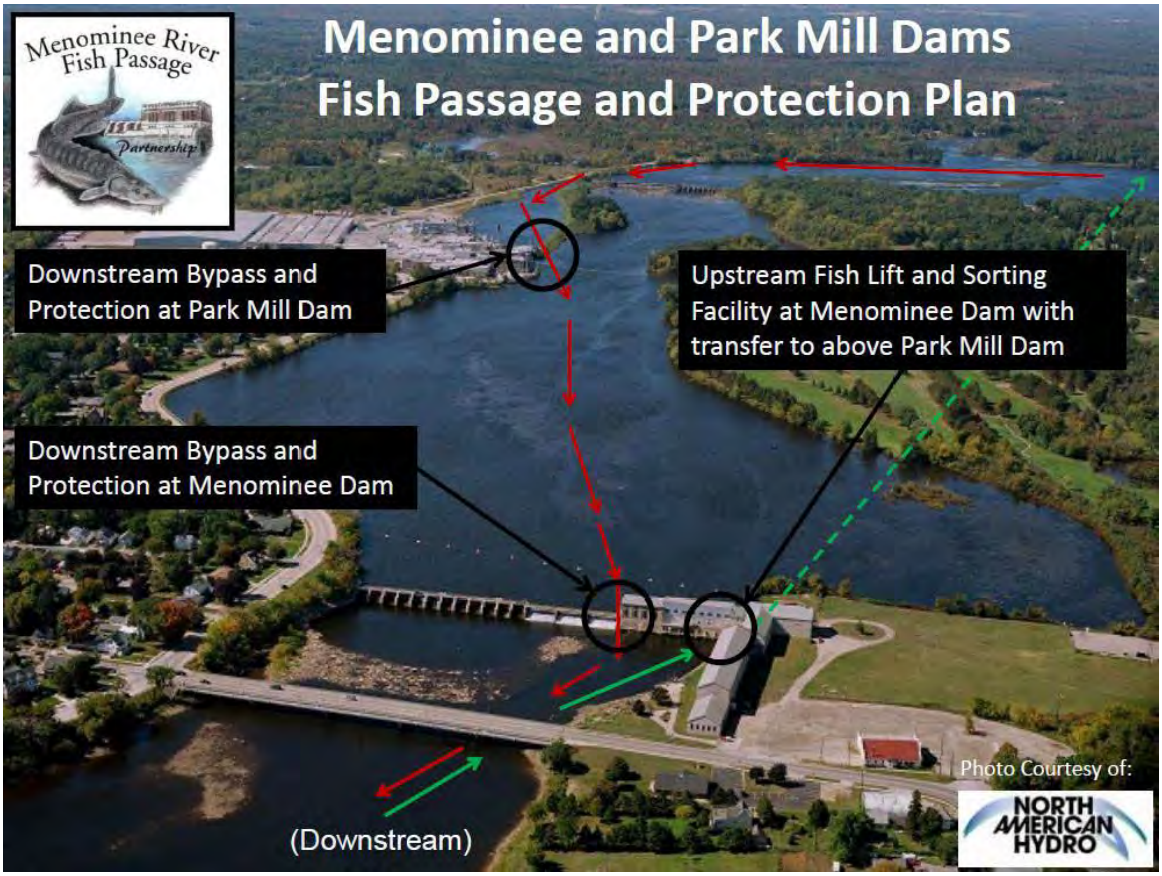


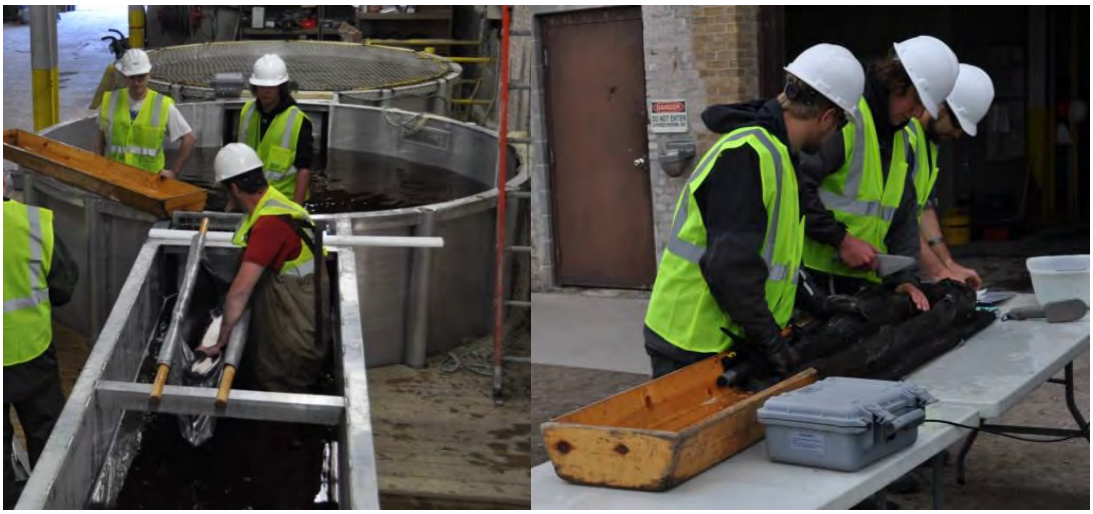
Figure 4. Depiction of the upstream and downstream passage segments for lake sturgeon (Rob Elliott, USFWS).

The second hurdle to upstream passage for the lake sturgeon is the Park Mill Dam. Adult sturgeon that have been selected to be moved upstream are loaded into a trailer for transport from the Menominee Dam to a release point above the Park Mill Dam. Although discussions continue about developing a custom transport trailer for the sturgeon, this aspect is not necessary for BUI removal. Existing equipment has been used to transport the sturgeon upstream since 2015. Once the sturgeon are upstream of the Park Mill Dam, they have access to 21 miles of river, 32 acres of spawning habitat, and 1,400 acres of juvenile habitat previously inaccessible to them. The new habitat opened as a result of passage includes high quality spawning and rearing acres both above and below the Menominee and Park Mill dams as shown in Table 2a (Daugherty, 2006). High quality lake sturgeon spawning habitat includes coarse substrates (gravel sized or larger) with moderate to high stream gradients (>0.6m/km), and quality larval habitat as silt to gravel sized particles with moderate to high stream gradients (0.3-1 m/km). See Table 2b, Appendix A for a list of habitats for riverine life stages of lake sturgeon.

Table 2a. Sturgeon Spawning and Rearing Habitat Menominee River (Daugherty, 2006).

Menominee River & Reach Location	**Spawning (Acres) Excellent/Good**	**Rearing (Acres) Excellent/Good**
Downstream of Menominee Dam	26/101	210/47
Downstream of Menominee Dam + Upstream of Park Mill Dam	58/664	1609/0.35
Menominee River up to Sturgeon Falls Dam	261/2353	4771/1055

After adult sturgeon have spawned they and juvenile sturgeon can freely move downstream. Adults and larger juveniles will move out into Lake Michigan to feed, and smaller juveniles will stay in the river or near the river mouth. Downstream fish passage was achieved through surface bypasses and fish guidance systems at each of the dams. Additionally, the powerhouse intake racks were modified to prevent juveniles going into the powerhouse and through the turbines (entrainment) and velocities were reduced to decrease the number of fish being trapped and killed on the racks (impingement). In 2015, an angled fish guidance rack was installed at the Park Mill Dam in front of the turbine intake to redirect fish moving downstream into a surface bypass leading to the tailrace below. The trash rack angle and spacing was modified in 2016 at the Menominee Dam to redirect fish into a surface bypass constructed at the location of an abandoned fish ladder. Biologists evaluate the downstream movement of all fish species with underwater cameras at both dams.



Sturgeon are sorted in holding tanks and carefully examined before passing upriver (WDNR).

The Menominee fish lift was operated in 2017 from April 17 to May 15 and from October 2 to 28. The lift or elevator was processed for 243 lifts in the spring and 185 lifts in fall of 2017. In 2017, a total of 2,177 fish (1,650 in the spring and 527 in the fall) were processed in the lift, compared to 1,228 fish (583 in the spring and 645 in the fall) in 2016 and 976 fish in the fall of 2015. In 2017, 124 lake sturgeon were processed compared to 84 lake sturgeon in 2016; 46 of those fish were transferred into Upper Scott flowage in the spring and 28 in the fall. The excess lake sturgeon were sent back downstream because they were either too small or not reproductively ready. The size range for all sturgeon was 26.0 to 69.5 inches with an average length of 52.5 inches (Mike Donofrio, personal communication).

Studies have recently been conducted documenting upstream migration of adult sturgeon that were passed upstream at the Menominee and Park Mill dams to the known spawning grounds below the Grand Rapids Dam. In addition, the sturgeon have established their presence on or near the spawning grounds during the spawning season (Schulze, 2017). Downstream emigration has not been confirmed yet, but successful laboratory demonstration of this alternative for Menominee River fishes, including lake sturgeon is demonstrated by Amaral, 2001.

Long-term maintenance of the dams and passage structures is managed by ECRE and transport and sorting of the fish is shared by biologists at WDNR and MDNR. This project fulfills both objectives under the "Lake sturgeon population is enhanced" goal in the Plan (see *Goals and Objectives* section for more details).

Lower Menominee Islands – Rookery and Habitat Management

Description of Impairment

The sixth and seventh habitat restoration and protection activities listed in the Plan address the impairment of colonial nesting water-birds and their habitat primarily caused by the spread of non-native and invasive vegetation on four islands in the lower Menominee River (Table 2, Figure 5). Strawberry Island was home to a large breeding colony of great egrets, great blue herons, and black crowned night herons, while Little Blueberry Island, Blueberry Island, and Boom Island provided potential rookery habitat. These islands were substantially overrun with non-native species, particularly buckthorn (*Rhamnus* spp.) and honeysuckle (*Lonicera* spp.) (WDNR and MDEQ, 2014). Also, river bank grape (*Vitis riparia*), an aggressive native vine, was causing some nesting trees on Strawberry Island to lose their crowns and branches due to their weight. The lack of sufficient nesting sites and overcrowding by non-natives reduced the opportunity for thriving rookeries on these islands. Additionally, there was concern that the rookery habitat on the islands might be threatened by human development.

Figure 5. Lower Menominee River Islands (WDNR, 2018).

Activities

After two years of volunteer efforts and additional contracted work in 2013, it was determined that a large-scale effort was needed to control and manage invasive species on the islands. A USACE project to improve rookery habitat on Little Blueberry, Blueberry, Boom, and Strawberry Islands began in September 2014. In November of 2014, Ecology and Environment, Inc. (E & E) scientists identified and mapped invasive plant species on the four islands. An Invasive Species Control and Management Plan was developed in 2015 for each of the islands (E & E, 2015). Two rounds of chemical and mechanical treatment for invasives were completed in 2015. Extensive buckthorn (*Rhamnus* spp.) cutting took place on Little Blueberry Island and riverbank grape (*Vitis* spp.) on Strawberry Island. Work on Strawberry Island was performed when the rookery was not active. Depending on the island, two to three more rounds of treatment, primarily foliar chemical, were performed each year in 2016 and 2017. The cut material on the islands was chipped in 2015 and 2016. In the fall of 2016 some small-scale restoration plantings were installed, including trees, shrubs, and a sedge meadow seed mix. These plantings were monitored, and the results informed plans for larger-scale plantings installed in spring and fall of 2017. Twenty-one species of native trees were planted, including silver maple, red maple, American basswood, red oak, pin oak, hackberry, and balsam poplar. Ten species of shrubs were planted, including buttonbush, swamp rose, elderberry, common ninebark, and silky dogwood (E & E, 2017a).

Monitoring has been a very important component of this project; the data collected are used to measure project progress and direct future efforts. Bird surveys during spring migration, breeding season, and fall migration have been conducted to monitor bird species diversity, abundance, and habitat use. Rookery surveys, conducted with volunteers from the Chappee Rapids Audubon Society, have been used to monitor nesting activity on Strawberry Island. E&E reported an increase in nests on Strawberry Island from 38 nests in 2015 to 64 nests in 2017 (E&E, 2018b).

Little Blueberry Island, before and after mechanical and chemical treatment of buckthorn (E & E).

Vegetation surveys have been used to record the response of both invasive and native species to treatments and to inform future treatments. A Year Two Monitoring Report summarizes the work and monitoring results from 2016 (E & E, 2017b).

Monitoring and maintenance activities are ongoing, and the project has recently been extended to include an additional year (2018) to help ensure success. Discussions about long-term management of the islands are currently underway. Project partners will work with local landowners to ensure that the habitat restoration is successful over the long term. The

Blueberry Islands are owned by ECRE, Boom Island is owned by the city of Marinette, and Strawberry Island is owned by the Wisconsin Department of Natural Resources, Bureau of Natural Heritage Conservation (NHC). The islands are protected from human development through their respective ownership. The Blueberry Islands are protected through ECRE's FERC license. In 2015, in response to a request from the CAC, the city of Marinette made zoning and planning changes to Boom Island switching it from a "P-1" park zoned district to a "C-1" conservancy zoned district.

This project fulfills the "Maintain or enhance habitat conducive to colonial waterbird rookery activity on known or prospective rookeries" objective in the Plan. It also contributes to the "Invasive, non-native species comprise no more than 33% of the vegetation community in protected natural areas of the AOC" objective (see *Goals and Objectives* section for more details).

South Channel Habitat Restoration

Description of Impairment

The eighth and ninth habitat restoration and protection activities listed in the Plan (Table 2) address the impairment of fish and wildlife populations and habitat in the AOC due to the loss of historic wetlands, the spread of invasive plants, localized toxicity caused by contaminated sediment, and the blockage of flow under the Ogden Street Bridge between the South Channel and Menekaunee Harbor. The South Channel is located on the Wisconsin side of the Menominee River, east of the turning basin (Figure 1). The channel contained contaminated sediment and degraded habitat quality after years of industrial activity. The south shore of the channel between the Sixth Street Slip and Ogden Street, which contained one of the few remaining wetlands in the AOC, was degraded by past industrial use and invasive plants. The connection between the South Channel and Menekaunee Harbor had been blocked to prevent sediment movement downstream during the 2012-2015 Tyco/Ansul arsenic cleanup. These issues between the South Channel and Seagull Bar State Natural Area limited the quality and connectivity of fish and wildlife habitat.

Activities

The South Channel habitat restoration project took place following the removal of contaminated sediment. The dredging project and activities are detailed in the Restrictions on Dredging Activities Removal Recommendation (Bougie et al., 2017). Habitat restoration efforts took place along the shoreline, on three small islands, and on the south side of the channel north of an old railroad grade, east of the Sixth Street Slip and west of Ogden Street (Figure 6). A total of 110 acres and 1.6 miles of shoreline habitat were restored through a USEPA Great Lakes Restoration Initiative (GLRI) grant implemented by the city of Marinette and the WDNR. Approximately 21.4 acres of wetland and upland were treated for invasive species and planted with native species. A channel was created on the north western edge of the South Channel to improve access to the restored wetlands for northern pike spawning (as depicted by a red area on Figure 6). Turtle nesting areas were fashioned, and loafing platforms were added for turtles, ducks, and other animals. Woody structures were installed to improve fish habitat; and nesting and roosting structures were mounted for waterfowl, wading birds, raptors, songbirds, and bats (Figure 6). See Figure 8 Maps 1-3 in Appendix A for detailed maps showing the locations of plant community zones and habitat structures.

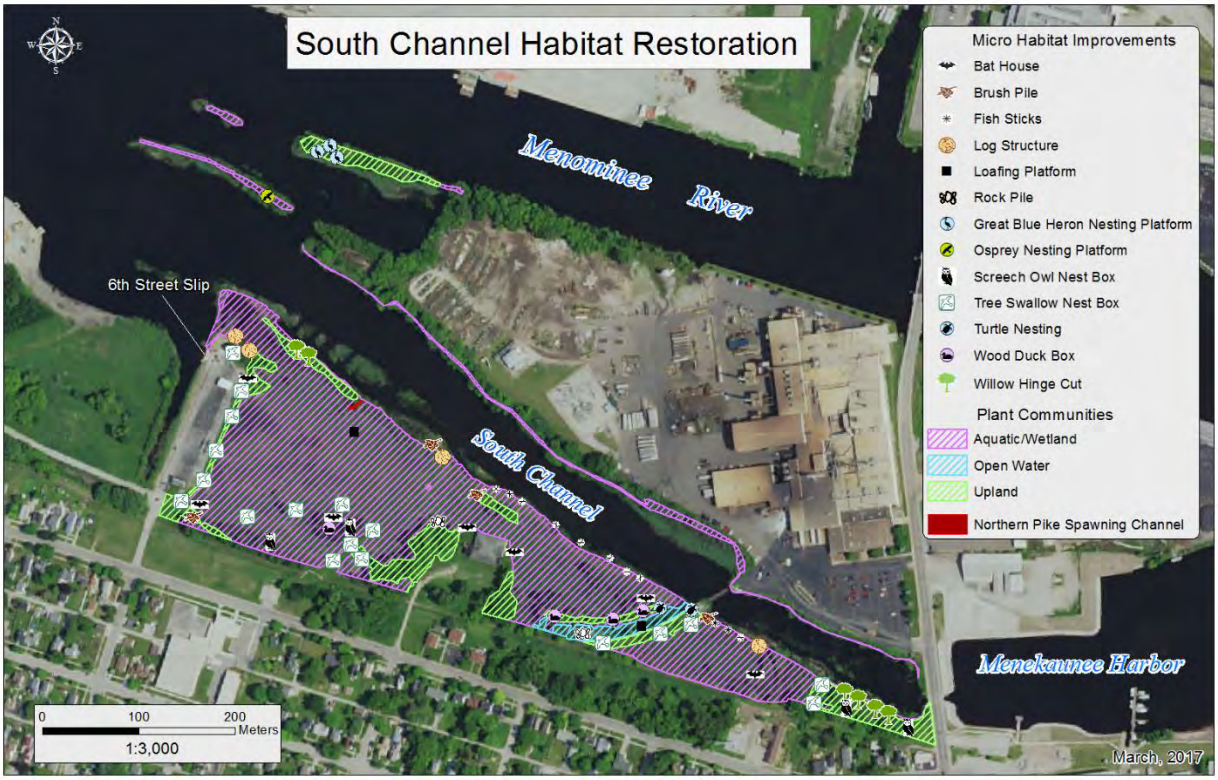


Figure 6. South Channel planting zones and habitat improvements (NES, 2018).

Habitat Structures:

18 Bluebird/Tree Swallow Boxes	1 Osprey Nesting Platform	2 Turtle Nesting Areas
14 Bat Houses	4 Wood Duck Nest Boxes	4 Screech Owl Nest Boxes
2 Brush Piles	3 Willow Hinge Cut	2 Rock Piles
3 Fish Sticks	4 Log Structures	2 Loafing Platforms
1 Northern Pike Channel	3 Great Blue Heron Nesting Platforms	

In addition, riprap and debris that had been placed during the Tyco arsenic cleanup to prevent sediment from moving downstream were removed from the stream channel underneath the Ogden Street. Approximately 1 cubic yard of material was hydraulically dredged from the streambed under the bridge along with riprap moved from the main channel for increased fish passage. This cleanup increased the hydrologic connection between the South Channel and Menekaunee Harbor and allows for unimpeded fish passage.

Channel under Ogden Street, before and after removal of excess riprap and debris (C. Bougie, WDNR).

The consultant will perform invasive plant monitoring and control through 2019. It is anticipated that the University of Wisconsin-Marinette will partner with the City of Marinette to perform monitoring and maintenance at the site to ensure the habitat restoration is successful over the long term.

This project contributes to the "Invasive, non-native species comprise no more than 33% of the vegetation community in protected natural areas of the AOC" objective and the "Maintain or enhance habitat conducive to colonial water-bird rookery activity on known or prospective rookeries" objective in the Plan (see *Goals and Objectives* section for more details).

Menekaunee Harbor Habitat Restoration

Description of Impairment

The tenth habitat restoration and protection activity listed in the Plan (Table 2) addresses the impairment of fish and wildlife populations and habitat in the AOC due to the loss of historic wetlands, the spread of invasive plants, and localized toxicity caused by contaminated sediment. The Menekaunee Harbor, located along the Marinette, Wisconsin side of the river experienced degradation of sediment quality and fish and wildlife habitat after many years of industrial and urban activities (Figure 1). There were elevated concentrations of metals, PAHs, and nutrients in the harbor (Weston Solutions, 2008). The harbor and nearby wetland are an important component of the riverine environmental corridor and serve as a midpoint between the South Channel and the Seagull Bar State Natural Area.

Activities

The Menekaunee Harbor habitat restoration project took place after the removal of contaminated sediment. The dredging project and activities are detailed in the Restrictions on Dredging Activities Removal Recommendation (Bougie et al., 2017). Habitat restoration efforts took place just south and east of the harbor (Figure 9, Appendix A). A total of 29.6 acres and 0.6 miles of shoreline habitat were restored through a USEPA GLRI grant implemented by the city of Marinette and the WDNR.

Restoration activities south and east of the harbor included the following: control of invasive plant species; planting of native seeds (including wild rice), plants, trees, and shrubs; installation of nesting and roosting structures for birds and bats; and placement of rockpiles and wood

structures (logs, brush piles, and “fish sticks”) for fish and wildlife habitat (NES, 2015; Figure 9, Appendix A).

Habitat Structures:

7 Bluebird/Tree Swallow Boxes	10 Forster Tern Nest Platforms	1 Osprey Nest Platform
2 Screech Owl Nest Boxes	3 Wood Duck Nest Boxes	2 Bat Houses
2 Brush Piles	5 Snag Trees	2 Rock Piles
5 Fish Sticks	6 Log Structures	4 Half-log Structures
2 Rock Piles		

After the restoration activities were complete, the contractors monitored the vegetation and maintained the area to control invasive species for a period of three years (2016-2018). It is anticipated that the University of Wisconsin-Marinette will partner with the City of Marinette to perform monitoring and maintenance to ensure the habitat restoration is successful over the long term.

In addition, this project contributes to the “Invasive, non-native species comprise no more than 33% of the vegetation community in protected natural areas of the AOC” objective (see *Goals and Objectives* section for more details).

Menekaunee Harbor before and after invasive species control and native plantings (C. Bougie, WDNR).

11th Avenue Pool Habitat Restoration

The last habitat restoration and protection activity listed in the Plan (Table 2) was to complete a fisheries habitat improvement and protection project in the 11th Avenue Pool, an area within the Lower Scott Flowage near the north (Menominee, Michigan) shore upstream of the Menominee Dam. This activity was necessary only if the USEPA GLNPO sediment characterization work in the Lower Scott Flowage found contamination near the 11th Avenue Pool that required remediation. Then, the habitat would be restored after the remediation was complete. Since the sediment assessment results showed that sediment remediation was not required, this habitat restoration activity was not a requirement of the Plan (CH2MHill, 2014).

Goals and Objectives

In addition to activities, the Plan lists five overarching goals along with ten supporting objectives (Table 1). Goals are qualitative overarching concepts that may take a long time to achieve, while objectives are the detailed and quantitative components of a goal. When all the objectives listed below a goal have been achieved, the goal itself is considered achieved. Objectives are

considered achieved when the WDNR, MDNR, CAC, and TAC agree that all applicable activities have been completed. See below for more details about the goals and objectives and how they were achieved.

Goal 1: Long-term Protection of Natural Areas

Goal 1 of the Plan is that "Long-term protection is in place for natural areas and wetlands within the AOC, including Seagull Bar and riverine islands." The objective listed under this goal specifies that the long-term protections must be deemed acceptable by the WDNR, MDNR, TAC, and CAC and are required for all-natural areas where habitat improvement has taken place. This would include the habitat restoration projects on Blueberry, Little Blueberry, Boom, and Strawberry Islands and at Menekaunee Harbor and the South Channel.

In 2014, the CAC reviewed and discussed existing protections for natural areas in the AOC (Appendix B.1). The two Blueberry Islands will be protected through Eagle Creek Renewable Energy's (ECRE) updated FERC license. The CAC sent an October 19, 2017 letter to FERC indicating long-term management of vegetation on Blueberry and Little Blueberry Islands is high priority for the CAC and supports management efforts via the USACE Island Restoration Project (LMR AOC CAC, 2017). E & E is currently developing a stewardship approach and conducting outreach activities with the goal of identifying partners to continue habitat restoration work and long-term invasive species control at each of the islands (E & E, 2018a). While ECRE continues to make incremental recreational improvements to its project lands to enhance recreational use and public access, the company is committed to providing "wilderness" management techniques to obtain the objective of protecting the natural quality of the resources and provide public access to recreation lands while remaining committed to environmental stewardship. Strawberry Island is protected under the ownership of WDNR NHC. The island will be managed by NHC in close coordination with WDNR Office of Great Waters to implement long-term operation and maintenance consistent with E & E's approach to mitigating the spread of invasive species and management actions to maintain desired plant communities and protect the colonial waterbird rookery. Boom Island and the Menekaunee Harbor and South Channel project areas were owned by the City of Marinette, and the CAC was unsure of protection of those areas. Representatives from the City of Marinette came to the 03/20/2014 and 09/18/2014 CAC meetings to describe existing protections and explain city planning and zoning. As a result, the CAC decided to send a letter to Denise Ruleau, Marinette Mayor and Chair of the Plan Commission, requesting zoning and planning changes to three habitat restoration areas. Specifically, the 11/25/2014 letter expressed the CAC's support for the following:

- Property north of Menekaunee Harbor should be rezoned P1 Park once it is acquired by the City
- Other properties south and east of Menekaunee Harbor, including the Lake Michigan shoreline, should remain in P1 Park zoning
- City-owned southern shore of South Channel should be considered for re-zoning to C1 Conservation District
- Boom Island should also be considered for re-zoning to C1 Conservation District

In May of 2015, following a recommendation and report from the Plan Commission, and a public hearing held by the Common Council, the Common Council made the CAC's requested changes. Considering that Blueberry, Little Blueberry, and Strawberry Island were protected through their ownership, this action by the City of Marinette completed protection for the remaining habitat restoration areas in the AOC. The TAC and the CAC decided at their

06/17/2015 and 07/16/2015 meetings, respectively, that the Natural Areas Protection objective had been met and thereby the goal had been achieved.

Goal 2: Nesting Populations of Water-Birds

Goal 2 of the Plan is that "Nesting populations of a diverse array of wetland-dependent and riparian-associated birds are consistently present within the AOC". The two supporting objectives are to maintain or enhance habitat for colonial water-bird rookeries (the Rookery Habitat Objective) and to monitor the activity of known or prospective rookeries (the Rookery Monitoring Objective). The project to improve the vegetation communities for rookery habitat on Little Blueberry, Blueberry, Boom, and Strawberry Islands is the primary activity completed in support of the first objective. The South Channel habitat restoration project also contributed to this objective, since it included the installation of three great blue heron nesting platforms (see *Activities* section for more details). Both projects were substantially completed in 2016, with follow-up monitoring and maintenance to be completed in 2018 for the island rookery project and 2019 for the South Channel project. Therefore, the Rookery Habitat Objective has been achieved.

The second objective, to monitor the rookery activity of known or prospective rookeries, was to establish whether nesting populations of a diverse array of wetland-dependent and riparian-associated birds were consistently present within the AOC. This objective required the TAC to qualitatively assess existing colonial waterbird populations, determining whether existing datasets were adequate or if new data would be necessary. In 2014, the TAC considered the WDNR eBird data analysis and decided 10/15/2014 that the effort fulfilled this requirement and the Rookery Monitoring Objective (Uvaas and Fayram, 2014; Appendix B.2). On 12/04/2014, the CAC agreed that the Rookery Monitoring Objective had been met. In addition, rookery monitoring on Strawberry Island was performed as part of the USACE island rookery restoration project (see *Activities* section for more details). Therefore, the Rookery Monitoring Objective has been achieved. Since both objectives are complete, this goal has been achieved.

Goal 3: Lake Sturgeon

Goal 3 of the Plan is that "The lake sturgeon population is enhanced." The two component objectives are to provide additional lake sturgeon spawning and rearing habitat by providing passage upstream of both Menominee and Park Mill Dams (the Upstream Fish Passage Objective) and to provide a means for fish to pass safely downstream of both Menominee and Park Mill Dams (the Downstream Fish Passage Objective). The second (fish lift) and third (truck and transfer) habitat restoration and protection activities listed in the Plan (Table 2) support the Upstream Fish Passage Objective. The first, fourth, and fifth habitat restoration and protection activities listed in the Plan (Table 2) support the Downstream Fish Passage Objective. All these activities have been completed and the safe downstream and upstream passage are operational (see *Activities* section for more details). Therefore, the Upstream and Downstream Fish Passage Objectives and this goal has been achieved.

Goal 4: Fish and Mussel Populations

Goal 4 of the Plan is that "Diverse and functional native fish and mussel assemblages are present in the AOC that sustain natural recruitment." The first two component objectives are that there is evidence of recruitment for target fish species in segments 2-8 (the Lower

Menominee River Fish Recruitment Objective) and segment 1 (the Lower Scott Flowage Fish Recruitment Objective; see Figure 3). The third component objective is that there is evidence of recruitment within the AOC for native mussel species (the Mussel Recruitment Objective), and the fourth objective is to monitor for larval lake whitefish to determine the necessity of future habitat improvements (the Larval Lake Whitefish Objective).

Fish Recruitment Objectives

The Lower Menominee River Fish Recruitment Objective and the Lower Scott Flowage Fish Recruitment Objective were assessed by the activity in the Plan to conduct additional fish population surveys in the AOC and select reference sites to determine target species recruitment status (Table 2). This project, titled "Fisheries Data Roundup Reference Site Monitoring," followed the "Fisheries Data Roundup" project, in which fisheries experts reviewed existing fisheries data, established restoration targets for select fish species, and determined what additional data would be needed to assess fish populations in the AOC. After reviewing available data, the team determined that yellow perch had achieved their restoration target for the lower river but recommended collecting one additional year of fisheries data for the Lower Scott Flowage and three additional years of data for the Lower Menominee River and reference sites before assessing other species (WDNR, 2013).

Following the project team's recommendations, fish population surveys were completed in 2013, 2014, and 2015 in two sections of the AOC and at two reference sites (Last, 2016). Target species for the Lower Scott Flowage were bluegill, largemouth bass, northern pike, rock bass, smallmouth bass, and walleye. The project team concluded that yellow perch had achieved their restoration target and that lake sturgeon would be addressed through Goal 3 of the Plan, so those species were not included in this effort (Last, 2016). Target species for the Lower Menominee River below the Menominee Dam were muskellunge, largemouth bass, northern pike, smallmouth bass, and walleye. The reference sites were the Peshtigo River and the Escanaba River below the first dam (Last, 2016; Tables 9 and 10, Appendix A).

In the Lower Scott Flowage, all target species except bluegill were found to be above the 25th percentile restoration goal in at least one monitoring season (Last, 2016; Tables 6 and 7, Appendix A;). This goal was developed as a consensus-based decision between the experts and technical staff of the TAC and CAC members. The members are listed in the Fish and Wildlife Population and Habitat Management and Restoration Plan Update for the Lower Menominee River Area of Concern. The technical team evaluating the survey data advised that the bluegill goal not being met was a reflection of the sampling locations and equipment rather than a reflection of low populations. The team observed that fisheries biologists did not sample the shallower areas with higher vegetation densities – where bluegill are more likely to be found - to avoid damaging electroshocking equipment. Additional evidence that the bluegill population was not impaired was provided by a 2006 fyke net survey near the 11th Avenue pool which found that bluegill were common. The conclusion of the team was that the AOC goal and two objectives related to fish assemblages had been met.

When discussing the 2013 survey data, the technical team decided that the Lower Scott Flowage Fish Recruitment Objective would not be considered achieved until the results of the sediment characterization work had been obtained (WDNR, 2014), a decision that was captured in the 2013 Interim Report. If sediment remediation was required in the 11th Avenue Pool area, then post-remedial habitat restoration would be required before this objective would be considered achieved. The results of the sediment characterization in the Lower Scott Flowage indicated that remediation would not be necessary; therefore, the Lower Scott Flowage Fish

Recruitment Objective has been met (CH2MHill, 2014). In the Lower Menominee River, all target species were found to be meeting the 25th percentile restoration goal; therefore, the Lower Menominee River Fish Recruitment Objective has been met (Table 8, Appendix A; Last, 2016).

Mussel Recruitment Objective

The Mussel Recruitment Objective was assessed by the activity in the Plan to conduct a mussel survey upstream of and within the AOC to assess hydro dam impacts and serve as a baseline for evaluating future remediation and restoration efforts (Table 2). The 2011 qualitative survey of the freshwater mussel community found 16 species in the study area with a clear difference between the mussel fauna of the Lower River versus the upper reaches (Piette, 2012; Figure 10, Appendix A; Table 11, Appendix A). The survey found juvenile (less than four years old) mussels of five native mussel species in the AOC: *Lamigona costata* and *Pyganodon grandis* in the Lower Scott reach and *Elliptio dilatata*, *Leptodea fragilis,* and *Truncilla truncata* in the Lower River reach. In 2013, the TAC discussed the study results and decided not to consider the Mussel Recruitment Objective met, because sediment remediation and other actions were expected to further improve mussel recruitment (Appendix B.3). In 2015, after sediment remediation in the AOC had been completed, the TAC reconsidered the results as they pertained to the objective. They discussed whether additional sampling was needed to document mussel recruitment in the AOC, particularly in the South Channel area, and concluded at their 05/14/2015 meeting that the mussel objective had been met and that additional mussel surveys would not be needed prior to removing the fish and wildlife BUIs. The CAC considered the issue and agreed with the TAC at their 05/21/2015 meeting (Appendix B.3). Therefore, the Mussel Recruitment Objective has been achieved (Appendix B.3).

Larval Lake Whitefish Objective

The Larval Lake Whitefish Objective was fulfilled by the activity in the Plan to conduct monitoring for larval lake whitefish (Table 2). The objective requires monitoring to understand whitefish recruitment in the AOC but does not hold BUI removal to a population goal, because it was determined that work that might be needed to improve recruitment would be outside the scope of the AOC program.

In 2014, sampling was postponed due to extremely high-water levels. However, several drifting lake whitefish eggs were captured and subsequently hatched in the lab, indicating overwinter survival of lake whitefish eggs is possible in the Menominee River. In 2015, a total of 699 recently hatched larval lake whitefish were captured in the Menominee River using various collection methods. The highest concentrations of larval whitefish were observed at the top of the river column and in downstream backwater areas. The study determined that lake whitefish are successfully producing offspring to the drifting larval stage in the lower section of the Menominee River (Houghton, 2016). The completion of this study fulfills the Larval Lake Whitefish Objective.

Goal 5: Native Vegetation Community

Goal 5 of the Plan is that “A healthy and diverse native vegetation community has been restored.” The objective listed under this goal specifies that “Invasive, non-native species comprise no more than 33% of the vegetation community in protected natural areas in the AOC.” To achieve this goal, invasive plants have been controlled and replaced by native plants

as part of the Lower Menominee island rookery, Menekaunee Harbor, and South Channel habitat restoration projects. Vegetation surveys on Blueberry, Little Blueberry, Boom, and Strawberry Islands and at Menekaunee Harbor and the South Channel confirm that this goal has been met. This goal was developed as a consensus-based decision between the experts and technical staff of the TAC and CAC members. The members are listed in the Fish and Wildlife Population and Habitat Management and Restoration Plan Update for the Lower Menominee River Area of Concern.

Lower Menominee Islands

After two years of volunteer and additional contracted work, the USACE project to improve rookery habitat on Little Blueberry, Blueberry, Boom, and Strawberry Islands began in 2014 (Figure 5). Invasive plant species locations were mapped in November of 2014, and chemical and mechanical treatment for invasive plants occurred in 2015, with additional treatments in 2016 and 2017 as needed. In the fall of 2016 some small-scale restoration plantings were installed, including trees, shrubs, and a sedge meadow seed mix. These plantings were monitored, and the results were used to develop plans for larger-scale plantings installed in spring and fall of 2017 (E & E, 2017a).

The restoration project contract includes monitoring and maintenance activities through 2018. The third annual monitoring report shows that the vegetation community is improving each year and that the project is meeting the 33% vegetation community objective on each of the islands (E & E, 2018a; Figure 7). The 33% non-native target is depicted on the bar graph across the 3 years of monitoring for each island. Each year there is a decrease in the non-native species as shown with the percent cover classes by viewing the percentages above the 33% non-native target bar. The red color containing the most non-native species and light blue containing the least or no non-native species. The goal by year 3 is to show percent cover in the 32% or less for each of the islands (yellow, green and light blue shows the goal has been achieved). The results in Figure 7 show the goal was met for monitoring Year 2 and 3. Across the four islands, the estimated invasive species extent (translated as those areas with any presence of invasive species) decreased from 10.1 acres in 2014 to 9.4 acres in 2017. The areas with more than 33% invasive species cover accounted for approximately 2% of the total area of the islands in 2017. The overall contribution of invasive species to each island's vegetation community can be estimated by calculating the product of each invasive species patch acreage with the patch's percent cover. The overall percentages range from approximately 2% on Boom Island to 15% on Little Blueberry Island (Table 3). See Figures 11-14 in Appendix A for the pre-treatment locations of invasive species in November 2014 and Figures 15-18 in Appendix A for the invasive species locations and estimates of percent cover in September 2017.

Note that the performance standards for the restoration project are more restrictive than the Plan objective. Monitoring and maintenance activities will continue through 2018 to ensure the success of the restoration. The Lower Menominee River island habitat restoration area has met the 33% vegetation community objective.

E & E is currently developing a stewardship approach and conducting outreach activities with the goal of identifying partners to continue habitat restoration work and long-term invasive species control at each of the islands.

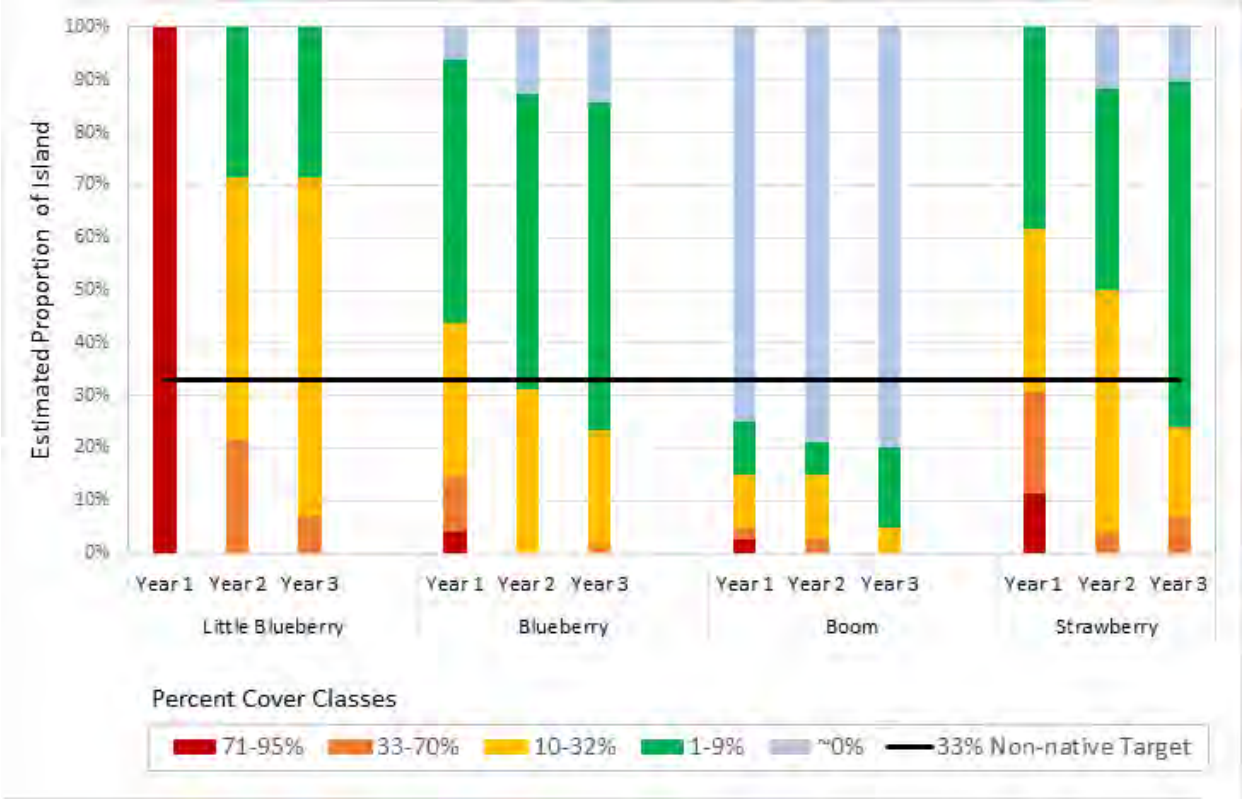


Figure 7. Invasive Species Percent Cover in High to Low Cover Classes, as a Proportion of Each Island, Pre- and Post-Treatment Activities from 2014 to 2017 (Project Years 1 through 3) (E & E, 2018b).

Note: Values represent estimates of combined acreage of previously treated areas containing invasive species seedlings and untreated areas containing targeted species. Estimates for acreage of coverage categories are more accurate for Years 2 and 3 compared to Year 1 because mapping in later years was conducted during the growing season and numeric coverage data was consistently collected.

Table 3. Island-wide Approximate Acres of Invasive Species in 2017 (Year 3) (E & E, 2018a).

Island	Island Area (acres)	Total of Invasive Species Patch Area Patch Coverage (acres)	Percentage of Invasive Species across Island
Little Blueberry Island	1.3	0.19	14.6%
Blueberry Island	4.8	0.29	6.1%
Boom Island	8.0	0.14	1.8%
Strawberry Island	2.6	0.15	6.0%
Totals	**16.7**	**0.77**	**4.6%**

South Channel

The South Channel habitat restoration project began in August 2016 and included multiple herbicide treatments to control invasive vegetation along with the planting of native trees, shrubs, plants, and seeds. Approximately 21.4 acres of wetland and upland were treated for invasive species and planted with native species. See Figure 7 in Appendix A for the locations of the plant community zones.

The restoration project contract includes monitoring and maintenance activities through 2019. The first annual monitoring report shows that the project is meeting the 33% vegetation community objective overall and in six of the eight plant community zones (NES, 2018b; Table 4). The "mesic prairie" and "wet mesic prairie" have the lowest native and highest invasive species cover. Since it takes time for seeded prairie species to establish, it can be expected that weedy species will fill in these areas in the early years after seeding. With continued maintenance the prairie should achieve desired native species coverage.

Note that the performance standards for the restoration project are more restrictive than the Plan objective (see Table 12, Appendix A). Monitoring and maintenance activities will continue through 2019 to ensure the success of the restoration. The South Channel habitat restoration area has met the 33% vegetation community objective.

Table 4. 2017 vegetation data summary for South Channel restoration project. FQI=floristic quality index. Mean C=Coefficient of Conservativism (NES, 2018b).

Community	# Total Species	# Native Species	FQI	Mean C	% Native Coverage	% Invasive Species Coverage
Mesic Forest	96	57	22.11	2.26	72.56	27.44
Wet Mesic Forest	71	57	26.58	3.15	91.03	8.97
Wet Mesic Prairie	41	16	8.28	1.29	45.45	54.55
Aquatic Submergent/Emergent Restoration	28	24	21.54	4.07	93.15	6.85
2017 Mapped Aquatic Submergent/ Emergent Restoration	29	25	23.40	4.34	93.92	6.08
Shrub Carr	85	64	25.27	2.72	82.39	17.61
Mesic Prairie	55	26	8.76	1.18	44.83	55.17
Northern Sedge Meadow	54	40	21.77	2.96	82.18	17.82
Entire Site	**205**	**142**	**39.46**	**2.76**	**77.47**	**22.53**

Menekaunee Harbor

The Menekaunee Harbor habitat restoration project began in August 2015 and included multiple herbicide treatments to control invasive vegetation along with the planting of native trees, shrubs, plants, and seeds. Approximately 24.1 acres of wetland and upland were treated for invasive species and planted with native species. See Figure 8 in Appendix A for the locations of the plant community zones.

The restoration project contract includes monitoring and maintenance activities through 2018. The second annual monitoring report shows that the project is meeting the 33% vegetation community objective overall and in each of the nine plant community zones (NES 2018a; Table 5). The "prairie" community has the lowest native and highest invasive species cover. Since it takes time for seeded prairie species to establish, it can be expected that weedy species will fill in these areas in the early years after seeding. With continued maintenance, the prairie should achieve desired native species coverage.

Note that the performance standards for the restoration project are more restrictive than the Plan objective (see Table 13, Appendix A). Monitoring and maintenance activities will continue through 2018 to ensure the success of the restoration. The Menekaunee Harbor habitat restoration area has met the 33% vegetation community objective.

Table 5. 2017 vegetation data summary for Menekaunee Harbor restoration project. FQI=floristic quality index. Mean C=Coefficient of Conservativism (NES, 2018a).

Community	# Total Species	# Native Species	FQI	Mean C	% Native Coverage	% Invasive Species Coverage
Open Water & Submergent Aquatic	16	16	21.00	5.25	100.00	0.0
Emergent Aquatic & Emergent Aquatic – Wild Rice	40	36	25.93	4.10	97.20	2.80
Northern Sedge Meadow	40	36	26.25	4.15	97.01	2.99
Shrub-Carr	57	52	27.11	3.19	91.07	8.93
Wet-Mesic Forest, Ephemeral Pool & Mesic to Wet-Mesic Prairie	58	52	31.91	4.19	90.76	9.24
Prairie	42	20	9.26	1.43	71.96	28.04
Shady Woodland Planting	25	13	6.00	1.43	86.46	13.54
Emergent/Wet Meadow Planting	42	33	17.99	2.65	84.13	15.87
Invasive Species Control Area	-	-	-	-	-	5.00
Entire Site	**163**	**127**	**44.66**	**3.50**	**91.39**	**8.61**

Conclusions

As set forth in Annex 2 of the 1987 and Annex 1 of the 2012 Amendments, respectively to the Great Lakes Water Quality Agreement, the BUIs addressed in this document are the following: 1) Degradation of Fish and Wildlife Populations and 2) Loss of Fish and Wildlife Habitat. This removal recommendation outlines the *Restoration Criteria* and summarizes assessment data, concluding that completed restorations and long-term planning all contributed to the successful restoration of the fish and wildlife beneficial uses.

As a requirement of the *Restoration Criteria*, a *Fish and Wildlife Population and Habitat Management and Restoration Plan for the Lower Menominee River Area of Concern* was developed and implemented (WDNR and MDEQ, 2014). All required activities in the Plan have been completed, and all ten objectives and five goals laid out in the Plan have been achieved (Table 1 and Table 2; WDNR and MDEQ, 2014). The WDNR, MDNR, TAC, and CAC agree that full implementation of the Plan fulfills the requirements for removal of the fish and wildlife populations and habitat BUIs. In conclusion, the Degradation of Fish and Wildlife Populations and the Loss of Fish and Wildlife Habitat BUIs meet the criteria for removal, according the *Restoration Targets* criteria outlined on page 10 of this report.

Stakeholder/Public Involvement

This removal recommendation was discussed with the Lower Menominee River TAC and CAC at their regular meetings on 5/21/2018 and 5/24/2018. The Lower Menominee River TAC and CAC concur with the recommendation, and the CAC has submitted a formal letter of support for removal of the BUI, dated June 8, 2018 (Appendix C). This proposed action was public noticed via listing in the MDNR Calendar and WDNR Public Meetings Calendar (Appendix D), and also publicized via AOC e-mail distribution lists and the AOC GovDelivery listserv on October 29, 2018. Supporting documents were posted on the WDNR's AOC program web page (https://dnr.wisconsin.gov/topic/GreatLakes/aoc.html) for public review and comment from October 29 through November 21, 2018. During the review and comment period the Departments received one written comment from the public and has addressed the comment by responding to the citizen's email.

The TAC was formed in 1988 to bring together technical experts familiar with the AOC for the development and implementation of the RAP (WDNR and MDNR, 1990). In addition, TAC members review and provide input on project plans, monitoring data, RAP updates, and BUI removal documents. The TAC members also provide support for monitoring programs to assess impaired uses, removal of the BUI, and ultimately removing/delisting the AOC status.

The CAC was formed in 1988 as a means of incorporating stakeholder feedback into the RAP documents and to serve as ambassadors on AOC issues to the Marinette and Menominee communities (WDNR and MDNR, 1990). CAC members help the agencies by identifying local issues, developing local targets and goals, serving as a resource for historical information, and assisting in project implementation when possible. The CAC developed governing bylaws in June of 2011, and then revised them in October of 2016, to ensure the committee's long-term viability and balanced representation of the community. As of March 2018, there are 12 membership positions filled of a possible 26. Dozens more individuals have attended monthly meetings and currently receive meeting minutes and AOC updates through e-mail. The WDNR and the MDNR strongly prefer that requests to remove the impaired designation of a BUI be

agreed to by the TAC and CAC. The CAC letter of support and the TAC meeting minutes document support for the removal of the Degradation of Fish and Wildlife Populations and Loss of Fish and Wildlife Habitat BUIs and are located in Appendix C and Appendix D, respectively.

The CAC holds nine or ten regular meetings per year on the University of Wisconsin-Marinette campus, open to all interested parties. Meetings are advertised through the WDNR Public Meetings Calendar (https://dnr.wisconsin.gov/calendar) and the CAC e-mail distribution list. Participation in meetings is the primary way members of the CAC stay informed and provide input on AOC activities. In addition to attending CAC meetings, the CAC members have been active in the AOC in the following ways: participated in tours of remediation and restoration projects, reviewed documents and provided letters of support for AOC projects, provided local representation or feedback at various state and federal AOC meetings, and hosted and participated in AOC open house events.

As the result of partner synergy with habitat restoration, there were many community efforts to increase public and recreational uses of the lower Menominee River. The City of Marinette developed a new boat launch at Menekaunee Harbor, hosted the Cabela's National Walleye Tournament and the Menominee Tribe participated in two wild rice reseeding ceremonies.

Cabela's National Walleye Tournament (C. Bougie, WDNR) and Wild Rice Seeding Ceremony (D. Buechler, Menominee Conservation District).

Removal Statement

The MDNR and WDNR AOC program staff recommend removal of the Degradation of Fish and Wildlife Populations and Loss of Fish and Wildlife Habitat BUIs in the Lower Menominee River AOC. This decision is based upon review of the data and technical input from the WDNR Fisheries and Wildlife Management Programs, MDNR Fisheries Division, and USEPA.

References

Amaral, S.V. 2001. *Evaluation of angled bar racks and louvers for guiding juvenile lake sturgeon (age1)*. Alden Research Laboratory, Holden, MA, Wisconsin Electric Power Company, U.S. Fish and Wildlife Service, Menominee Indian Tribe of Wisconsin, and Wisconsin Department of Natural Resources.

Baker, S. and S. Galarneau. 2011. *Lower Menominee River Area of Concern Remedial Action Plan Proposed Removal Recommendation for the Restrictions on Recreational Contact Beneficial Use Impairment*. Office of the Great Lakes, MDEQ, Lansing, Michigan and Office of the Great Lakes, WDNR, Madison, Wisconsin.
(The link provided was broken and has been removed)

Baker, S., L. Last, and C. Bougie. 2017. *Removal Recommendation for the Degradation of Benthos Beneficial Use Impairment in the Lower Menominee River Area of Concern*. Office of the Great Lakes, WDNR, Madison, Wisconsin and Office of the Great Lakes, MDEQ, Lansing, Michigan.
(The link provided was broken and has been removed)

Bohr, J. 2012. *Investigation of PCB, PAH, and Pesticide Concentrations in the Menominee River Using Semi-Permeable Membrane Devices August 30-September 27, 2011*. Water Resources Division, MDEQ, Lansing, Michigan. MI/DEQ/WRD-12/038.
(The link provided was broken and has been removed)

Bougie, C., K. Axness, S. Galarneau, S. Inman, J. Killian, L. Last, V. Pappas, S. Baker, and S. Swart. 2017. *Menominee River Area of Concern Restrictions on Dredging Activities Beneficial Use Impairment Removal Package and Dredge Management Plan.* Office of the Great Lakes, WDNR, Madison, Wisconsin and Office of the Great Lakes, MDEQ, Lansing, Michigan.
(The link provided was broken and has been removed)

CH2MHill. 2014. *Final Site Characterization Report: Assessment of Contaminated Sediments in the Lower Scott Flowage in Menominee River Area of Concern.* CH2MHILL for USEPA. USEPA, Chicago, Illinois.

Daugherty, D.J., T.M. Sutton and R.R. Elliot. 2009. *Suitability Modeling of Lake Sturgeon Habitat in Five Northern Lake Michigan Tributaries: Implications for Population Rehabilitation.* Restoration Ecology 17:245-257.

Daugherty, D.J. 2006. *Development and Implementation of Habitat Availability Models to Determine Lake Sturgeon Restoration Strategies in the Northern Lake Michigan Tributaries.* Doctoral dissertation. Purdue University, West Lafayette, Indiana.

Ecology and Environment, Inc., 2015. *Invasive Species Control and Management Plan Aquatic Plant Control for Rookery Habitat Menominee River Area of Concern Menominee, Wisconsin, and Michigan.* Prepared for United States Army Corps of Engineers. February 2015.

Ecology and Environment, Inc., 2017a. *Final Restoration Planting Plan for the Menominee River Area of Concern (AOC) Aquatic Plant Control for Rookery Habitat Aquatic Plant Control Research Program (APCRP).* Prepared for the United States Army Corps of Engineers Buffalo District. January 2017.

Ecology and Environment, Inc., 2017b. *Year 2 Monitoring Report for the Menominee River Area of Concern (AOC) Aquatic Plant Control for Rookery Habitat Aquatic Plant Control Research Program (APCRP).* Prepared for United States Army Corps of Engineers Buffalo District. March 2017.

Ecology and the Environment, Inc., 2018a. *Menominee River Islands Update April 2018.* Newsletter. April 2018.

Ecology and the Environment, Inc., 2018b. *Year 3 Monitoring Report for the Menominee River Area of Concern (AOC) Aquatic Plant Control for Rookery Habitat Aquatic Plant Control Research Program (APCRP). October 2018.*

GLWQA. 1987. Agreement on Great Lakes water quality, 1978, with annexes and terms of reference. *Signed at Ottawa November 22, 1978. Entered into force November 22, 1978.* 30 UST 1383; TIAS 9257; 1153 UNTS 187. Amendments: October 16, 1983 (35 UST 2370; TIAS 10798), November 18, 1987 (TIAS 11551; 2185 UNTS 504).

GLWQA. 2013. Agreement on Great Lakes water quality, 1978, with annexes and terms of reference. *Signed at Ottawa November 22, 1978. Entered into force November 22, 1978.* 30 UST 1383; TIAS 9257; 1153 UNTS 187. Amendments: October 16, 1983 (35 UST 2370; TIAS 10798), November 18, 1987 (TIAS 11551; 2185 UNTS 504), September 7, 2012 (TIAS 13-212), last amendment entered into force February 12, 2013. *(The link provided was broken and has been removed)*. https://www.ijc.org/en/who/mission/glwqa

Houghton, C., P. Forsythe, D. Lawrence, and S. Hansen. 2016. Final report: Larval lake whitefish (*Coregonus clupeaformis*) production in west shore tributaries of Wisconsin waters of Green Bay. Submitted to Scott Hansen, WDNR, Sturgeon Bay, Wisconsin. *(The link provided was broken and has been removed)*

Last, L. 2016. *Lower Menominee River AOC Fish Reference Site Monitoring Final Report*. Office of the Great Lakes, WDNR.
(The link provided was broken and has been removed)

Last, L. and S. Swart. 2018. *Removal Recommendation for the Restrictions on Fish and Wildlife Consumption in the Lower Menominee River Area of Concern*. Office of Great Waters, WDNR and Office of Great Lakes, MDNR.
(The link provided was broken and has been removed)

Lower Menominee River AOC Citizens Advisory Committee, 2017. *October 19, 2017 LMR AOC CAC letter to Secretary of Federal Energy Regulatory Commission*. 1-page letter WDNR OGW Files.

NES, 2012. *Vegetation Survey Report Lower Menominee River Area of Concern*. NES Ecological Services for WDNR. WDNR, Madison, Wisconsin.
(The link provided was broken and has been removed)

NES, 2015. *Habitat Restoration Plan, Menekaunee Harbor Restoration Marinette County, Wisconsin.* August 10, 2015. NES Ecological Services, 1250 Centennial Centre Boulevard, Hobart, WI 54155. Pp. 250-301 in https://drive.google.com/file/d/0B2gzvflVdaq1aGF3ZmFkTkNzUHc/view

NES, 2018a. *Lower Menominee River Area of Concern Menekaunee Harbor Restoration Project Great Lakes Restoration Initiative Grant, City of Marinette, Wisconsin. (Annual Vegetation Report).* January 24, 2018. NES Ecological Services, 1250 Centennial Centre Boulevard, Hobart, WI 54155. https://drive.google.com/file/d/1T38yZWDud4fr6z674cQbvCim8f5yL3eF/view

NES, 2018b. *Lower Menominee River Area of Concern South Channel Restoration Project Great Lakes Restoration Initiative Grant, City of Marinette, Wisconsin. (Annual Vegetation Report).* January 24, 2018. NES Ecological Services, 1250 Centennial Centre Boulevard, Hobart, WI 54155. https://drive.google.com/file/d/16l9vXVxPU5Ex1FYAngIHqc67uZkYJvKP/view

Onterra, 2010. *An Aquatic Vegetation Survey of the Lower Scott Flowage & Lower Menominee River*. Onterra, LLC for USEPA, WDNR, and Michigan Department of Natural Resources and Environmental Quality. WDNR, Madison, Wisconsin.
(The link provided was broken and has been removed)

Piette, R. 2012. *Lower Menominee River Freshwater Mussel Survey Summary of 2011 Results*. Fish and Aquatic Research Station, WDNR, Oshkosh, Wisconsin.
(The link provided was broken and has been removed)

Schulze, J. 2017. *Lake Sturgeon Movement After Upstream Passage of Two Hydroelectric Dams on the Menominee River, Wisconsin-Michigan.*

Thuemler, T. F. 1985. *The lake sturgeon, Acipenser fulvescens, in the Menominee River, Wisconsin/Michigan*. In F. P. Binkowski and S. I. Doroshov (eds), North American Sturgeons: Biology and Aquaculture Potential, Dr. W. Junk Publishers, Dordrecht, Netherlands pp. 73-78.

USFWS. 2012. *Final Environmental Assessment: Proposed Upstream and Downstream Fish Passage for Lake Sturgeon at Menominee Dam and Park Mill Dam on the Lower Menominee River in the Cities of Marinette Wisconsin and Menominee Michigan.* *(The link provided was broken and has been removed)*

Uvaas, B. and A. Fayram. 2014. *Evaluation of the relative status of bird density and diversity in the Menominee River Area of Concern using citizen science data.* Office of the Great Lakes, WDNR, Madison, Wisconsin. *(The link provided was broken and has been removed)*

WDNR. 1996. *The Lower Menominee River Remedial Action Plan Update*. PUBL WR-410 96. *(The link provided was broken and has been removed)*

WDNR. 2013. *Lower Menominee River AOC Fisheries Data Roundup Final Report.* *(The link provided was broken and has been removed)*

WDNR. 2014. *Menominee River AOC Fish Reference Site Monitoring 2013 Interim Report.* Green Bay, WI. *(The link provided was broken and has been removed)*

WDNR, 2018. Lower Menominee River Area of Concern GIS maps developed by OGW GIS Specialist, Tom Simmons, Madison, WI.

WDNR and MDNR. 1990. *The Lower Menominee River Remedial Action Plan Stage One Report.* PUBL WR-246 90. *(The link provided was broken and has been removed)*

WDNR and MDEQ. 2008. Lower Menominee River AOC BUI Restoration Targets. Office of the Great Lakes, WDNR, Madison, Wisconsin and Water Resources Division, MDEQ, Lansing, Michigan. *(The link provided was broken and has been removed)*

WDNR and MDEQ. 2011. Stage 2 Remedial Action Plan for the Lower Menominee River Area of Concern, Office of the Great Lakes, WDNR, Madison, Wisconsin and Office of the Great Lakes, MDEQ, Lansing, Michigan. *(The link provided was broken and has been removed)*

WDNR and MDEQ. 2014. *2013 Fish and Wildlife Population and Habitat Management and Restoration Plan Update for the Lower Menominee River Area of Concern*. Office of the Great Lakes, WDNR, Madison Wisconsin and Office of the Great Lakes, MDEQ, Lansing, Michigan. *(The link provided was broken and has been removed)*

List of Acronyms and Initialisms

AOC	Area of Concern
BUI	Beneficial Use Impairment
CAC	Citizens Advisory Committee
ECRE	Eagle Creek Renewable Energy
E & E	Ecology & Environment Inc
FERC	Federal Energy Regulatory Commission
GLLA	Great Lakes Legacy Act
GLNPO	Great Lakes National Program Office
GLWQA	Great Lakes Water Quality Agreement
GLRI	Great Lakes Restoration Initiative
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
NES	Northern Ecological Services-A Division of Robert E Lee & Associates, Inc
NHC	Bureau of Natural Heritage Conservation
PAH	Polycyclic Aromatic Hydrocarbon
RAP	Remedial Action Plan
TAC	Technical Advisory Committee
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish & Wildlife Services
WDNR	Wisconsin Department of Natural Resources
WPSC	Wisconsin Public Service Corporation

Definitions

Activity - A specific action or project that's completion will contribute towards the achievement of one or more objectives. Details regarding who will do the work, how it will be done, costs, location, and timeframe should also be included.

Area of Concern (AOC) - Defined by Annex 1 of the 2012 Protocol to the U.S.-Canada Great Lakes Water Quality Agreement (GLWQA, 2012) as "a geographic area designated by the Parties where significant impairment of beneficial uses has occurred as a result of human activities at the local level." These areas are, or were, the "most contaminated" areas of the Great Lakes, and the purpose of the AOC program is to bring these areas to a point at which they are not environmentally degraded more than other comparable areas of the Great Lakes. When that point has been reached, the AOC can be removed from the list of AOCs in the Annex, or "delisted." The GLWQA can be found at https://ijc.org/en/who/mission/glwqa

Beneficial Use Impairment (BUI) - Defined by the GLWQA as a reduction in the chemical, physical, or biological integrity of the waters of the Great Lakes sufficient to cause impairment to a designated use (GLWQA, 2013). The Lower Menominee River AOC has three BUIs remaining including: restrictions on fish and wildlife consumption; degradation of fish and wildlife populations; and loss of fish and wildlife habitat.

Beneficial use(s) are ways that a water body can improve the quality of life for people or for fish and wildlife. For example, providing habitat for fish and wildlife is a beneficial use of a water body. If a beneficial use is suppressed or unavailable due to environmental problems, like loss of habitat, then that beneficial use is considered impaired. The International Joint Commission provided a list of 14 possible beneficial use impairments in the 2012 amendments to the GLWQA.

Great Lakes Restoration Initiative (GLRI) - A federal program that provides unprecedented funding for protection and restoration efforts on the five Great Lakes. State and local governments and non–profit organizations are eligible to receive grants from the U.S. Environmental Protection Agency (USEPA) for projects addressing toxic substances, invasive species, non–point source pollution, habitat protection and restoration or accountability, monitoring, evaluation, communication, and partnership building.

Goal - Goals are qualitative overarching ideas that may take a long time to achieve. They usually don't change significantly over the life of a project. An example goal statement is, "Nesting populations of a diverse array of wetland-dependent and riparian-associated birds are consistently present within the AOC." Goals are listed in Table 1.

Natural Areas - A "natural area" is an area that currently has value as fish and wildlife habitat or has the potential to be restored so that it has value as fish and wildlife habitat. Natural areas can be publicly or privately held and can include wetlands or riparian lands within the AOC. Natural areas are not necessarily formally designated State Natural Areas.

Objective - Objectives are the detailed and quantitative components of a goal. They are important because they provide a means of measuring progress toward achieving a goal. Objectives should be SMART: Specific, Measurable, Achievable, Realistic, Time-Constrained. An example objective is, "Invasive, non-native species comprise no more than 33% of the vegetation community in protected natural areas of the AOC." Objectives are listed in Table 1.

Protected - For a natural area to be considered protected, the WDNR, MDEQ, CAC, and TAC must come to a consensus that measures in place adequately restrict people from diminishing its current fish and wildlife habitat value. Those measures may be existing state environmental regulations, state, county, or city ordinances, or other means deemed adequate by the WDNR, MDEQ, CAC, and TAC.

Remedial Action Plan (RAP) - A RAP is developed for each AOC to identify the status of BUIs and their sources, document restoration targets, and list actions needed to reach those targets. RAPs are updated periodically to report progress toward achieving the restoration targets. This Plan, along with the most current RAP Update for the Lower Menominee River AOC, constitutes a complete strategy for removing all BUIs in the Lower Menominee River AOC.

Restoration Target - Specific goals and objectives established to track restoration progress of beneficial use impairments. Once targets have been met, the beneficial use is no longer considered impaired. Targets should be locally derived. Working with the Lower Menominee AOC Citizens Advisory Committee, delisting targets were developed in partnership with the WDNR and the MDEQ. Wisconsin and Michigan use different criteria when assessing BUIs. The agencies and CAC agreed to implement the most restrictive criteria from either state when developing the Menominee AOC specific delisting targets.

Appendices

Appendix A Additional Figures and Tables, in the order referenced in the document

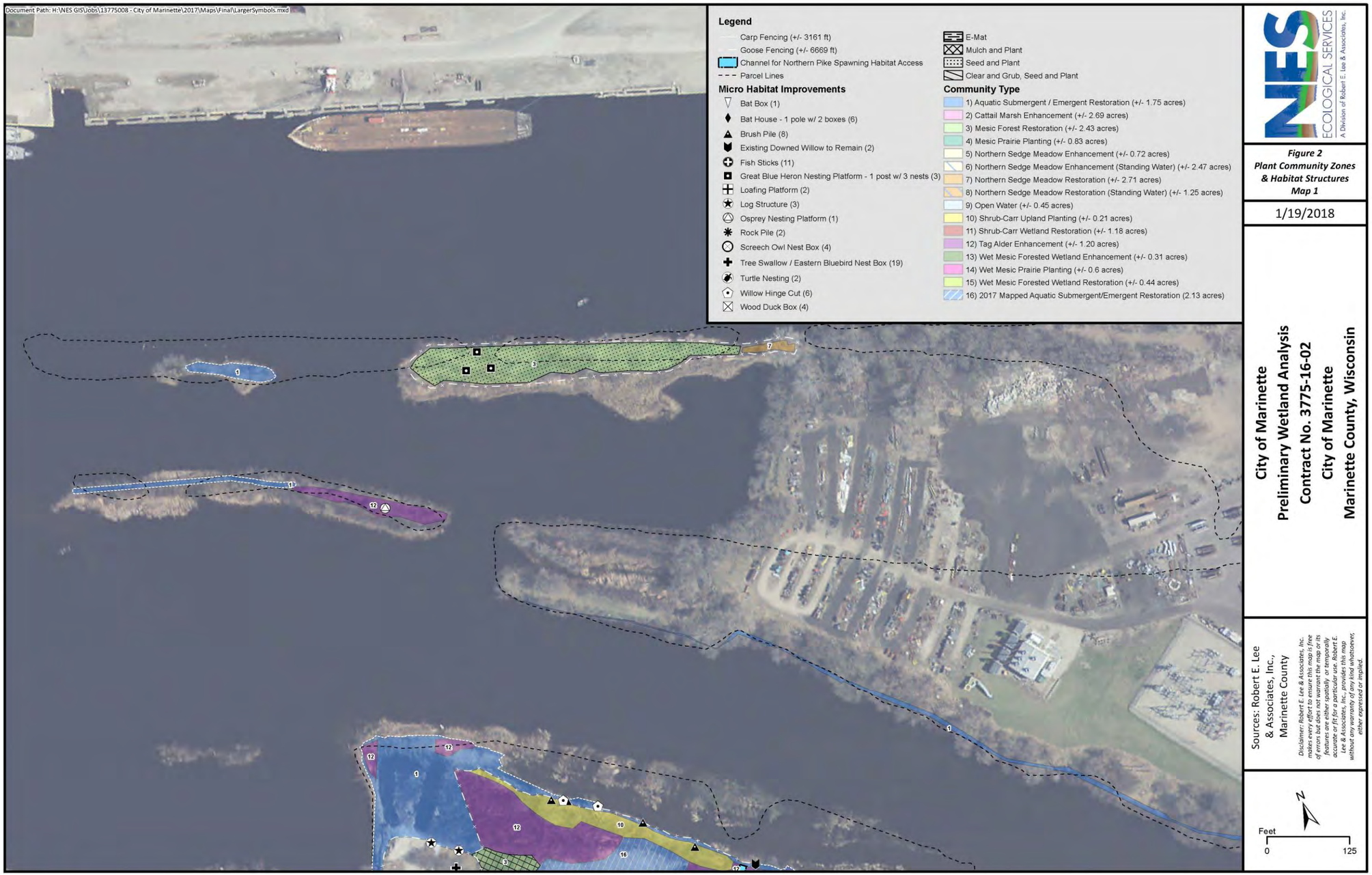
Appendix B CAC and TAC meeting minutes related to fish and wildlife objectives and goals

- B.1 Long-term protection of natural areas goal and objective
- B.2 Rookery monitoring objective
- B.3 Mussel recruitment objective

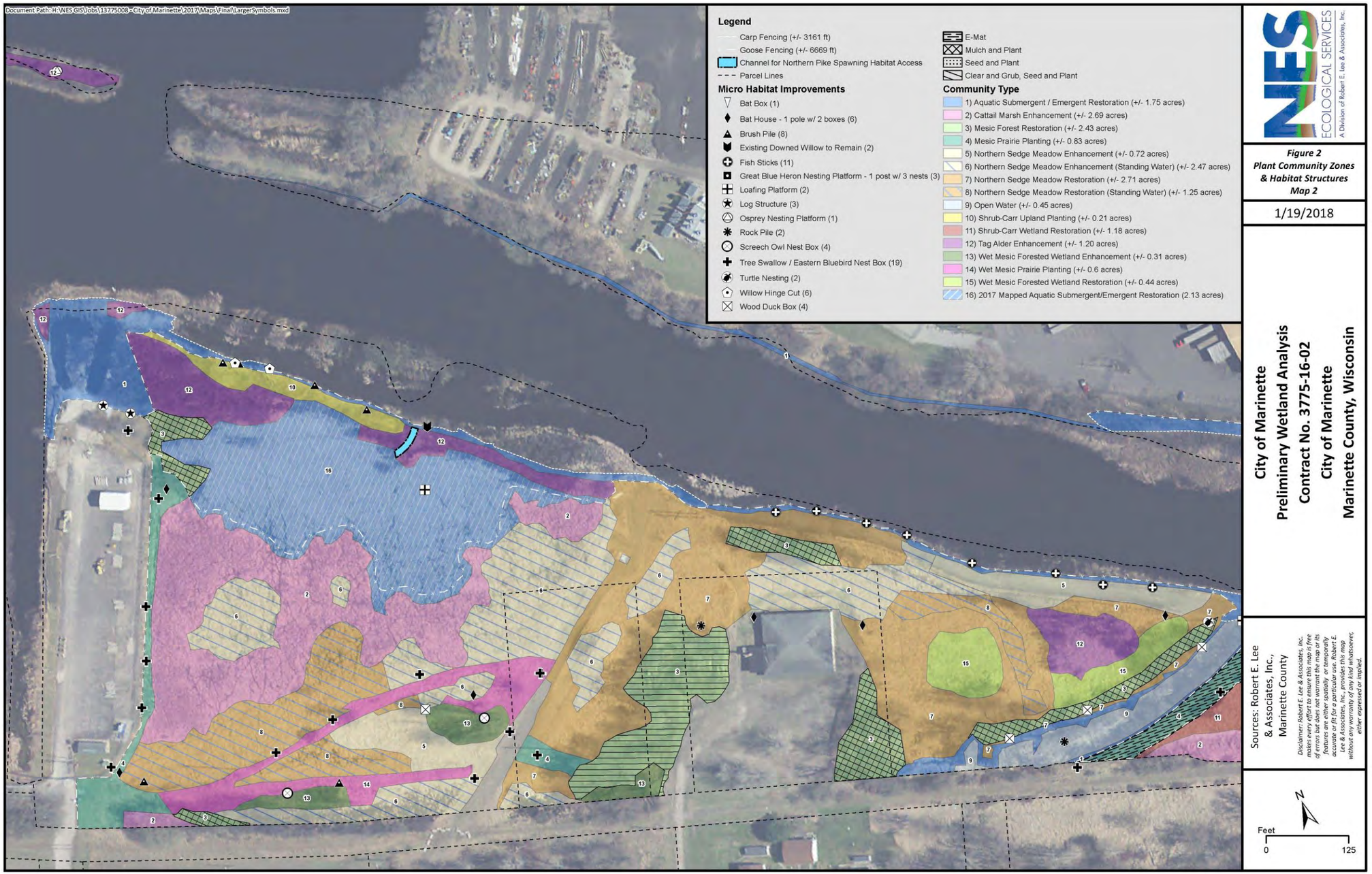
Appendix C Lower Menominee River AOC CAC letter supporting BUI removal, June 8, 2018

Appendix D Lower Menominee River AOC TAC May 21, 2018 and CAC May 24, 2018 meeting announcements, agendas, and minutes

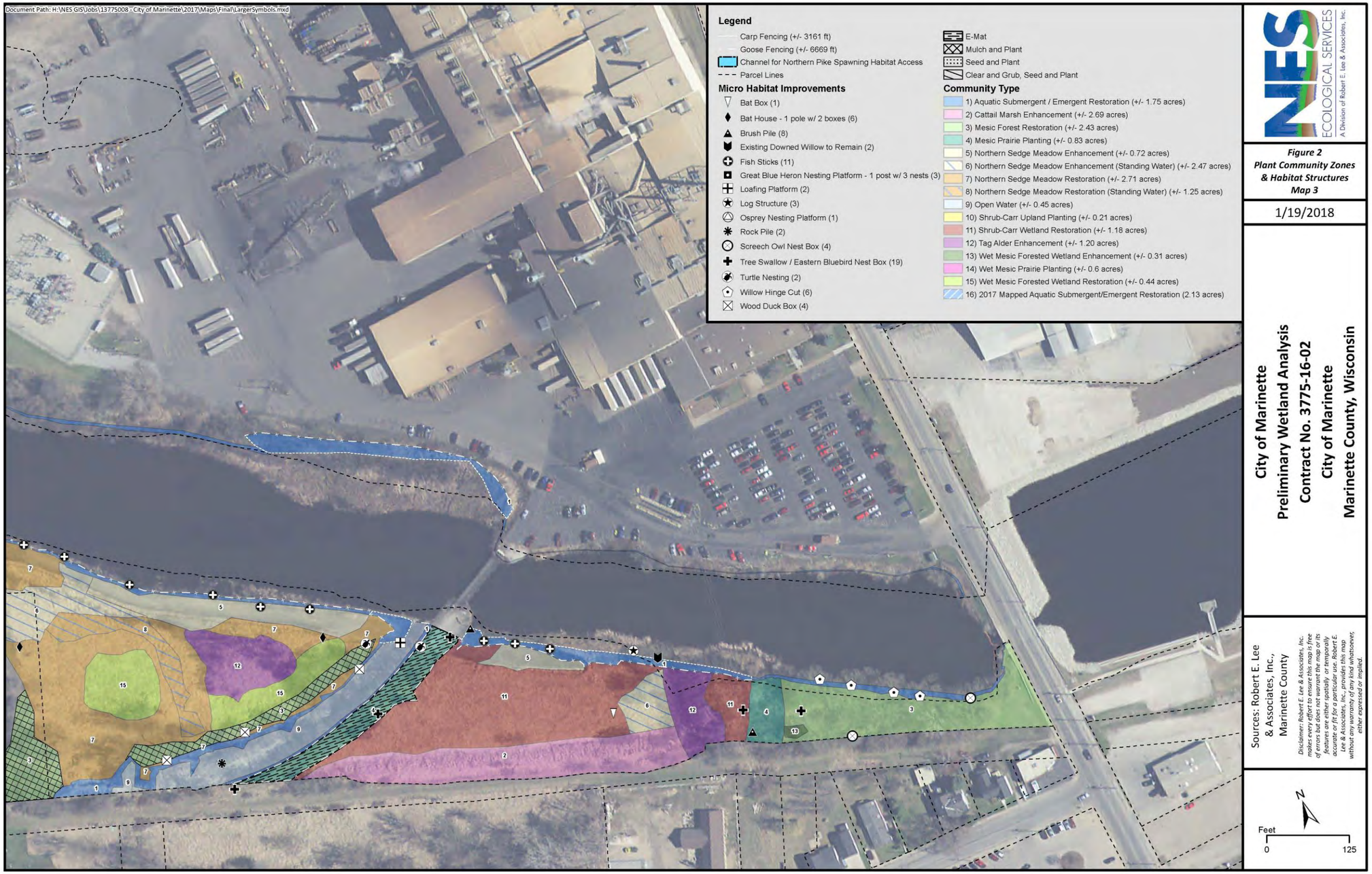
Appendix A - Additional Figures and Tables



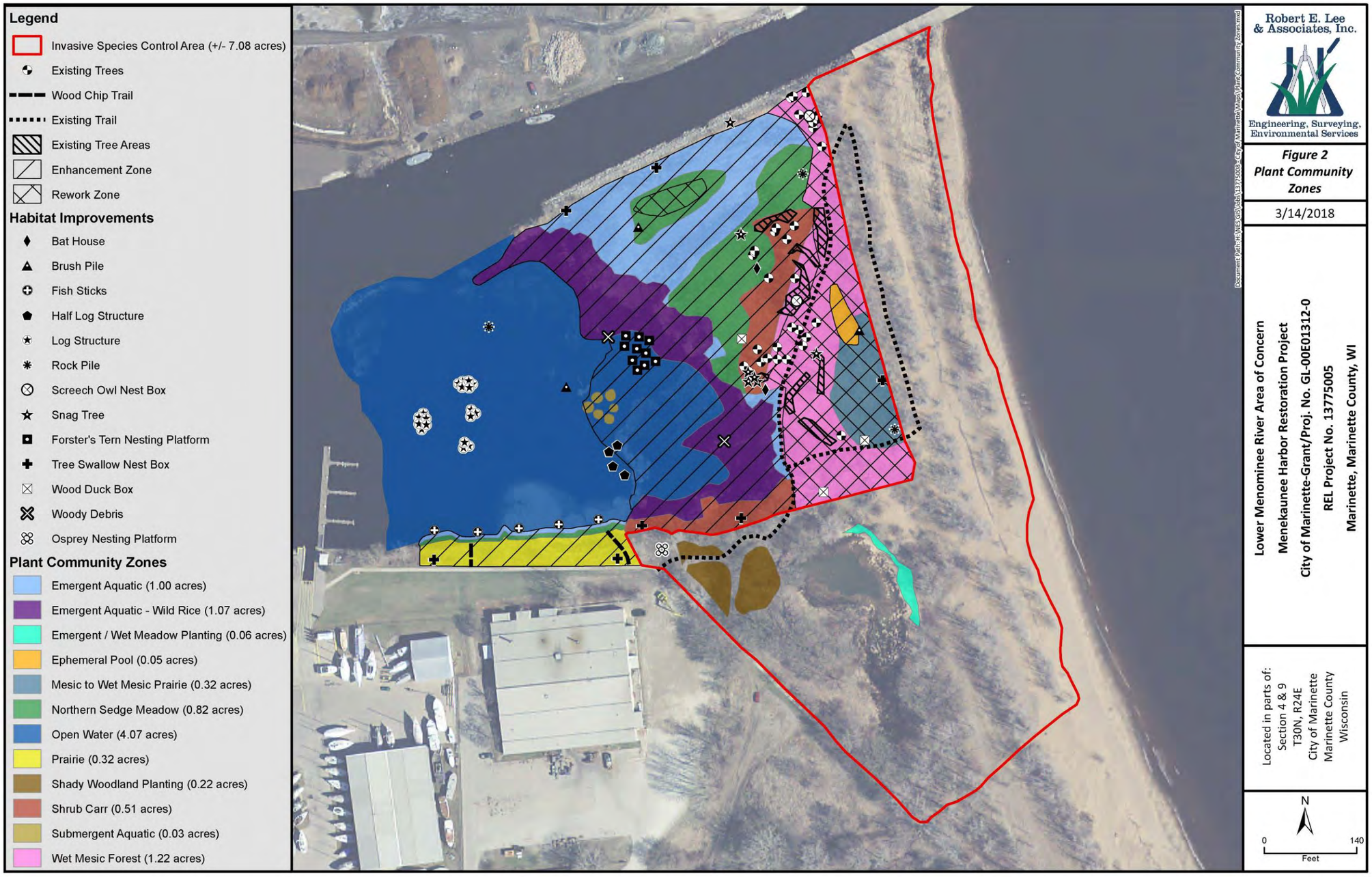
Appendix A, Figure 8, Map 1. South Channel Plant Community Zones and Habitat Structures (REL).



Appendix A, Figure 8, Map 2. South Channel Plant Community Zones and Habitat Structures (REL).



Appendix A, Figure 8, Map 3. South Channel Plant Community Zones and Habitat Structures (REL).



Appendix A, Figure 9. Menekaunee Harbor Plant Community Zones and Habitat Structures (REL).

Appendix A, Table 2b. Input values for the identification of optimal, marginal, and unsuitable habitats for riverine life states of lake sturgeon (*Acipenser fulvescens*) (Daugherty et al, 2009).

Table 3. Input values for the identification of optimal, marginal, and unsuitable habitats for riverine life stages of Lake sturgeon (*Acipenser fulvescens*).

Life Stage	*Habitat Variable*	*Suitability Index*	*Source*
Egg/spawning adult			
	Substrate		
	Clay	0	Threader et al. (1998)
	Silt	0	Threader et al. (1998)
	Sand	0	Threader et al. (1998)
	Gravel	0.5	Threader et al. (1998)
	Cobble	1	Threader et al. (1998)
	Boulder	1	Threader et al. (1998)
	Bedrock	0.3	Threader et al. (1998)
	Stream gradient (m/km)		
	>1.0	1	Hay-Chmielewski and Whelan (1997)
	0.6–1.0	1	Hay-Chmielewski and Whelan (1997)
	0.3–0.59	0.5	Hay-Chmielewski and Whelan (1997)
	0.0	0	Hay-Chmielewski and Whelan (1997)
Larval/juvenile			
	Substrate composition		
	Clay	0.2	Threader et al. (1998)
	Silt	1	Threader et al. (1998)
	Sand	1	Threader et al. (1998)
	Gravel	1	Threader et al. (1998)
	Cobble	0.8	Threader et al. (1998)
	Boulder	0.5	Threader et al. (1998)
	Bedrock	0.2	Threader et al. (1998)
	Stream gradient (m/km)		
	>1.0	0	Benson et al. (2005)
	0.6–1.0	1	Benson et al. (2005)
	0.3–0.59	0.9	Benson et al. (2005)
	0.0	0.5	Benson et al. (2005)
	Water depth (m)		
	<0.5	0	Threader et al. (1998)
	0.5–1.9	0.8	Threader et al. (1998)
	2.0–4.0	0.9	Threader et al. (1998)
	4.0–7.9	1	Threader et al. (1998)
	8.0–14.0	0.5	Threader et al. (1998)
	>14.0	0	Threader et al. (1998)
	Geographic constraint		
	>0.5 rkm of habitat	1	Benson et al. (2005)
	<0.5 rkm of habitat	0.9	Benson et al. (2005)
Staging adult			
	Water depth (m)		
	<2.0 m	0	Bruch and Binkowski (2002)
	>2.0 m	1	McKinley et al. (1998); Bruch and Binkowski (2002)
	Geographic constraint		
	<3 km from potential spawning habitat	1	Bruch and Binkowski (2002)
	>3 km from potential spawning habitat	0	Bruch and Binkowski (2002)

Suitability index value of 0 refers to unsuitable habitats, whereas values ranging between 0 and 0.79 were defined as marginal habitat. Values of 0.8–1 were considered to provide high-quality habitat.

Appendix A, Tables 6 and 7. Lower Scott Flowage fish monitoring results (Last, 2016).

LOWER SCOTT FLOWAGE

Table 6. Spring electrofishing catch totals and average catch-per-effort (CPE; number of individuals caught per mile) in the Lower Scott Flowage. A blank cell indicates that the species was not targeted in that survey. Average CPE and calculated percentile are derived from information found in the Lower Menominee River AOC Fisheries Data Roundup Final Report (2013).

Survey Date	4/25/2011	5/24/2011	5/22/2012	5/20/2013	**Average CPE (2011-2013)**	**Restoration Goal Percentile**	**2011-2013 Calculated Percentile**
Species Catch Totals							
Bluegill		3	4	5	3.4	25th	**4.6**
Largemouth Bass	1	0	0	0	0.1	"	**20.3**
Northern Pike	14	8	1	0	1.7	"	**30.5**
Rock Bass		28	14	14	14	"	**47.8**
Smallmouth Bass	7	87	11	41	14.5	"	**44.1**
Walleye	31	24	0	7	4.7	"	**50.9**

Table 7. Fall electrofishing catch totals and species specific average CPE (number per mile) in the Lower Scott Flowage. A blank cell indicates that the species was not targeted in that survey. Average CPE and calculated percentile are derived from information found in the Lower Menominee River AOC Fisheries Data Roundup Final Report (2013).

Survey Date	9/16/1987	10/4/1989	7/31/2003	8/4/2003	10/3/2011	10/1/2012	**Average CPE (1987-2012)**	**Restoration Goal Percentile**	**1987-2012 Calculated Percentile**
Species Catch Totals									
Bluegill	7	16	0			5	2.8	25th	**24.3**
Largemouth Bass	5	0	0	0	2	4	0.9	-	**53.4**
Northern Pike	1	11	0	3	7	0	2.0	-	**3.6**
Rock Bass	53	80	21			38	18.3	-	**94.5**
Smallmouth Bass	26	8	0	29	50	22	12.0	-	**81.2**
Walleye	16	22	18	0	7	12	4.1	-	**16.8**

Appendix A, Tables 8, 9, and 10. Fish monitoring results for the Lower Menominee, Peshtigo, and Escanaba Rivers (Last, 2016).

LOWER MENOMINEE RIVER

Table 8. Fall electrofishing catch totals and species specific average CPE in the Lower Menominee River. Average CPE is based on catch totals and either 1.5-mile survey effort (2012, 2013, and 2014) or 2.5-mile survey effort (2015). Calculated percentile is derived from information found in the Lower Menominee River AOC Fisheries Data Roundup Final Report (2013).

Survey Date	10/23/2012	9/23/2013	09/30/2014	10/13/2015	**Average CPE (2012-2015)**	**Restoration Goal Percentile**	**2012-2015 Calculated Percentile**
Species Catch Totals							
Muskellunge	2	0	0	4	0.73	25th	**94.2**
Largemouth Bass	5	4	0	3	1.80	"	**91.4**
Northern Pike	1	1	1	5	1.00	"	**44.8**
Smallmouth Bass	1	0	2	2	0.70	"	**41.9**
Walleye	12	0	23	19	7.73	"	**79.1**

PESHTIGO RIVER

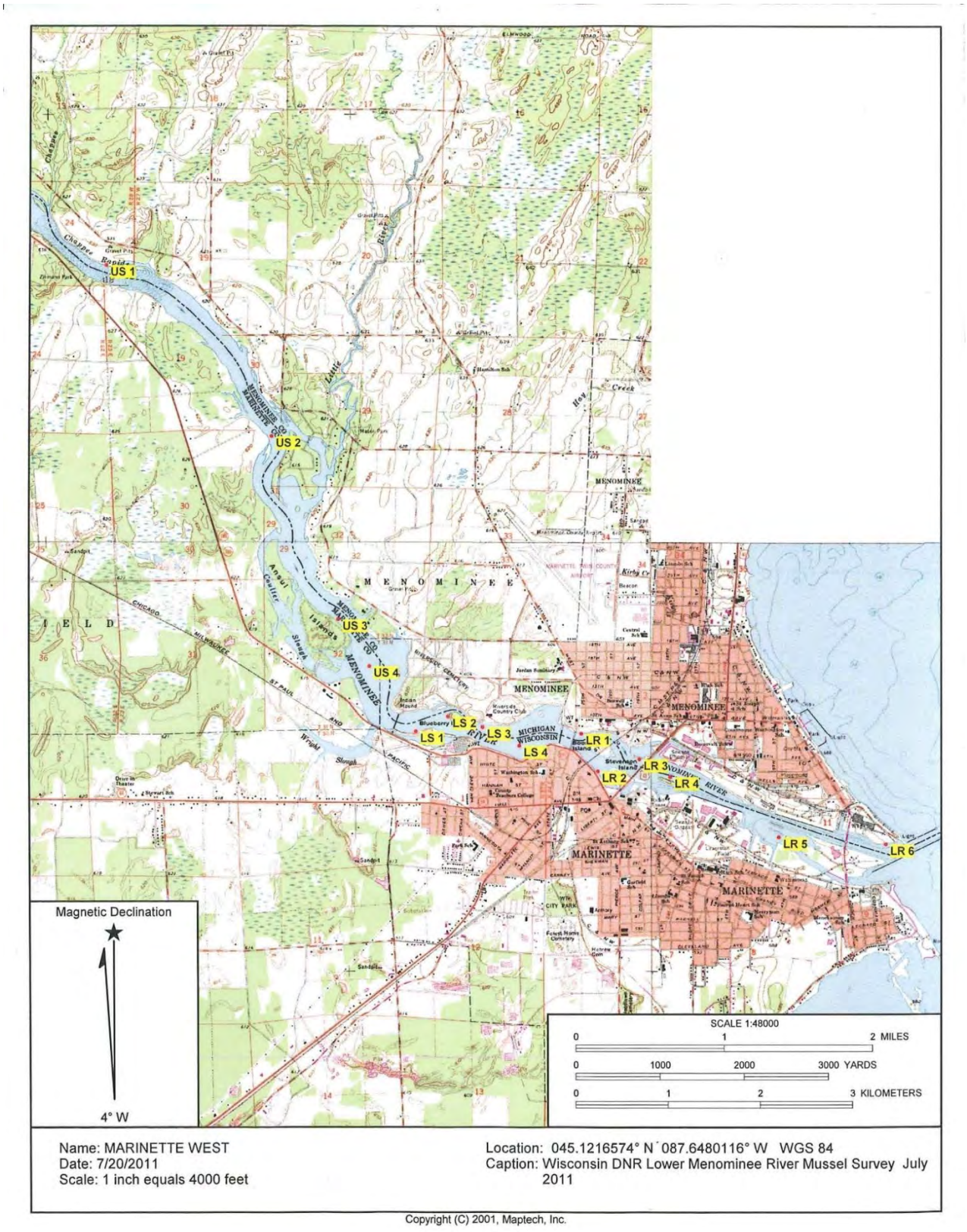
Table 9. Fall electrofishing catch totals and species specific average CPE in the Peshtigo River. Average CPE is based on catch totals and 2.25-mile survey effort.

Survey Date	10/01/2013	09/29/2014	10/12/2015	**Average CPE (2013-2015)**
Species Catch Totals				
Muskellunge	0	0	0	0.00
Largemouth Bass	0	0	0	0.00
Northern Pike	4	0	2	0.89
Smallmouth Bass	5	18	4	4.00
Walleye	0	0	1	0.15

ESCANABA RIVER

Table 10. Fall electrofishing catch totals and species specific average CPE in the Escanaba River. Average CPE is based on catch totals and either 2.43-mile survey effort (2013 and 2014) or 2.19-mile survey effort (2015).

Survey Date	10/7/2013	10/08/2014	10/09/2015	**Average CPE (2013-2015)**
Species Catch Totals				
Muskellunge	0	0	0	0.00
Largemouth Bass	0	0	0	0.00
Northern Pike	18	55	23	13.51
Smallmouth Bass	16	5	1	3.03
Walleye	9	8	7	3.40



Appendix A, Figure 10. Map of 2011 mussel survey locations in the Menominee River (Piette, 2012).

Appendix A, Table 11. Number of freshwater mussels collected during 2011 Menominee River qualitative mussel survey. Survey times equal 1 hr per site except site US4 = 0.5 hr. Number of juveniles <4 yrs old in parentheses. An 'x' indicates dead shell only observed at site. Only one dead shell was found at site LR5 and no mussels were found at site LR6. Species status as listed by WDNR Bureau of Endangered Resources (6/01/2011) (Piette, 2012).

		Upper Scott				Lower Scott				Lower River					
SPECIES	Status	US1	US2	US3	US4 *	LS1	LS2	LS3	LS4	LR1	LR2	LR 3	LR4	LR 5	LR 6
Alasmidonta marginata	WSC	3						1		1					
Amblema plicata			x	3	2		1			1			1		
Cyclonaias tuberculata	WE	x				x		1				x			
Elliptio dilatata		120 (2)	274	476	90	22	291	197	196	13	34 (1)	31	26		
Fusconaia flava		4	1	1	5		x	1	1						
Lampsilis cardium		1													
Lampsilis siliquoidea		39 (4)	5	7	7		6	10	2	1	x	x	3		
Lasmigona costata		14	35	5	3		12 (1)	18	17		x	1	6		
Leptodea fragilis										52 (1)	23	11	50		
Ligumia recta	WSC	4	4	x	2	x	5	5	1	x	1				
Obovaria olivaria			1	2			1								
Pleurobema sintoxia	WSC		2		3										
Potamilus alatus										42	8	32	33	x	
Pyganodon grandis			1	1			1	1	1 (1)	1		1			
Strophitus undulatus		1	2					2		1					
Truncilla truncata										71 (22)	5	70	86 (4)		
Number of live mussels		186	325	495	112	22	317	236	218	183	71	146	205	0	0
Number live < 4 yr old		6	0	0	0	0	1	0	1	23	1	0	4	0	0
Number of live species		8	9	7	7	1	7	9	6	9	5	6	7	0	0
Number of species		9	10	8	7	3	8	9	6	10	7	8	7	1	0

Appendix A, Figure 11. Little Blueberry Island pre-treatment invasive species locations in November 2014 (Ecology & Environment, Inc. 2018b).

Figure 2-2
Pre-treatment Invasive Species Locations in November 2014
Blueberry Island
Lower Menominee River Area of Concern

Legend

- Boat Ramp
- Possible Access Point
- State Boundary
- Bush Honeysuckle Mature Shrubs (0.1 ac)
- Bush Honeysuckle Seedlings/Shrubs and Common Buckthorn Seedlings (0.1 ac)
- Bush Honeysuckle Seedlings/ Shrubs: 10 - 20% Cover (0.6 ac)
- Previously Treated Area with Brush Piles and Dense Common Buckthorn Seedlings (1.9 ac)

N

0 25 50 100 Feet

Data Source: Ecology and Environment, Inc. 2016.
Basemap Source: ESRI 2012.

Appendix A, Figure 12. Blueberry Island pre-treatment invasive species locations in November 2014 (Ecology & Environment, Inc. 2018b).

Fig 2-3
Pre-treatment Invasive Species Locations in November 2014
Boom Island
Lower Menominee River Area of Concern

Legend

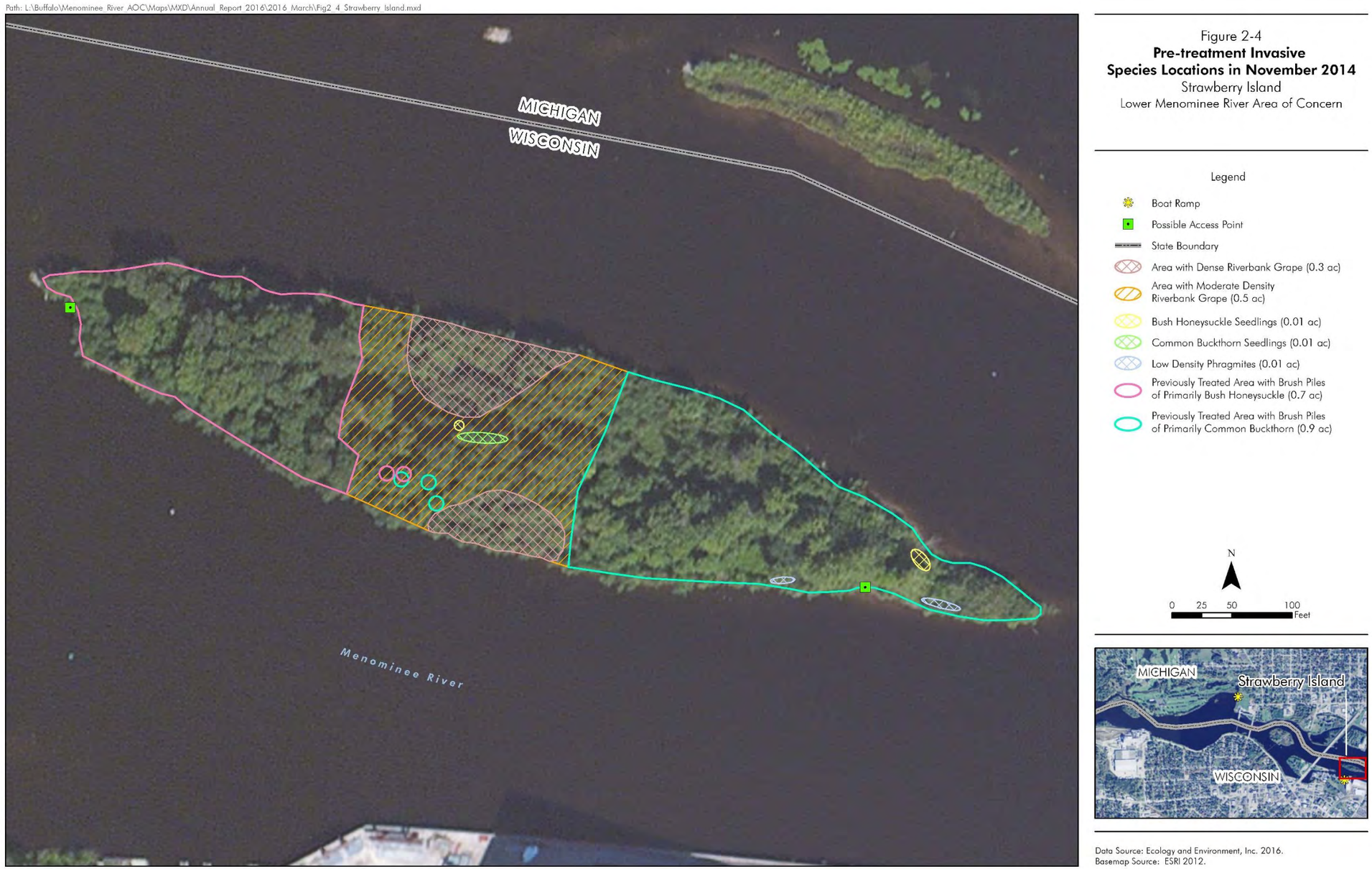
- Boat Ramp
- Possible Access Point
- State Boundary
- Bush Honeysuckle Shrub
- Common Buckthorn Seedlings (0.01 ac)
- Glossy Buckthorn Seedlings (0.2 ac)
- Low Density Glossy Buckthorn Seedlings (0.02 ac)
- Previously Treated Area with Brush Piles and Bush Honeysuckle Seedlings (0.1 ac)
- Previously Treated Area with Brush Piles and Dense Glossy Buckthorn Seedlings (1.3 ac)

N

0 25 50 100 Feet

Data Source: Ecology and Environment, Inc. 2016.
Basemap Source: ESRI 2012.

Appendix A, Figure 13. Boom Island pre-treatment invasive species locations in November 2014 (Ecology & Environment, Inc. 2018b).



Appendix A, Figure 14. Strawberry Island pre-treatment invasive species locations in November 2014 (Ecology & Environment, Inc. 2018b).

Path: L:\Buffalo\Menominee_River_AOC\Maps\MXD\Annual_Report_2017\2017_Oct\Fig5_7_Little_Blueberry_Invasives_2017.mxd

Figure 5-7
Observed Invasive Species Locations and Estimates of Percent Cover September 2017
Little Blueberry Island
Lower Menominee River Area of Concern

Legend
- Boat Ramp
- State Boundary
- Bush Honeysuckle Seedlings
- Common Buckthorn Saplings and Seedlings
- Glossy Buckthorn Seedlings

N

0 25 50 100 Feet

Data Source: Ecology and Environment, Inc. 2017.
Basemap Source: NAIP 2015.

Appendix A, Figure 15. Little Blueberry Island observed invasive species locations and estimated percent cover in September 2017 (Ecology & Environment, Inc. 2018b).

Figure 5-8
Observed Invasive Species Locations and Estimates of Percent Cover September 2017
Blueberry Island
Lower Menominee River Area of Concern

Legend

- Boat Ramp
- State Boundary
- Bush Honeysuckle Seedlings and Resprouts
- Common Buckthorn Seedlings
- Glossy Buckthorn Seedlings

N

0 25 50 100 Feet

Data Source: Ecology and Environment, Inc. 2017.
Basemap Source: NAIP 2015.

Appendix A, Figure 16. Blueberry Island observed invasive species locations and estimated percent cover in September 2017 (Ecology & Environment, Inc. 2018b).

Fig 5-9
Observed Invasive Species Locations and Estimates of Percent Cover September 2017
Boom Island
Lower Menominee River Area of Concern

Legend

- Boat Ramp
- State Boundary
- Common Buckthorn Seedlings
- Glossy Buckthorn Seedlings
- Mix of Glossy Buckthorn and Common Buckthorn Seedlings

N

0 25 50 100
Feet

Data Source: Ecology and Environment, Inc. 2017.
Basemap Source: NAIP 2015.

Appendix A, Figure 17. Boom Island observed invasive species locations and estimated percent cover in September 2017 (Ecology & Environment, Inc. 2018b).

Figure 5-10
Observed Invasive Species Locations and Estimates of Percent Cover September 2017
Strawberry Island
Lower Menominee River Area of Concern

Legend
- Boat Ramp
- State Boundary
- Common Buckthorn Seedlings
- Mix of Glossy Buckthorn and Common Buckthorn Seedlings
- Riverbank Grape

N
0 25 50 100 Feet

Data Source: Ecology and Environment, Inc. 2017.
Basemap Source: NAIP 2015.

Appendix A, Figure 18. Strawberry Island observed invasive species locations and estimated percent cover in September 2017 (Ecology & Environment, Inc. 2018b).

Appendix A, Table 12. Status of ecological performance standard achievement for South Channel habitat restoration project (NES, 2018b).

Ecological Performance Standards (PS) For Year One	PS Achievement			Monitoring Results			Discussion of Monitoring Results/Trends
	2017	2018	2019				
Except in the far eastern Mesic Forest stand, aerial coverage of invasive, nonnative species such as giant reed grass, reed canary grass, purple loosestrife, Japanese knotweed and garlic mustard will not be >10% absolute cover after one year, and will not be >5% absolute cover after two and three years.	Y	--	--	**Invasive, non-native species** Giant reed grass Reed canary grass Japanese knotweed. Purple loosestrife Garlic mustard	**% Cover** 0.25 1.25 0 0.5 0.5	**% Relative Cover** 0.21 1.03 0 0.41 0.41	The five main invasive species of concern currently have <5% total coverage within the project area.
Aerial coverage of garlic mustard will not be >75% absolute cover after one year, >50% absolute cover after two years, and >25% absolute cover after three years within the far eastern Mesic Forest stand.	IP	--	--	Garlic mustard has an absolute cover of 85%.			The amount of garlic mustard in the far eastern Mesic Forest exceeded 75%. After our survey, herbicide treatment of garlic mustard basal leaves was performed to keep this area on track to meet this performance standard in Year 2.
After one year, >75% of the vegetative cover within the restoration site will be native species, <25% of the cover will be invasive, non-native species. After two years, >80% of the vegetative cover within the restoration site will be native species, <20% of the cover will be invasive, non-native species. After three years, >85% of the vegetative cover within the restoration site will be native, non-invasive species, <15% of the cover will be invasive, non-native species.	Y	--	--	Native vegetative cover was 77.47% and non-native vegetative coverage was 22.53%.			This performance standard was met by having greater than 75% native species coverage and less than 25% non-native species coverage.
Eighty percent of the site will be vegetated within one year. Eighty-five percent of the site will be vegetated within two years. Ninety percent of the site will be vegetated within three years.	Y	--	--	Sum of average percent cover across the site = 121.72%			Based on the sum of average percent cover across all communities this criterion has been met. The lowest percent cover across all communities was the s Aquatic Submergent/Emergent Restoration Community at 73% cover. Otherwise all communities had greater than 80% cover.
90% of trees, shrubs and live stakes planted within the various communities will be present and healthy one year after installation, 80% two years after installation, and 75% three years after installation.	NA	--	--	Monitoring was not performed; but, visual observations suggest this performance standard is on track to be met.			Year 1 monitoring was intended to be conducted once the woody species were established for roughly one year. Since additional planting was conducted in the spring of 2017, survival surveys will being in 2018.
The Aquatic Submergent/Emergent Restoration Community shall have a minimum of 20 native, non-invasive species present	Y	--	--	There were 24 native, non-invasive species.			Performance standard was met.
The 2017 Mapped Aquatic Submergent/Emergent Restoration Community shall have a minimum of 20 native, non-invasive species present.	Y	--	--	There were 25 native, non-invasive species.			Performance standard was met.
The Mesic Forest, Mesic Prairie*, Northern Sedge Meadow, Shrub-Carr Upland, Shrub-Carr Wetland, Tag Alder, Wet-Mesic Forested Wetland and Wet-Mesic Prairie* Communities shall each have a minimum of 20 native, non-invasive species present after one year, 25 native, non-invasive species present after two years and 30 native, non-invasive species present after three years. **The Mesic Prairie and Wet Mesic Prairie were not evaluated in this standard due to these communities having separate requirements listed in the performance standard below.*	Y	--	--	**Community** Mesic Forest Northern Sedge Meadow Shrub-Carr (Shrub-Carr Upland, Shrub-Carr Wetland, Tag Alder) Wet-Mesic Forested Wetland	**Number of Native, Non-invasive species** 57 40 64 57		Planted species along with naturally occurring species allowed this performance standard to be met in all communities.
The Mesic Prairie and Wet-Mesic Prairie Communities shall each have a minimum of 15 native, non-invasive species present after one year, 20 native, non-invasive species present after two years, and 25 native, non-invasive species present after three years.	Y	--	--	**Community** Mesic Prairie Wet-Mesic Prairie	**Number of Native, Non-invasive Species** 26 16		All communities for this performance standard currently meet the goal. The Wet Mesic Prairie currently has the lowest number of native species with 16. Because the prairie was started from bare soil and seed, it will take longer to become fully established and display a higher number of native species.

NA = Not Applicable IP = In Progress P = Performance Standard is Partially Met Y = Performance Standard is Met

Appendix A, Table 12, Continued.

<table>
<tr><th rowspan="2">Ecological Performance Standards (PS) For Year One</th><th colspan="3">PS Achievement</th><th>Monitoring Results</th><th>Discussion of Monitoring Results/Trends</th></tr>
<tr><th>2017</th><th>2018</th><th>2019</th><th></th><th></th></tr>
<tr><td>To ensure the restored communities have natural significance, the floristic quality index (FQI) and Coefficient of Conservatism (Mean C) for each shall be >20 and >3.5, respectively, after one year, >22 and >3.8, respectively, after two years, and >25 and >4.0, respectively . FQI values will be calculated utilizing all species present: non-native species will be assigned a value of zero.</td><td>P</td><td>--</td><td>--</td><td><table><tr><th>Community</th><th>FQI</th><th>Mean C</th></tr><tr><td>Mesic Forest</td><td>22.11</td><td>2.26</td></tr><tr><td>Mesic Prairie</td><td>8.76</td><td>1.18</td></tr><tr><td>Northern Sedge Meadow</td><td>21.77</td><td>2.96</td></tr><tr><td>Shrub-Carr (Shrub-Carr Upland, Shrub-Carr Wetland, Tag Alder)</td><td>25.27</td><td>2.72</td></tr><tr><td>Wet-Mesic Forested Wetland</td><td>26.58</td><td>3.15</td></tr><tr><td>Wet-Mesic Prairie</td><td>8.28</td><td>1.29</td></tr><tr><td>Aquatic Submergent/Emergent</td><td>21.54</td><td>4.07</td></tr><tr><td>2017 Mapped Aquatic Submergent/Emergent</td><td>23.40</td><td>4.34</td></tr></table></td><td>All communities with the exception of the Mesic Prairie and Wet Mesic Prairie have met the performance standard of having an FQI greater than 20. Only the Aquatic Submergent/Emergent and 2017 Mapped Aquatic Submergent/Emergent communities met the standard of having an FQI greater than 3.5. This is due to the communities' early stage of development.</td></tr>
<tr><td>Twenty-one of the forty-two nesting and roosting boxes shall be utilized or occupied annually by year three.</td><td>IP</td><td>--</td><td>--</td><td>This standard was not analyzed in Year 1.</td><td>This standard was not analyzed in Year 1; however, an osprey successfully utilized a nesting platform.</td></tr>
<tr><td>Twenty avian species, five species of reptiles and amphibians, and five mammal species will be recorded, either through direct observation, calls or sign left by the species, utilizing the site after three years.</td><td>IP</td><td>--</td><td>--</td><td><table><tr><th></th><th>2017</th><th>2018</th><th>2019</th></tr><tr><td>Avian</td><td>9</td><td>--</td><td>--</td></tr><tr><td>Herptiles</td><td>4</td><td>--</td><td>--</td></tr><tr><td>Mammals</td><td>1</td><td>--</td><td>--</td></tr></table></td><td>This standard does not need to be evaluated until Year 3, but it is currently on track to be met.</td></tr>
</table>

NA = Not Applicable IP = In Progress P = Performance Standard is Partially Met Y = Performance Standard is Met

Appendix A, Table 13. Status of ecological performance standard achievement for Menekaunee Harbor habitat restoration project (NES, 2018a).

<table>
<tr><th rowspan="2">Ecological Performance Standards (PS) For Year Two</th><th colspan="3">PS Achievement</th><th rowspan="2">Monitoring Results</th><th rowspan="2">Discussion of Monitoring Results/Trends</th></tr>
<tr><th>2016</th><th>2017</th><th>2018</th></tr>
<tr><td>Aerial coverage of invasive, non-native species such as giant reed grass, reed canary grass, cattail spp., purple loosestrife and spotted knapweed will not be >5% after two years.</td><td>Y</td><td>Y</td><td>--</td><td><table><tr><th>Invasive, non-native species</th><th>% Cover</th><th>% Relative Cover</th></tr><tr><td>Giant reed grass</td><td>0.70</td><td>0.57</td></tr><tr><td>Reed canary grass</td><td>0.78</td><td>0.64</td></tr><tr><td>Cattail spp.</td><td>0.50</td><td>0.41</td></tr><tr><td>Purple loosestrife</td><td>0.70</td><td>0.57</td></tr><tr><td>Spotted knapweed</td><td>0.20</td><td>0.16</td></tr></table></td><td>The five main invasive species of concern currently have <5% total coverage within the project area.</td></tr>
<tr><td>After two years, >80% of the vegetative cover within the restoration site will be native species, <20% of the cover will be invasive, non-native species.</td><td>Y</td><td>Y</td><td>--</td><td><table><tr><th>Species</th><th>Percent cover</th></tr><tr><td>Native</td><td>91.39</td></tr><tr><td>Invasive / Non-native</td><td>8.61</td></tr></table></td><td>Vegetative cover is currently exceeding the 80% minimum native species cover after two years. Elodea canadensis (Canadian waterweed), a submergent aquatic and Acer negundo (box elder) are accounting for the largest portion of vegetative cover of native species with 11.46 & 12.46% relative cover, respectively.</td></tr>
<tr><td>Eighty five percent of the site will be vegetated within two years.</td><td>Y</td><td>Y</td><td>--</td><td>Sum of average percent cover across the site = 122.18%</td><td>Based on the sum of average percent cover across all communities this criterion has been met. The lowest percent cover across all communities was the submergent aquatic at 95% cover and the shady woodland planting at 96% cover.</td></tr>
<tr><td>520 of the 650 planted shrubs within the Shrub-Carr community will be present and healthy two years after installation.</td><td>Y</td><td>IP</td><td>--</td><td>-</td><td>Due to the continued water level increase there were many shrubs on the edge of being live or dead. Due to this NES did not conduct a count of live shrubs in 2017 but will conduct the count for the final year of monitoring in 2018. It is probable that this standard will not be met due to the dramatic water level increase during the establishment of installed shrubs.</td></tr>
<tr><td>800 of the 1,000 planted trees and shrubs within the Wet-Mesic Forest community will be present and healthy after two years of installation.</td><td>Y</td><td>IP</td><td>--</td><td>-</td><td>Due to the continued water level increase there were many trees on the edge of being live or dead. Due to this NES did not conduct a count of live shrubs in 2017 but will conduct the count for the final year of monitoring in 2018. It is probable that this standard will not be met due to the dramatic water level increase during the establishment of installed trees.</td></tr>
<tr><td>The Open Water with Submergent Vegetation community shall have a minimum of 5 native species present.</td><td>Y</td><td>Y</td><td></td><td>This community had 16 native species identified during the vegetation survey</td><td>Planted species along with naturally occurring species allowed this performance standard to be met.</td></tr>
<tr><td>The Emergent Aquatic, Northern Sedge Meadow, Shrub-Carr, Wet-Mesic Forest and Mesic to Wet Mesic Prairie & Prairie communities shall each have a minimum of 15 native, non-invasive species present.</td><td>P</td><td>Y</td><td>--</td><td><table><tr><th>Community</th><th>Number of Native, Non-invasive Species</th></tr><tr><td>Emergent Aquatic & Emergent Aquatic –Wild Rice</td><td>36</td></tr><tr><td>Northern Sedge Meadow</td><td>36</td></tr><tr><td>Shrub-Carr</td><td>52</td></tr><tr><td>Wet-Mesic Forest, Ephemeral Pool & Mesic to Wet-Mesic Prairie</td><td>52</td></tr><tr><td>Prairie</td><td>20</td></tr></table></td><td>All communities for this performance standard currently meet the goal. The prairie has the lowest number of native species with 20. Because the prairie was started from bare soil it will take longer to become fully established and display a higher number of native species.</td></tr>
</table>

Appendix A, Table 13, continued.

<table>
<tr><th rowspan="2">Ecological Performance Standards (PS) For Year Two</th><th colspan="3">PS Achievement</th><th rowspan="2">Monitoring Results</th><th rowspan="2">Discussion of Monitoring Results/Trends</th></tr>
<tr><th>2016</th><th>2017</th><th>2018</th></tr>
<tr><td>To ensure the restored communities have natural significance, the floristic quality index (FQI) and Coefficient of Conservatism (Mean C) for each shall be ≥ 22 and ≥ 3.8, respectively, after two years. FQI values will be calculated utilizing all species present: non-native species will be assigned a value of zero.</td><td>P</td><td>P</td><td>--</td><td><table><tr><th>Community</th><th>FQI</th><th>Mean C</th></tr><tr><td>Emergent Aquatic & Emergent Aquatic – Wild Rice</td><td>25.93</td><td>4.10</td></tr><tr><td>Northern Sedge Meadow</td><td>26.25</td><td>4.15</td></tr><tr><td>Shrub-Carr</td><td>27.11</td><td>3.19</td></tr><tr><td>Wet-Mesic Forest, Ephemeral Pool & Mesic to Wet-Mesic Prairie</td><td>31.91</td><td>4.19</td></tr><tr><td>Prairie</td><td>9.26</td><td>1.43</td></tr><tr><td>Open Water w/Submergent Veg</td><td>21.00</td><td>5.25</td></tr></table></td><td>The prairie, open water w/submergent veg and shrub-carr communities have not met the criteria for this performance standard. The prairie did trend positively in regards to both FQI (11.9 to 13.42) and mean C (1.67 to 3.00) since 2016 but will still require more time to establish due to being started from seed and bare soil. The open water w/submergent veg trended positively since 2016 in regards to FQI (15.20 to 21.00) but stayed relatively the same for mean C (5.38 to 5.25) which has met the standard. The shrub-carr community also trended positively since 2016 in regards to FQI (24.18 to 27.11) and also stayed relatively the same in regards to mean C (3.32 to 3.19).</td></tr>
<tr><td>Six of the twelve nesting and roosting boxes shall be utilized or occupied annually by year three.</td><td>IP</td><td>IP</td><td>-</td><td>This standard was not analyzed in Year 1 or 2.</td><td>-</td></tr>
<tr><td>Twenty avian species, five species of reptiles and amphibians, and five mammal species will be recorded, either through direct observation, calls or sign left by the species, utilizing the site after three years.</td><td>IP</td><td>IP</td><td>-</td><td><table><tr><th>Species Type</th><th>2016</th><th>2017</th><th>2018</th></tr><tr><td>Avian</td><td>9</td><td>9</td><td>-</td></tr><tr><td>Herptiles</td><td>3</td><td>3</td><td>-</td></tr><tr><td>Mammals</td><td>3</td><td>3</td><td>-</td></tr></table></td><td>This standard does not need to be evaluated until Year 3, but it is currently on track to be met.</td></tr>
</table>

NA = Not Applicable IP = In Progress P = Performance Standard is Partially Met Y = Performance Standard is Met

Appendix B - CAC and TAC meeting minutes related to fish and wildlife objectives and goals

Appendix B.1. Long-term protection of natural areas goal and objective

From 3/20/2014 CAC meeting minutes:

City Zoning Ordinance Review: provided by Jon Sbar
Uvaas requested Sbar to attend the March CAC meeting so the CAC could learn more about city zoning ordinances and how zoning may assist with meeting the fish and wildlife plan's protection objective. Zoning is how the city plans short and long term land usage. Sbar specifically discussed park district (P1) including; permitted uses, conditional uses, and other restrictions (see Sbar Handout). Boom Island, the South Channel's southern shoreline, and wetlands surrounding Menekaunee Harbor are the city properties in question. Each of these areas is currently zoned P1.

Sbar did not feel that development pressure was significant on any of the undeveloped properties in question. He did clarify that portions of the Menekaunee Harbor area are not zoned P1, and may require a zoning change to be used as a public boat launch. The eastern wetland areas are zoned P1, and no changes are proposed. Discussion occasionally arises to change Boom Island to the Historic Preservation District, but hasn't been seriously pursued.

Sbar explained that all zoning changes are made by vote of the Marinette Common Council. In addition, city zoning should align with the city's comprehensive plan. The comprehensive plan is being revised in 2014, and there will be an opportunity for public comment. **If the CAC has an opinion on zoning as a means to protect these areas, they're welcome to provide comment at that time.**

From 4/17/2014 CAC meeting minutes:

Follow up on Habitat Protection – Uvaas
As a follow up from the March CAC meeting, Uvaas reported that he had contacted the City of Marinette to discuss opportunities for the CAC to provide formal comments on the city's Comprehensive Plan. Jon Sbar, City of Marinette Attorney, informed Uvaas that the comprehensive plan had been reviewed in 2009, and would not be reviewed again in the near future. Sbar was then asked to identify another means for the CAC to provide formal comments regarding city zoning and the protection of natural areas in the AOC.

West and Erickson suggested the CAC draft a letter to the Marinette City Council to formalize the CAC's support of zoning ordinances as a means to protect natural areas and meet delisting targets. Attending members of the CAC agreed, and Baker, West, and Erickson volunteered to draft the letter. Specific natural areas were then discussed:

- Menekaunee Harbor – Northern half should be rezoned P1 Park if it is acquired by the city. Other parts of the Harbor including the Lake Michigan Shoreline should remain in P1 Park zoning.
- The city owned southern shore of the South Channel should be considered for re-zoning to C1 conservation district.
- Boom Island should also be considered for re-zoning to C1 conservation district.

Baker asked if a similar letter should be sent to the Menominee City Council. Uvaas stated that there are no identified habitat restoration projects in Menominee, MI that to require protection for delisting, although the CAC could seek protections if they choose to. Erickson noted that zoning is very political in Menominee. A number of areas in Menominee, MI were then discussed that could be protected as habitat. Erickson will look into Menominee's Comprehensive Plan review as an opportunity for CAC input.

From 5/15/2014 CAC meeting minutes:

Follow up on Habitat Protection

- ACOE is helping to provide cost estimates for Island Rookery Habitat Enhancement Project using guidance provided by TAC
- Ben - Zoning protections might be helpful for Boom, South Shore of South Channel, and Menekaunee Harbor
    - Send Marinette letters from CAC asking to maintain or enhance current zoning protections to Mayor, City, Planning Commission, and City Engineer (Brian Miller)
    - Ask to be notified of proposed zoning changes impacting these areas
    - Discuss other site protections at future meeting

From 8/21/2014 CAC meeting minutes:

Identify Future Agenda Items and Meeting Date

- Next meeting proposed for September 18, 2014—keep this date
- Identify Agenda Topics
    - Habitat protection
        - Letter to Marinette City Council in support of zoning ordinances as a means to protect natural areas (see March and April CAC meeting minutes)
        - Concerns about City of Marinette long-term plan for Menekaunee Harbor and South Channel area
        - Keith—Maybe have Brian Miller come to CAC meeting and talk about city plans
        - Others agreed—Need to look at plans first to see what areas need protected
        - Mark—Need to encourage municipalities to keep natural areas/corridors and newly restored habitat areas protected via planning and zoning
        - **Cheryl will contact Brian to see if he or someone else from City can come talk to CAC about their plans**

From 9/18/2014 CAC meeting minutes:

City planning, zoning, and habitat protection – Brian Miller and Jon Sbar (City of Marinette)

- Shared City zoning map and map from City 2020 Comprehensive Plan
- Handed out excerpts from City Zoning Ordinance and Comprehensive Plan
- Discussed four "lines of defense" for habitat protection

1. Wetlands protected by WDNR regulations
2. City Zoning—P-1 Park District and C-1 Conservancy District limit uses
3. Waterfront Overlay Zoning Districts limit uses
4. City Comprehensive Plan—vision for next 20 years (2004-2024)

- 2010 law—To amend zoning, must be consistent with Comprehensive Plan
- City Council can amend Comprehensive Plan, however
- Never 100% guaranteed protection; need to trust elected officials
- They know that people want to protect these areas
- Should the CAC write letter to the city in support of protection?
  - Couldn't hurt to go on record
  - Group agrees it would be good idea
  - Address letter to zoning commission
  - Discuss at next CAC meeting (see "Identify Future Agenda Items" below)
- Question—Can road along South Channel for Tyco dredging project be turned into trail?
  - No—Permit says it must come out after completion of project
  - Area will return to wetland
  - Could put in elevated boardwalk, but that's expensive
  - Tyco plans to donate gravel to City
- Question—What are plans for Jozaitis property?
  - City is in process of purchasing
  - Plan to tear down building, put in pavilion, fishing piers
  - Future work is not yet funded–will apply for grants
  - Group interested in Menekaunee Harbor concept plan/rendering—**Laurel will send out to CAC**

Identify Future Agenda Items and Meeting Date

- Next meeting proposed for October 16, 2014—keep this date
- Identify Agenda Topics
  - CAC letter to Marinette City Council supporting zoning ordinances as a means to protect natural areas
  - AOC planning and BUI summary

From 10/16/2014 CAC meeting minutes:

CAC letter to Marinette City Zoning Commission – Keith West (CAC Co-Chair)

- Shared draft CAC letter supporting zoning ordinances as a means to protect natural areas
- Members approved letter
- Discussion about to whom to send the letter—Planning Commission, City Council, Mayor
- Discussion about sending a similar letter to the City of Menominee—group approved that idea
- **Laurel will send Keith's and Mark's signature blocks to Keith**

- **Keith will print and send City of Marinette letters**
- **Mark will work on draft City of Menominee letter, for discussion at next CAC meeting**

Identify Future Agenda Items and Meeting Date

- Next meeting would be November 20, but Laurel will be at Audubon Society meeting
    - Alternate date—**December 4th**
    - Identify Agenda Topics
        - eBird data discussion—Ben will present
        - Letter to City of Menominee
        - Trygve—will look at funding options for South Channel south shore work (boardwalk, etc.)

From 12/4/2014 CAC meeting minutes:

CAC letter to Menominee City Zoning Commission – Mark Erickson (CAC Co-Chair)

- CAC discussed sending letter to City of Menominee supporting zoning ordinances as a means to protect natural areas (similar to letter to City of Marinette)
- Mark—City Planning Commission is currently busy with other issues; best to wait a while so the letter doesn't get lost
- **Mark and Keith will write and send City of Menominee letter**

From 1/22/2015 CAC meeting minutes:

CAC letter to Menominee City Zoning Commission – Mark Erickson (CAC Co-Chair)

- CAC will send letter to City of Menominee supporting zoning ordinances as a means to protect natural areas (similar to letter to City of Marinette)
- Mark has written the letter, but is waiting for a good time to send it—City Planning Commission is currently busy with other issues

From 2/19/2015 CAC meeting minutes:

CAC letter to Menominee City Planning Commission – Mark Erickson

- CAC will send letter to City of Menominee supporting zoning ordinances as a means to protect natural areas (similar to letter to City of Marinette)
- Mark spoke with Tom Lesperance, City Code Enforcement Officer, who has agreed to pass the letter on to Kim Coggins on the Planning Commission
- Mark will work with Keith to complete and sign the letter and send it to Tom

From 3/19/2015 CAC meeting minutes:

CAC letter to Menominee City Planning Commission – Mark Erickson

- Mark reported he had spoken to the appropriate people and they knew it is coming

From 4/15/2015 CAC meeting minutes:

CAC letter to Menominee City Planning Commission – Mark Erickson

- A section of property was never plotted and hasn't been claimed (it falls in the 100 year flood plain)
- Can't be zoned because it is not on the books
- Old map shows it was a major flowage
- Letter should state that if this ever becomes a viable piece of property we'd like to see in preserved
- Sharon would also like to see letter sent to the State of Michigan

From 5/14/2015 TAC meeting minutes:

Habitat protection letter discussion (Laurel Last and Sharon Baker, MDEQ)

- CAC sent letter to City of Marinette in November to express support for the use of City planning and zoning to protect natural areas in the AOC
- Does the TAC want to do the same?
- Refer to GOAT (Table 1) from 2013 Fish & Wildlife Plan
- **TAC members present decided that CAC letter is good enough—will not send equivalent letter from TAC**

From 6/17/2015 TAC meeting minutes:

Natural areas protection goal – Laurel Last (WDNR)

- Refer to Laurel's May 29th e-mail (forwarded from Jon Sbar, City Attorney)
- City responded to CAC letter by making zoning and planning changes they requested in AOC habitat restoration areas (Boom Island, South Channel, Menekaunee Harbor)
- Blueberry Islands and Strawberry Island are protected through Eagle Creek Renewable Energy's FERC license and Bureau of Land Management, respectively
- Refer to Fish and Wildlife Plan Goals and Objectives table
- Does TAC agree that this action fulfills the natural areas protection goal?
- **TAC members present voted unanimously that the natural areas protection objective and goal have been met**
- **Will confirm with CAC at the July meeting**
- Wendel—Will Green Island development impact Seagull Bar?
- Laurel will check on status of Green Island project

From 7/16/2015 CAC meeting minutes:

Natural Areas Protection Goal-Laurel Last (WDNR)

- Refer to Laurel's May 29th e-mail (forwarded from Jon Sbar, City Attorney)
- City responded to CAC letter by making zoning and planning changes they requested in AOC habitat restoration areas (Boom Island, South Channel, Menekaunee Harbor)
- Refer to Fish and Wildlife Plan Goals and Objectives Table
- TAC agreed that this action fulfills the natural areas protection goal
- Moved by Trygve Rhude that members agree with TAC that this fulfills the goal, second by Keith West. Motion carried.

Appendix B.2. Rookery monitoring objective

From 3/03/2014 TAC meeting minutes:

eBird Database and the AOC (Ben Uvaas, WDNR)
Uvaas provided an overview of the work he and Fayram have completed using the eBird.org database to assess avian diversity and abundance in the AOC. See *eBird* handout for additional details. The TAC provided Uvaas with the following recommendations:

- Green Island is part of the AOC, but wasn't included in the analysis. Please provide an explanation and clarify this in future presentations.
- Consider comparisons between best data points within each survey area, or between data points within the same survey area
- Develop graphs or charts to depict species dominance
- Consider separating each year's data to investigate trending

In general the TAC was supportive of the eBird work, although as Halfmann noted, related objectives of the Fish and Wildlife Plan are focused on monitoring rookery activity specifically. Uvaas will follow up with these recommendations and present them at a future TAC meeting.

From 10/15/2014 TAC meeting minutes:

Review of eBird report and discussion (Ben Uvaas, WDNR)

- Follow-up from March 2014 TAC meeting
- Ben presented his and Andy Fayram's work: Utilizing the eBird Database to assess Avian Diversity and Abundance in the AOC
- Paper almost done, not published yet
- Compared Menominee River AOC eBird data with Oconto and Suamico
- Did not include Green Island, since it's not public and has no eBird data
- Menominee River AOC had lower abundance, diversity, richness, evenness
- Therefore, restoration/enhancement activities in RAP are warranted
- Question for TAC: Does this activity meet the F&W Plan rookery monitoring objective?
- Mark—Should we show improvement in the AOC?
- Ben—Not the purpose of this project or the objective—more for information and education, documenting what's there
- OK to repeat this work again in future, but not necessary for BUI removal
- **After discussion, TAC agreed to use the eBird work to fulfill the F&W rookery monitoring objective**
- **Ben will present the data for discussion at a CAC meeting for their discussion and concurrence**

From 12/4/2014 CAC meeting minutes:

Review of eBird report and discussion – Ben Uvaas (WDNR)

- Ben shared presentation on "Utilizing the eBird Database to assess Avian Diversity and Abundance in the AOC"
- **Laurel will send out PowerPoint slides (pdf) with meeting minutes**

- TAC has decided that this activity meets the Fish & Wildlife Plan objective for bird monitoring in the AOC
- Does the CAC concur?
- Mark—Does this mean we need to do this again at a later date (show improvement)?
- Ben—Not necessarily. This is educational, it shows that we've looked at the data, it shows that the AOC is not as good as reference sites (justifies the habitat work)
- **After discussion, CAC members agree that this activity meets the F&W Plan objective**

Appendix B.3. Mussel recruitment objective

From 9/17/2013 TAC meeting minutes:

A discussion regarding the status of the objective worded "There is evidence of recruitment within the AOC for native mussel species", resulted in the TAC deciding not to consider the objective achieved at this time. The qualitative 2011 mussel survey found juvenile (<4yrs old) mussels of five native species in the AOC. However, sediment remediation and other actions are expected to further improve mussel recruitment.

From 10/15/2014 TAC meeting minutes:

Mussel monitoring discussion (Laurel Last, WDNR)

- Follow-up from September 2013 TAC meeting
- Qualitative 2011 mussel survey found juvenile (<4 yrs old) mussels of five native species in the AOC
- In 2013, TAC decided not to consider F&W mussel objective met, because sediment remediation and other actions are expected to further improve mussel recruitment
- Laurel—Need to decide whether additional mussel monitoring will be needed after management actions are complete to confirm that the objective has been met
- Mark—Can we consider the objective met once all remediation is complete?
- Steve—South Channel might require more than just sediment remediation to be good for mussels, due to low flow (bridge restriction)
- Cheryl—South Channel was always a deposition zone, and will never be great habitat for mussels
- Laurel—Does the objective need to be met in all sections of the AOC?
- Vic—We're considering degraded benthos BUI for removal once all sediment remediation complete (no monitoring needed)—Shouldn't mussels be the same?
- Mike Donofrio—Should ask mussel expert (Randy Piette) how long we would need to wait after remediation is complete to repeat study in order to see a response
- Mike D—Consider Randy's response, reread the 2011 report conclusions, then make final decision
- **Group agreed to delay final decision on need for follow-up mussel monitoring—Ben will talk to Randy and Laurel will send out 2011 mussel report to group**

From 5/14/2015 TAC meeting minutes:

Mussel monitoring discussion (Laurel Last, WDNR)

- Follow-up from October 2014 TAC meeting
- Qualitative 2011 mussel survey found juvenile (<4 yrs old) mussels of five native species in the AOC
- Question: Does this fulfill mussel recruitment objective in AOC, or do we need to monitor again after remediation?

    - Refer to GOAT (Table 1) from 2013 Fish & Wildlife Plan

- Main reason to monitor would be to find mussels in South Channel
- Randy Piette said would need to wait at least 3 to 5 years after remediation to be able to detect/identify new mussels
- Even after remediation, South Channel may not have suitable mussel habitat
- Do mussels need to be present in all areas of AOC?
- If we are assuming recovery after remediation for Degraded Benthos BUI removal, can we do the same for mussels?
- Habitat managers assume that if you build the habitat, they will come, caveat that habitat in the Menominee would not be specific for mussels
- Tammie—If we would survey and find no mussels in South Channel, would we do additional work there? Answer—No
- **TAC members present voted unanimously that additional mussel surveys are not needed in the AOC before removing Fish and Wildlife BUIs**

From 5/21/2015 CAC meeting minutes:

Mussel Monitoring in the AOC- Laurel & Sharon

- Qualitative 2011 mussel survey found juvenile (<4yrs old) mussels of five native species in the AOC
- The question is-Does this mussel survey fulfill the objective for mussels in AOC, or do we need to monitor again after remediation?
- Main reason to monitor would be to find mussels in South Channel
- WDNR mussel expert said we would need to wait at least 3-5 years after remediation to be able to detect/identify new mussels
- MDEQ pointed out that a general resources manager's assumption is that "if you build the habitat, they will come" with the caveat if the habitat meets that specific organism's requirements
- TAC decided on May 14th that additional monitoring is not required for BUI removal
- Moved by Keith West to accept the TAC decision, second by Trygve Rhude. Motion carried.

Appendix C – Lower Menominee River AOC CAC Letter Supporting BUI Removal, June 8, 2018.

Lower Menominee River Area of Concern Citizens Advisory Committee

The Lower Menominee River: A Great Lakes Area of Concern

June 08, 2018

Cheryl Bougie
Sediment & WQ Monitoring Coordinator
Wisconsin Department of Natural Resources
2984 Shawano Avenue
Green Bay, Wisconsin 54313

Stephanie Swart
Lower Menominee River AOC Coordinator
Michigan Department of Natural Resources
Constitution Hall 6FS
525 West Allegan Street
PO Box 30473
Lansing, Michigan 48909

Subject: Support for the Lower Menominee River AOC *Degradation of Fish and Wildlife Populations BUI* and *Loss of Fish and Wildlife Habitat BUI* Removal

Dear Ms. Bougie and Ms. Swart:

The Lower Menominee River Area of Concern (AOC) Citizens Advisory Committee (CAC) supports the efforts of the Wisconsin Department of Natural Resources (WDNR) and the Michigan Department of Natural Resources (MDNR) to remove *Degradation of Fish and Wildlife Populations* and *Loss of Fish and Wildlife Habitat* Impairments (BUIs) from the Lower Menominee River AOC.

Over the years, the CAC has partnered with local, state, and federal agencies, businesses, and volunteers to clean up toxic sediments and other contamination issues in the AOC. It has also worked closely with various stakeholders to educate the public on the decline of local fish and wildlife habitats and the critical need for such habitat as part of a healthy aquatic environment.

Signage that details the efforts taken within the AOC to revive fish and wildlife habitat has been posted at prominent locations such as Menekaunee Harbor and near the Sixth Street boat launch. Recently completed projects in the AOC to remove extremely large volumes of contaminated sediments are expected to reduce the introduction of such contaminants into the food webs occupied by most game and commercial fish and enhance the region as a breeding ground and healthy habitat for numerous species.

The CAC believes that these actions along with the dedication of the WDNR, the MDNR, the USEPA and other partners to continuing to improve the quality of fish and wildlife habitat within the Lake Michigan basin clearly merits the removal of this *Degradation of Fish and Wildlife Populations* and *Loss of Fish and Wildlife Habitat* BUIs.

Thank you for your time and consideration.

Respectfully Submitted,

Keith West
CAC Co-Chair
keith.west@uwc.edu

Trygve Rhude
CAC Co-Chair
rhude@newnr.com

Appendix D – Lower Menominee River AOC TAC May 21, 2018 and CAC May 24, 2018 meeting announcements, agendas, and minutes.

Lower Menominee River Area of Concern
Technical Advisory Committee Meeting Agenda
Monday, May 21, 2018
1:00 – 3:00 pm CST
WDNR Service Center
101 N Ogden Rd, Peshtigo, WI

Dial-in Audio Number: 1-(855)-947-8255 or 1-(630)-424-2356 Access Code: 9205-440#

Meeting Objectives

- TAC members discuss and provide input on the draft Fish and Wildlife Populations and Habitat BUI removal document
- TAC members decide whether to support moving forward with BUI removal process
- TAC members are updated on the status of the Restrictions on Fish Consumption BUI

Agenda

1:00 Introductions and review of the agenda

1:10 "Restrictions on Fish Consumption" BUI – Cheryl Bougie (WDNR) and Stephanie Swart (MDNR)

- Status and proposed schedule
- Public Comment Period April 26 – May 18th
- Incorporate Comments
- Submit to EPA Concurrence – June

1:15 **"Degradation of Fish and Wildlife Populations" and "Loss of Fish and Wildlife Habitat" BUIs – Cheryl Bougie and Stephanie Swart**

- **Overview of draft document**
- **Proposed schedule**
- **TAC members discuss and provide input, Comments Due June 29th via email**
- **TAC decides whether to approve moving forward with review process**
- **CAC will also review, provide comments and approve moving forward with review process**
- **Incorporate comments from EPA,TAC & CAC - July**
- **Public comment period – July/August**
- **EPA Concurrence – August**


F&W PopsHab BUI.pdf

2:15 Agency Updates – Cheryl Bougie (WDNR) and Stephanie Swart (MDNR)

- AOC signs – Completed and ready for installation
- South Channel video
- 2018 AOC Conference, Sheboygan, WI, May 16-17 – Vic
- WDNR AOC Coordinator position update – Vic

2:30 Public Comment, Other News or Events

2:50 Future Agenda Items and Next Meeting Date

- No meeting anticipated for June
- E-mail updates on BUI Documents & Status
- Next meeting in July to discuss final F&W BUIs document prior to Public Comment Period

3:00 Adjourn

CONTACT INFORMATION

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Stephanie Swart, Michigan DNR
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John Perrecone, EPA Area of Concern Task Force Leader
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312-353-1149

ONLINE RESOURCES

EPA – (The link provided was broken and has been removed)

MDNR – https://www.michigan.gov/dnr

WDNR – https://dnr.wisconsin.gov/topic/GreatLakes/Menominee.html

CAC – https://www.facebook.com/menomineeriveraoc, *(The link provided was broken and has been removed)*

2017 RAP Update for public review

(The link provided was broken and has been removed)

2013 F&W Plan

(The link provided was broken and has been removed)

Lower Menominee River Area of Concern
Technical Advisory Committee Meeting
Monday, May 21, 2018
1:00 – 3:00 pm CST
WDNR Service Center
101 N Ogden Rd, Peshtigo, WI
Meeting minutes prepared by Cheryl Bougie, WDNR

Dial-in Audio Number: 1-(855)-947-8255 or 1-(630)-424-2356 Access Code: 9205-440#

Meeting Objectives

- TAC members discuss and provide input on the draft Fish and Wildlife Populations and Habitat BUI removal document
- TAC members decide whether to support moving forward with BUI removal process
- TAC members are updated on the status of the Restrictions on Fish Consumption BUI

Agenda

1:00 Introductions and review of the agenda

1:10 "Restrictions on Fish Consumption" BUI – Cheryl Bougie (WDNR) and Stephanie Swart (MDNR)

- Status and proposed schedule
- Public Comment Period April 26 – May 18th
- No comments or inquires received by WDNR or MDNR
- Submitted to EPA Concurrence – June 4, 2018
- This makes the 78 BUI removal across the Great Lakes this year!

1:15 **"Degradation of Fish and Wildlife Populations" and "Loss of Fish and Wildlife Habitat" BUIs – Cheryl Bougie and Stephanie Swart**

- **Overview of draft document**
- **Proposed schedule**
- **TAC members discuss and provide input, Comments Due June 29th via email**
- **TAC decides whether to approve moving forward with BUI review & removal process:**
  - **Table 2. shows review of existing data, field studies, habitat restoration and monitoring. A great deal of work was accomplished in the AOC to meet the goals and objectives listed in Table 1. Great work by stakeholders!**
  - **The TAC & EPA agreed the draft BUI removal document should move forward through the review and removal process due to the completed restoration/monitoring projects and because the document meets the 2008 Delisting Targets written for this AOC.**
  - **The TAC & CAC should consider developing a list of additional projects and implementation strategy in the watershed and AOC under a separate watershed plan. The plan will identify projects to further improve fish and wildlife habitat and populations and build on the great work completed under the AOC Program.**
- **CAC will also review, provide comments and approve moving forward with review process**
- **Incorporate comments from EPA,TAC & CAC - July**
- **Public comment period – July/August**
- **EPA Concurrence – August**


F&W PopsHab BUI.pdf

2:00 Agency Updates – Cheryl Bougie (WDNR) and Stephanie Swart (MDNR)

- AOC signs – Completed and ready for installation
  - Bougie delivered 8 large signs to partners for installation on 5/21/18
  - Locations: Red Arrow Park, Menekaunee Harbor, 6th Street Boat Launch, Boom Landing, Stephenson Island, Eagle Creek Renewable Energy Menominee Dam, 5th Ave Boat Launch, Lighthouse Ann Harbor Park

- South Channel video – Under final edit, video should be available end of May.

- 2018 AOC Conference, Sheboygan, WI, May 16-17 – Vic Pappas (WDNR)
  - Well attended ~250 people
  - Great networking opportunity with other AOCs
  - Focus on Long-term O&M Plans for restoration projects
  - AOC Remediation & Restoration Projects lead to community Revitalization

- WDNR AOC Coordinator position update – Vic Pappas (WDNR)
  - The Lower Green Bay-Fox River AOC Coordinator position has been announced for recruitment. It can be found at:
    (The link provided was broken and has been removed)

2:15 Public Comment, Other News or Events

- Eagle Creek Renewable Energy Fish Passage Tour Menominee Dam – Mike Donofrio (WDNR)
  - First opportunity for public tours 150 people registered
  - Likely more tours in the future to accommodate public interest
  - MDNR & WDNR Fisheries Staff to provide info at tours

- New MDNR Tribal Liaison – Stephanie Swart (MDNR)
  - Jon Allan Director with assistance from John Riley MDNR

- CAC Planning Waterfront Cleanup event – Keith West (UW Marinette)
  - Sept 29, 2018 –Details to follow – planning underway

2:25 Future Agenda Items and Next Meeting Date

- No meeting anticipated for June
- E-mail updates on BUI Documents & Status
- Next meeting in July to discuss final F&W BUIs document prior to Public Comment Period

2:35 Adjourn

CONTACT INFORMATION

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920-662-5170

Stephanie Swart, Michigan DNR
swarts@michigan.gov
517-284-5046

John Perrecone, EPA Area of Concern Task Force Leader
Perrecone.John@epamail.epa.gov
312-353-1149

ONLINE RESOURCES
EPA – *(The link provided was broken and has been removed)*

MDNR – https://www.michigan.gov/dnr

WDNR – https://dnr.wisconsin.gov/topic/GreatLakes/Menominee.html

CAC – https://www.facebook.com/menomineeriveraoc, *(The link provided was broken and has been removed)*

2017 RAP Update for public review
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2013 F&W Plan
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L Menominee River AOC BUI Documents & Status
https://dnr.wisconsin.gov/topic/GreatLakes/Menominee.html

Menominee River Area of Concern Technical Advisory Committee

Sign-Up for More Information

Monday, May 21, 2018
1 - 3pm

NAME	ORGANIZATION	CONTACT INFORMATION e-mail address, if attending for the first time
Mike Donofrio	WDNR	
Keith West	UW-Marinette/MRCAC	
Tammie Paoli	WDNR	
John Huff	WDNR	
John Perrecone	USEPA	via phone
Leah Medley	USEPA	via phone
Vic Pappas	WDNR	via phone
Stephanie Swart	MDNR	via phone
Derek Strohl	BLM	via phone
Cheryl Bougie	WDNR	

Wisconsin Department of Natural Resources

PO Box 7921, Madison, WI 53707-7921

Phone: 1-888-936-7463

[redacted]

Monday, May 21, 2018 - Sunday, May 27, 2018

Public Hearings and Meetings

Pursuant to the Americans with Disabilities Act, reasonable accommodations, including the provision of informational material in an alternative format, will be provided for qualified individuals with disabilities upon request. Please call the contact person listed for the meeting or hearing with specific information on your request before the date of the scheduled hearing.

This meeting has been added to the DNR Hearing and Meeting Calendar for May 21-27, 2018

Meetings

May 24 – 6:30-8:30 p.m.

Lower Menominee River Area of Concern Citizens Advisory Committee

UW-Marinette Theatre/Fine Arts Building, 750 W. Bay Shore St., Theatre Conference Room (T-139), **Marinette**

Contact: Cheryl Bougie, 920-662-5170

Detailed information: The meeting will include a tour at 3:45 p.m. at Eagle Creek Renewable Energy (RSVP required) and presentations on proposed beneficial use impairment removals and the process for Lower Menominee River Area of Concern delisting.

Lower Menominee River Area of Concern
Citizens Advisory Committee Meeting Agenda
Thursday, May 24, 2018
3:45 – 5:15 p.m. CST Fish Passage Tour and 6:30 – 8:30 p.m. CST Regular Meeting
Dial-In Auto Number: 1 (855) 947-8255 or 1 (630) 424-2356 Access Code: 9205-440 #

Theatre/Fine Arts Building Conference Room (T-139) UW-Marinette
(online map: *The link provided was broken and has been removed.*)

DESIRED OUTCOMES

- Meeting attendees learn about process and schedule for remaining beneficial use impairment (BUI) removals
- Process and schedule for AOC Delisting

AGENDA

3:45 **Tour Eagle Creek Renewable Energy Fish Passage** (meet at Eagle Creek Renewable Energy – safety gear provided, wear closed-toe shoes—no flipflops or sandals) **901 26th Street, Menominee, MI.** YOU MUST COMPLETE the attached RELEASE of LIABILITY FORM and bring it with you. A brief safety orientation prior to the tour is also required.


13-01-01_LG_ECRE
SITE ACCESS VISITOR

NOTE: If you attend the fish passage tour there will be limited time to have supper. We will leave space between the tour and the meeting to grab something quick or consider bringing it to the meeting.

6:30 **UW-Marinette Theatre/Fine Arts Building Conf Rm T-139.** Introductions, Overview of Agenda, Review of Minutes – Keith West, CAC Chair and Trygve Rhude, CAC Vice Chair

6:40 Process for AOC delisting – John Perrecone (USEPA)
- Share process and schedule for AOC Delisting
- Plan for next steps, partner input, CAC role & logistics
- Discussion and questions

7:10 Status of "Restrictions on Fish and Wildlife Consumption" BUI removal document – Cheryl Bougie (WDNR) and Stephanie Swart (MDNR)
- Public comment April 26 – May 18
- Incorporate Comments - June
- Submit to EPA Concurrence - July

Status of "Degradation of Fish and Wildlife Populations" and "Loss of Fish and Wildlife Habitat" BUIs – Cheryl Bougie and Stephanie Swart
- **Overview of draft document**
- **Proposed schedule**
- **TAC members discuss and provide input, Comments Due June 29th via email**
- **CAC will also review, provide comments and approve moving forward with review process**
- **Incorporate comments from EPA, TAC & CAC – July**
- **Public comment period – July/August**

- **CAC Letter of Support for BUI removal – August**
- **EPA Concurrence - August**

7:40 Master Students U of M CAC/PAC relationships with Federal/State Partners - Stephanie Swart
- Student (Allison) attend July meeting & interview CAC members

7:50 Mark Erickson Memorial – Keith West

8:00 2018 Great Lakes AOC Conference Sheboygan WI – Keith West

8:15 Island Habitat – Seeking Partners – Kris Erickson Ecology & Environment, Inc

8:25 Future Agenda Items and Next Meeting Date
- Usually take June off – Need to meet? If yes, June 21
- Next Meeting Thursday, July 19 move meeting times back to 6 pm?
- Plan September 29th Waterfront Cleanup Event
- Update on BUIs Status
- Prepare/Sign approval letter from CAC for the FW Populations & Habitat BUI

8:30 Adjourn

CONTACT INFORMATION

Keith West, CAC Chair
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715-735-4300 x4352

Trygve Rhude, CAC Vice Chair
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Stephanie Swart, Michigan DNR
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John Perrecone, EPA Area of Concern Task Force Leader
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2017 RAP Update

(The link provided was broken and has been removed)

2013 F&W Plan

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Lower Menominee River Area of Concern
Citizens Advisory Committee Meeting Minutes

Thursday, May 24, 2018
3:45 – 5:15 p.m. CST Fish Passage Tour and 6:30 – 8:30 p.m. CST Regular Meeting
Dial-In Auto Number: 1 (855) 947-8255 or 1 (630) 424-2356 Access Code: 9205-440 #
Meeting Minutes Prepared by Cheryl Bougie, WDNR

Theatre/Fine Arts Building Conference Room (T-139) UW-Marinette
(online map: *The link provided was broken and has been removed.*)

DESIRED OUTCOMES

- Meeting attendees learn about process and schedule for remaining beneficial use impairment (BUI) removals
- Process and schedule for AOC Delisting

AGENDA

3:45 **Tour Eagle Creek Renewable Energy Fish Passage – 901 26th Street, Menominee, MI.**

Thank you to Paul Radzikinas Eagle Creek Renewable Energies, Mike Donofrio – WDNR and Darren Kramer, MDNR for being great tour guides and the excellent presentations to the CAC Members and our guests from USEPA!

6:30 **UW-Marinette Theatre/Fine Arts Building Conf. Rm T-139.** Introductions, Overview of Agenda, Review of Minutes – Keith West, CAC Chair and Trygve Rhude, CAC Vice Chair

6:40 Process for AOC delisting – John Perrecone (USEPA-GLNPO)

- Introduction of Leah Medley who will be covering LMR when John retires
  - Shared delisting steps/process, provided & explained Great Lakes Water Quality Agreement Annex 1 Areas of Concern
  - 6 to 9-month schedule for AOC Delisting, it could take longer as it is necessary to make sure all steps are completed
  - All BUIs must be removed prior to delisting, but the document can be started
  - LMR AOC will be the 5th of 31 AOCs to be delisted.
  - States (usually lead) or USEPA develops Generate Preliminary Delisting Document
  - Tribal Consultation important step in delisting process
    - 3 tribes: Menominee Indian Tribe, Little Traverse Bay of Odawa Indians, Hannahville Indian Community have been contacted by USEPA for the BUI removal steps and introduction to the delisting process/tribal consultation
    - State Tribal Liaisons: Shelly Allness, WDNR & Jon Allan, MDNR
    - CAC offered to take program out to the tribes to ensure tribal consultation is achieved
    - Tribes do not formally sign off on Final Delisting Documents
  - Gather comments all interested stakeholders, address and incorporate
  - Generate Draft Final Delisting Report
  - Gather comments all interested stakeholders, address and incorporate
  - Plan for next steps, partner input, CAC will provide a Letter of Support
  - Generate Final Delisting Report
  - USEPA submits Final Delisting Report to U.S. Department of State for delisting process
  - USEPA acknowledges delisting via letter to the states and IJC
  - AOC Coordinators finalize Formal File Record for AOC

- Stakeholders Celebrate Delisting!

7:10 Status of "Restrictions on Fish and Wildlife Consumption" BUI removal document – Cheryl Bougie (WDNR) and Stephanie Swart (MDNR)
- Public comment April 26 – May 18
- No comments or inquiries received by WDNR or MDNR
- Submit to EPA Concurrence – letters in *DRAFT* form - Submit to EPA last week of May.
- This makes the **78** BUI removal across the Great Lakes this year!

7:20 **Status of "Degradation of Fish and Wildlife Populations" and "Loss of Fish and Wildlife Habitat" BUIs – Cheryl Bougie and Stephanie Swart**
- **Overview of draft document-combine two BUIs into one document**
- **BUI Removal Criteria – Goals & Objectives and Activities needed to remove BUIs**
- **Proposed BUI removal schedule**
- **TAC members discuss and provide input, Comments Due June 29th via email**
- **CAC agreed to support moving forward with BUI review & removal process**
- **Incorporate comments from EPA, TAC & CAC – July**
- **Public comment period – July/August**
- **CAC Letter of Support for BUI removal – July/August**
- **EPA Concurrence – August**
- **Last 2 BUIs! Thanks to all the CAC and project partners for all the great work and support over the years!**

7:40 Master Students University of MI School of Sustainability & Environment CAC/PAC relationships with Federal/State Partners - Stephanie Swart
- 2 Projects: Masters Project and Masters Thesis
- Allison Voglesong-Zejnati will be attending the July 19th CAC meeting. She will be in the Menominee/Marinette area to conduct interviews during that week. Stephanie will send an email to CAC members for introduction to Allison.
- Juliana Lisuk, Ben Pollins, and Collin Knauss will be in the Menominee/Marinette area to interview CAC members June 21-22. Stephanie will send a separate email with a letter from the masters project students as introduction to the CAC.

7:50 Mark Erickson Memorial – Keith West
- Looking for locations for Mark's memorial
- Made a connection with MI Parks – potential site at Lighthouse Ann Harbor Park, Menominee, MI

8:00 2018 Great Lakes AOC Conference Sheboygan WI – Keith West
- Great Networking, build partnerships with others finding creative solutions to BUI issues
- Expectation of Long-Term O&M of projects was highlighted—ideas to continue great work
- Write O & M plans with 10-year review & adapt to changing conditions
- Recommend other CAC members attend—re-energized!
- Funding available for CAC members to attend
- Next Conference 2019 Cleveland, OH

8:15 Island Habitat Seeking Partners – Kris Erickson & Paul Fuhrmann Ecology & Environment, Inc
- 4 Islands: Big & Little Blueberry, Boom and Strawberry Habitat Restoration
- 4-yr invasive species project concluding in 2018

- Looking for stewardship leaders & partners to facilitate & protect the Islands long-term - invasive species control to protect habitat investment
- Talking with a variety of local interested stakeholders this week (May 21-24)
- Looking for additional ideas and stakeholders
- Develop O & M Manual, Training/Tours, Access Agreements, Grant Opportunities, Events
- Develop information for Websites, You-Tube Videos
- Form a stewardship coalition to monitor and enhance the initial habitat restoration efforts
- Potential partners: TNC, Greg Cleereman-Marinette Co Soil & Water Conservation & TOAD Program, Eagle Creek Renewable Energies, Wild River Invasive Species Coalition, 4-H, Boy & Girl Scouts, UW Marinette, City of Menominee (City Development), City of Marinette, Bur Land Mgmt (Strawberry Island)
- Anne Pearce Education & Outreach Specialist with WI Extension out of Madison WI and Invasive Plants Association of Wisconsin IPAW can assist with outreach activities. https://ipaw.org/ or https://fyi.uwex.edu/wifdn/who-we-are/

  Anne Pearce
  Wisconsin First Detector Network Coordinator
  608.262.9570
  http://fyi.uwex.edu/wifdn/

8:45 Future Agenda Items and Next Meeting Date

- **No June Meeting – due to CAC member availability**
- Next Meeting Thursday, **July 19** move meeting time back to **6 pm**
- Plan September 29th Waterfront Cleanup Event
- Update on BUIs Status
- Prepare/Sign Letter of Support from CAC for the FW Populations & Habitat BUI Removal

8:50 pm Adjourn

CONTACT INFORMATION

Keith West, CAC Chair
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Trygve Rhude, CAC Vice Chair
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Cheryl Bougie, Wisconsin DNR
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Stephanie Swart, Michigan DNR
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L Menominee River AOC BUI Documents & Status

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Menominee River Area of Concern Citizen's Advisory Committee

Sign-Up for More Information Thursday, May 24, 2018

NAME	ORGANIZATION	CONTACT INFORMATION e-mail address, if attending for the first time
Cheryl Bougie	WDNR	Cheryl.bougie@Wisconsin.gov
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Vic PAPPAS	WDNR	Victor.PAPPAS@WI.GOV
JIM Cox	Tyco	jamesCOX@jci.com
Trygve Rhude	Audubon	
John Clark	MPM & LSF	
Gail Clark	" "	
Keith West	UW Marinette	
Steve Galarneau	WDNR	phone
Stephanie Swant	WDNR	phone
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PAUL FUHRMANN	" "	PFUHRMANN@ENE.COM