STAGE 2 REMEDIAL ACTION PLAN

for the

LOWER MENOMINEE RIVER AREA OF CONCERN

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Wisconsin Department of Natural Resources
Office of the Great Lakes

Michigan Department of Environmental Quality
Office of the Great Lakes

Stage 2 Remedial Action Plan
for the
Lower Menominee River Area of Concern

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Cover Photo:
A family enjoys the beach at Red Arrow Park, courtesy WDNR.

Disclaimer
The Great Lakes Water Quality Agreement (GLWQA) 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 as needed to meet beneficial use impairment (BUI) delisting targets are not subject to enforcement or regulatory actions.

The actions identified in this Stage 2 RAP do not constitute a list of preapproved projects, nor is it a list of projects simply related to BUIs or generally to improve the environment. Actions identified in this document are directly related to removing a BUI and are needed to delist the AOC.

Acknowledgments
We, the Wisconsin Department of Natural Resources and the Michigan Department of Environmental Quality, would like to acknowledge the many contributions of members of the Lower Menominee River Area of Concern (AOC) Citizen's Advisory Committee (CAC) and Technical Advisory Committee (TAC) in the development of this Stage 2 Remedial Action Plan (RAP), development of the Fish and Wildlife Population and Habitat Management Plan, previous RAPs, and development of public outreach materials and activities. CAC and TAC collaboration with state and federal agencies has resulted in materials and activities which reflect local issues and concerns.

EXECUTIVE SUMMARY

Six of the potential fourteen beneficial use impairments (BUIs) were identified in the Lower Menominee River when it was designated an Area of Concern (AOC). Most of the impairments are influenced by the presence of contaminated sediment (Table 2). Arsenic, paint sludge, and coal tar, have been identified as the three most significant contaminants, although other more minor sediment contaminants exist. Log driving, urbanization, invasive species, habitat fragmentation, and stormwater discharges also contribute to the impairments.

Much progress has been made toward restoring the Lower Menominee River AOC, but significant work remains. Paint sludge remediation was completed in 1995 by the Lloyd Flanders Furniture Company through Michigan Act 307 authority (RAP, 1996). Negotiations between regulatory agencies and parties found responsible for the remediation of the Ansul arsenic and Wisconsin Public Service Corporation (WPSC) coal tars contaminated sediment sites are underway. State and local agencies continue work to identify sources of contaminants causing the “restriction on fish consumption” BUI. To remove all impairments, activities beyond the remediation of contaminated sediment sites are also required. State agencies working with the Citizen’s and Technical Advisory Committees have drafted the *Fish and Wildlife Population and Habitat Management and Restoration Plan*. This plan is the principal document needed to guide the removal of the “degradation of fish and wildlife populations” and “loss of fish and wildlife habitat” impairments. Lastly, significant upgrades to the City of Marinette’s and City of Menominee’s wastewater treatment plants have resulted in removal of the “restrictions on recreational contact” impairment, leaving only five remaining impairments to be addressed.

The Wisconsin Department of Natural Resources and the Michigan Department of Environmental Quality share oversight of the Lower Menominee River AOC. The 1990 Lower Menominee River Remedial Action Plan (RAP) and the 1996 Lower Menominee River RAP Update describe the historical activities that led to AOC designation, identify the BUIs for the AOC, summarize the status of those impairments, and offer recommendations for meeting environmental cleanup goals. Wisconsin and Michigan will use the Stage 2 RAP as the primary tool needed to remove BUIs and delist the AOC. The Stage 2 RAP documents progress made since the 1996 RAP update, the current status of each BUI, and activities needed to remove all BUIs. This document will be updated as needed to effectively communicate progress to the public as well as local, state and federal agencies.

In 2012, AOC activities will focus on finalizing the *Fish and Wildlife Population and Habitat Management and Restoration Plan*; exploring opportunities to implement projects identified in the plan; reviewing the results of relevant environmental studies (Table 3) and assessing any implications for the AOC; and, continuing to engage citizens and technical stakeholders in AOC activities through the Citizen’s Advisory Committee (CAC) and the Technical Advisory Committee (TAC).

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List of Acronyms

AOC	Area of Concern
BUI	Beneficial Use Impairment
CAC	Citizen's Advisory Committee
CSO	Combined Sewer Overflow
FERC	Federal Energy Regulatory Commission
GLNPO	Great Lakes National Program Office
GLRI	Great Lakes Restoration Initiative
GLWQA	Great Lakes Water Quality Agreement
LaMP	Lakewide Management Plan
MDCH	Michigan Department of Community Health
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
NAH	North American Hydro
NOAA	National Oceanic and Atmospheric Administration
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
ppm	Parts per million
RAP	Remedial Action Plan
SPMD	Semi-permeable membrane device
TAC	Technical Advisory Committee
USACE	U.S. Army Corps of Engineers
USEPA	U. S. Environmental Protection Agency
USGS	U.S. Geological Survey
WDHS	Wisconsin Department of Health Services
WDNR	Wisconsin Department of Natural Resources
WPSC	Wisconsin Public Service Corporation

DEFINITIONS

Acceptable Species List- Selected from species found to be dominant in at least one natural area surveyed during the riparian vegetation survey in 2011. Acceptable species include all native and several naturalized species. Several species found on this list are considered only moderately beneficial to the ecosystem; therefore this list is titled “acceptable” instead of “desirable”.

Area of Concern (AOC)- Defined by Annex 2 of the 1987 Protocol to the U.S.-Canada Great Lakes Water Quality Agreement (GLWQA) as “geographic areas that fail to meet the general or specific objectives of the Agreement where such failure has caused or is likely to cause impairment of beneficial use of the area’s ability to support aquatic life.” These areas are the “most contaminated” areas of the Great Lakes, and the goal 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: http://www.ijc.org/rel/agree/quality.html

Beneficial Use Impairment (BUI)- Beneficial uses are ways that a water body can improve the quality of life for people or support life for fish and wildlife. For example, supplying drinking water and providing habitat for fish and wildlife are both beneficial uses of a water body. If a beneficial use is suppressed or unavailable due to environmental problems, like limitations on usage or taste and odor problems with drinking water, then that beneficial use is considered impaired. The International Joint Commission provided a list of 14 possible beneficial use impairments in the 1987 Great Lakes Water Quality Agreement amendment.

Delisting Target- Specific goals and objectives established to track restoration progress of beneficial uses. Once targets have been met, the beneficial use is no longer considered impaired. Targets should be locally derived.

Goal- Goals are broad 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.”* The delisting targets for the impairments may also be considered the goal statements (in some cases they may be objectives).

Lakewide Management Plan (LaMP)- A Lakewide Management Plan, or "LaMP", is a plan of action to assess, restore, protect and monitor the ecosystem health of a Great Lake. It is used to coordinate the work of all the government, tribal, and non-government partners working to improve the Lake ecosystem. A public consultation process is used to ensure that the LaMP is addressing the public's concerns.

Natural Areas- 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 publically 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 activities that are needed in order to meet goals. Objectives are normally accomplished in less time than goals. They are important because they provide a means of measuring progress toward plan implementation. Objectives should be SMART: Specific, Measurable, Achievable, Realistic, Time-Constrained.

Polychlorinated Biphenyls (PCBs)- A group of more than 200 compounds, PCBs have been manufactured since 1929 for uses including electrical insulation, hydraulics, fluorescent lights, and carbonless paper to name a few. In 1979, PCBs were banned because of their persistence in the environment and tendency to magnify up the food chain. They have been linked to reproductive problems in wildlife and are suspected of causing developmental problems in human infants.

Polycyclic Aromatic Hydrocarbons (PAHs)- Chemicals commonly associated with oils, greases, and other components derived from petroleum. Some PAH compounds have been identified as cancer or mutation causing.

Project- Also referred to as activity. As defined for this document, a project is a specific activity that has been defined with enough detail to understand who will do the work, how it will be done, and where it will be done. The end result of the activity should be visible and concrete. One or more projects may be defined to meet the goals and objectives for the impairments, if the AOC is not yet eligible for delisting. With this definition, “Coordinating with partners to make sure data is consistently collected and used” would not be a project. However, “XY Agency will Host a data symposium and write a set of standards for data collection and analysis for the Example AOC.” would be a project.

Protected- Under the jurisdiction of a city ordinance or setback significantly limiting alteration of a site from its present state, or state or local zoning restrictions that significantly limit the alteration of a site from its present state, or landowner agreements or conservation easements that significantly limit the alteration of a site from its present state for an acceptable length of time.

Semi-Permeable Membrane Device (SPMD)- A passive sampling device used to measure concentrations of lipophilic (mixing more easily with oils than water) environmental pollutants like PCBs in water.

Undesirable Species List- Selected from species found to be dominant in at least one natural area surveyed during the riparian vegetation survey in 2011. Unacceptable species include non-native and invasive species. Several species are considered prohibited or restricted species according to Wisconsin State Statute NR 40. Management activities will reduce populations of these species in protected natural areas to meet restoration objectives.

Figure A. Lower Menominee River Area of Concern (AOC) as delineated by USEPA. Green Island, which was included in the AOC in the 1996 RAP, is not visible on this map, and is located approximately 5 miles east from Seagull Bar.

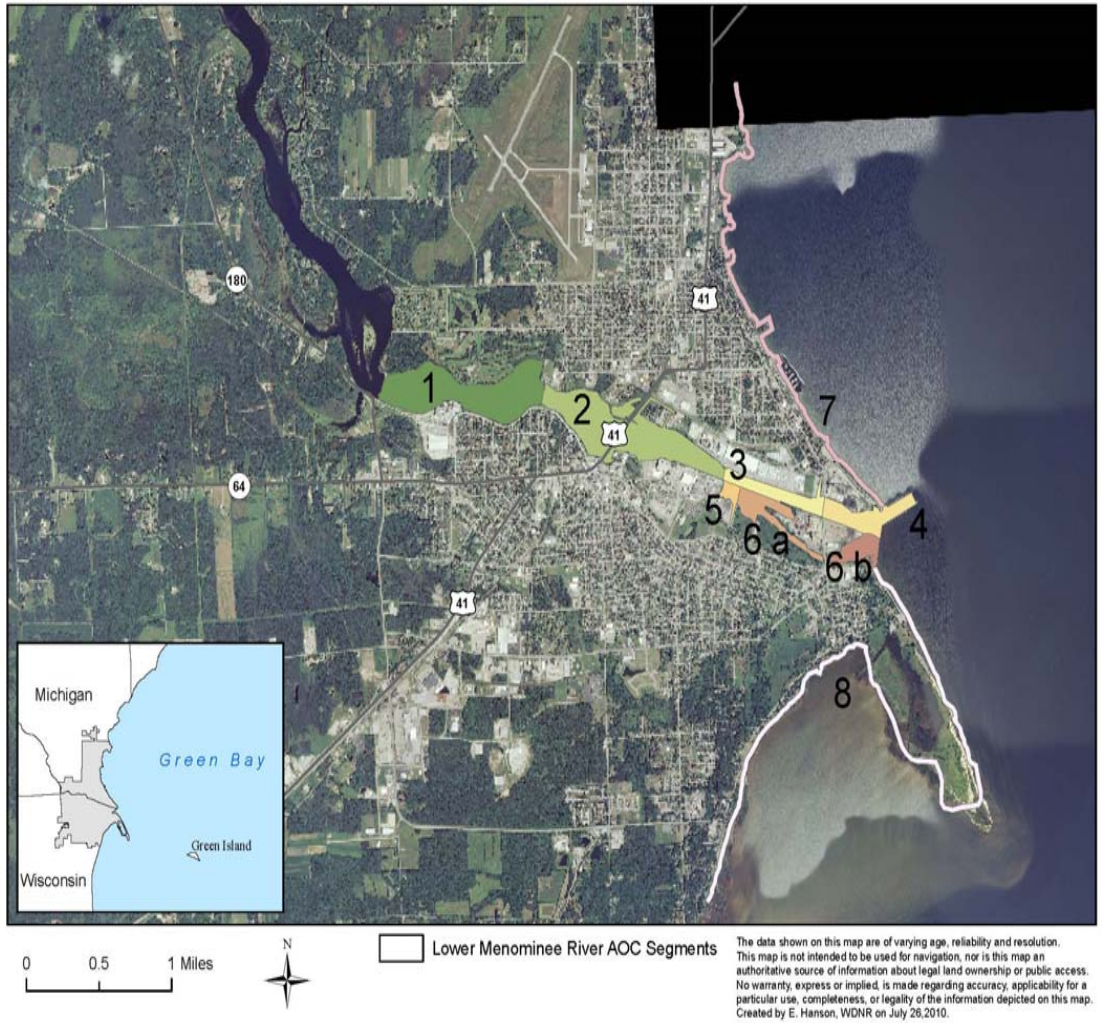

Figure B. Segment Map of the Lower Menominee River Area of Concern. Green Island, seen in the map inlay, has not been assigned a segment number.

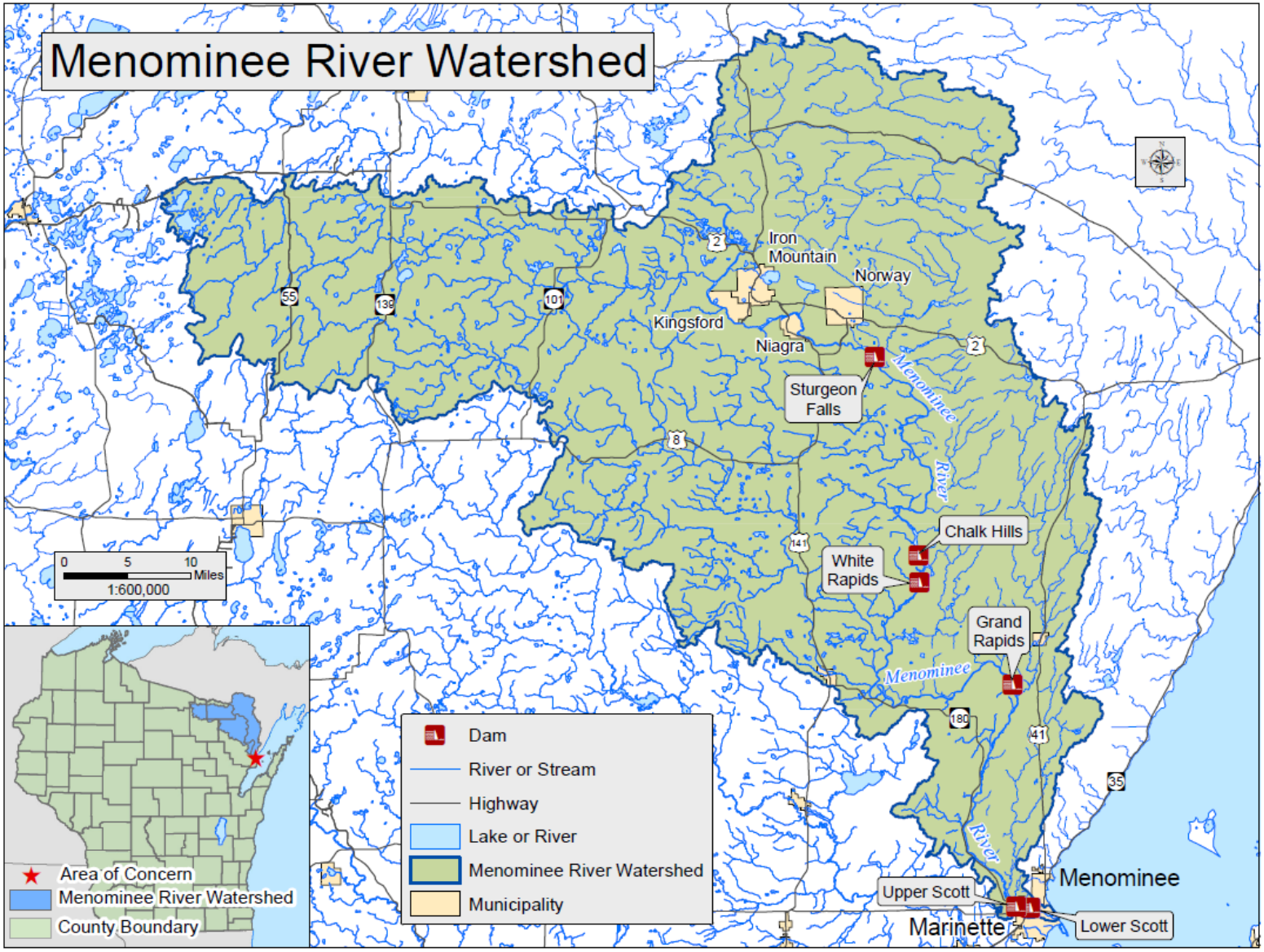

Figure C. Menominee River Watershed including tributaries and dams as they pertain to the Fish Passage Project. The Upper and Lower Scott Dams are commonly referred to as the Park Mill Dam and Menominee or Bridge Street Dams respectively.

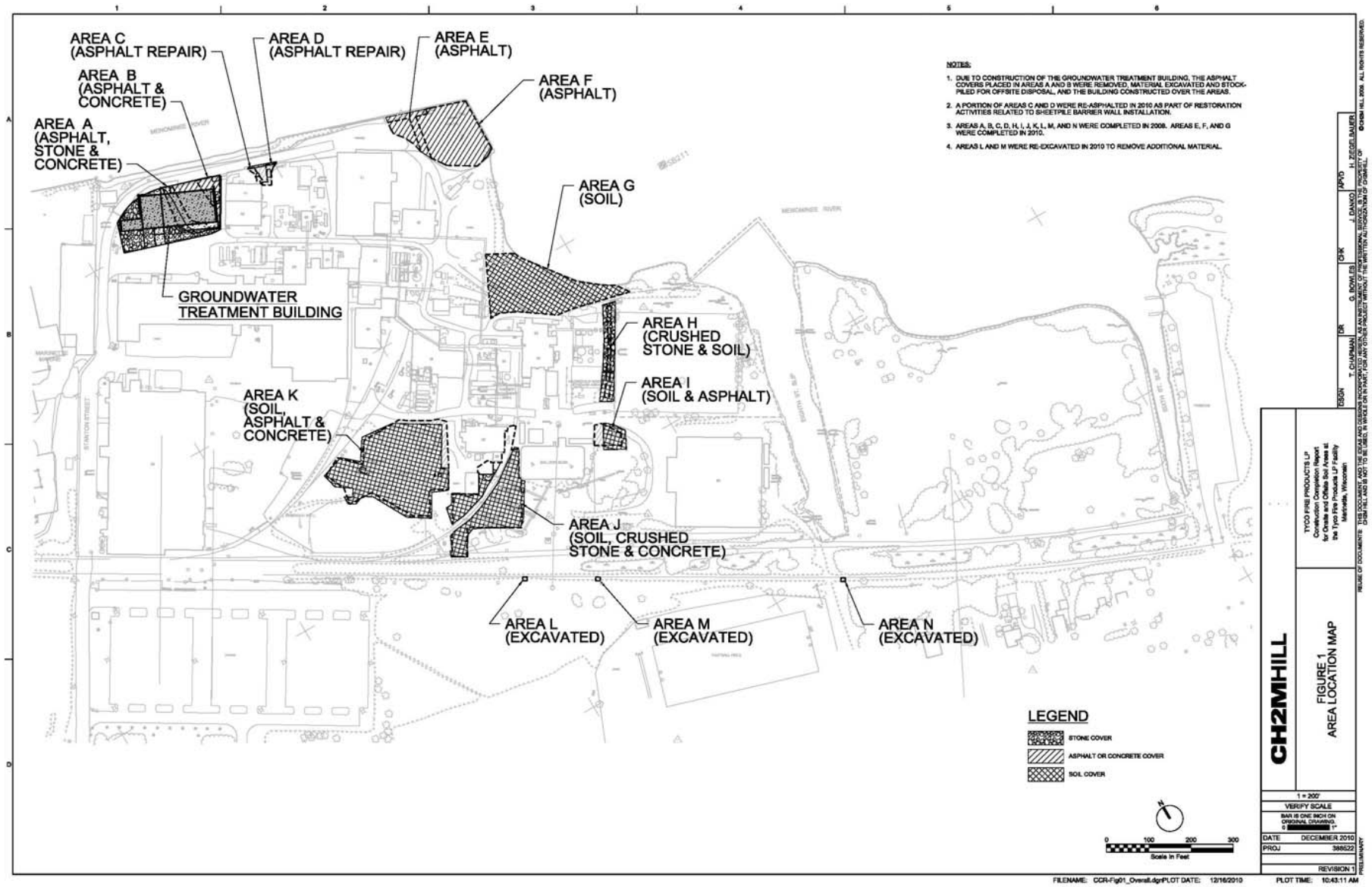

Figure D. Ansul Site, locations of upland soil remedies.

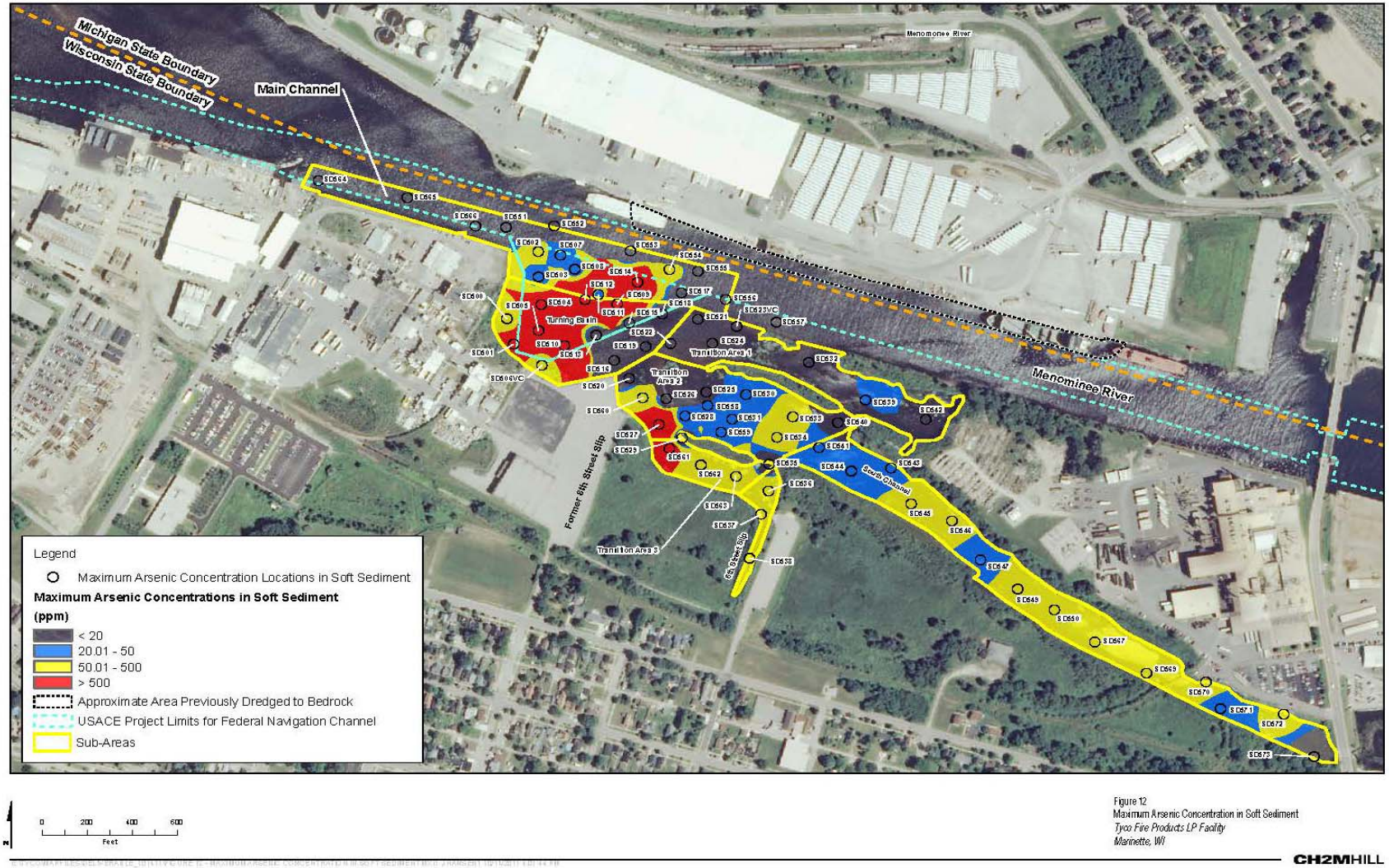

Figure E. Ansul Site, sediment arsenic concentrations in shallow "soft sediment." Numbers correspond to sample identification numbers, arsenic concentrations in parts per million located on the legend. Rationale behind displayed contours: 0-20 ppm considered safe and no action is required, 20.01-50 ppm monitored natural recovery is required to a value <20 ppm within 10 years, 50.01-500 ppm must be removed and properly disposed of, >500 ppm considered hazardous waste and must be removed and properly disposed of.

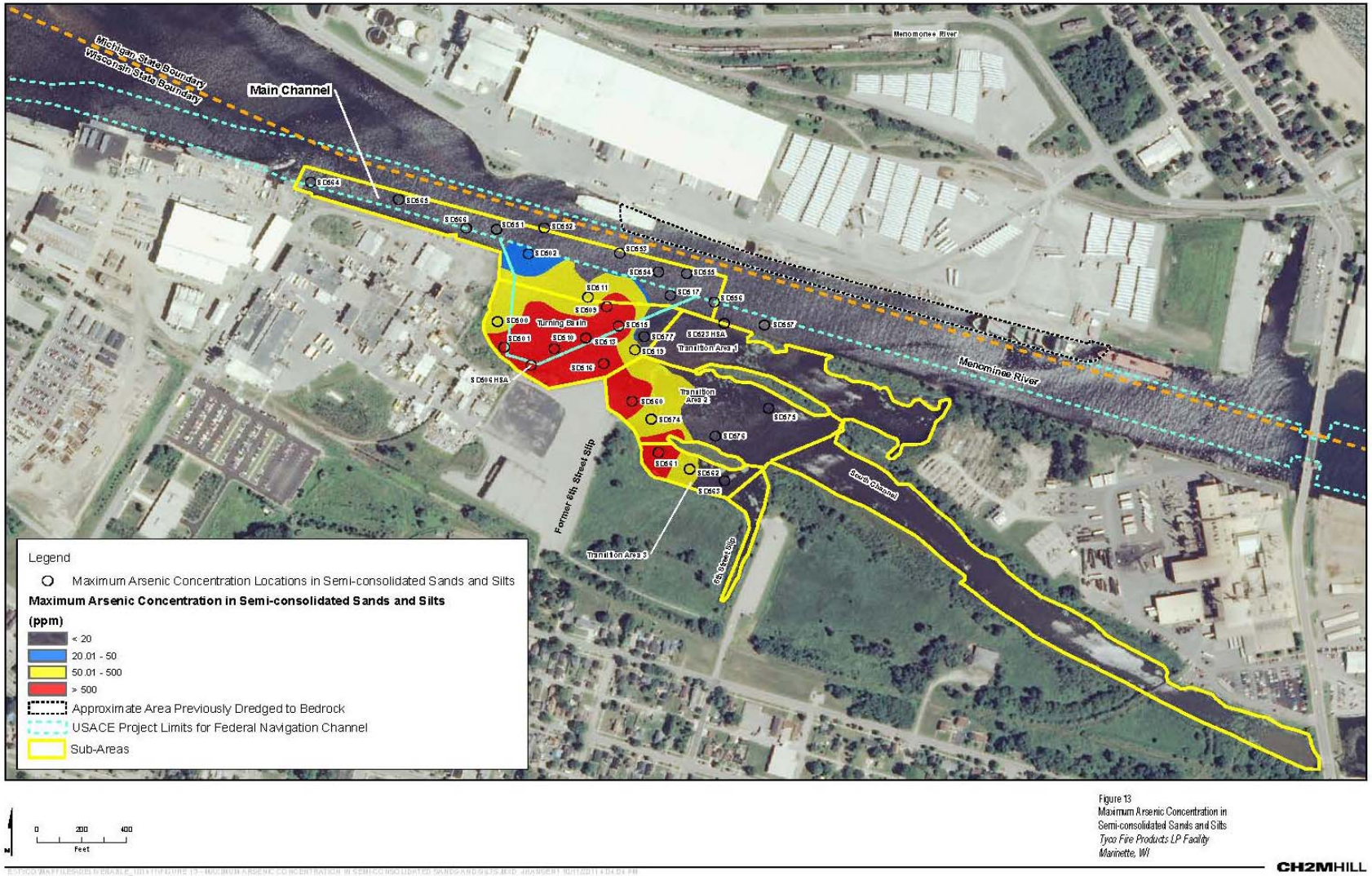

Figure F. Ansul Site, sediment arsenic concentrations in deeper "semi-consolidated sediment." Numbers correspond to sample identification numbers, arsenic concentrations in parts per million located on the legend. Rationale behind displayed contours: 0-20 ppm considered safe and no action is required, 20.01-50 ppm monitored natural recovery is required to a value <20 ppm within 10 years, 50.01-500 ppm must be removed and properly disposed of, >500 ppm considered hazardous waste and must be removed and properly disposed of.

PURPOSE STATEMENT

The purpose of this Stage 2 Remedial Action Plan (RAP) is to document the current status of the beneficial use impairments (BUIs) within the Lower Menominee River Area of Concern (AOC) and to lay out a strategic plan for their removal. The Stage 2 RAP will combine scientific studies, progress reports for cleanup sites, and monitoring documents to track the restoration progress of each impairment. Progress will be assessed based on the Lower Menominee River AOC BUI Restoration Targets established by Wisconsin and Michigan with participation of the Citizen's Advisory Committee (CAC) in December, 2008 (WDNR-MDEQ, 2008). The projects needed to remove BUIs were recommended by members of the Lower Menominee River AOC Citizens Advisory Committee (CAC) and the Technical Advisory Committee (TAC).

Stage 2 RAPs are tools for concisely documenting and communicating progress to partners and stakeholders, and identifying specific actions that are necessary for removing beneficial use impairments and ultimately delisting the AOC. "Actions" may include on-the-ground restoration projects, monitoring and assessment projects, placing habitat protections such as conservation easements, and stakeholder engagement processes. The Stage 2 RAP will be updated as needed to incorporate new information that may become available.

INTRODUCTION

Areas of Concern are severely degraded geographic areas within the Great Lakes. These areas, 43 within the Great Lakes region, were designated as AOCs primarily due to contamination of river and harbor sediments by toxic pollutants (sometimes referred to as "legacy" pollutants due to the historical industrial development that often was the source of the pollution). Cleaning up these severely degraded areas is a first step toward restoring the chemical, physical, and biological integrity of the lakes as required by the Great Lakes Water Quality Agreement (GLWQA). When AOCs have been cleaned up to the point where they are not more degraded than other comparable non-AOC areas, they are "delisted" or considered restored from the perspective of the AOC program. Former AOCs are then considered to be part of the Lakewide Management Plan (LaMP) program, a "whole lake" program that is also set forth in the GLWQA. The Agreement provides the framework for the U.S. and Canada to work together to restore the chemical, physical, and biological integrity of the Great Lakes.

The Lower Menominee River AOC includes the lower three miles of the river from the Upper Scott Dam (Park Mill Dam) to the river's mouth (Figure A). It extends north of the river mouth to John Henes Park and south of the river mouth past Seagull Bar along Green Bay. Green Island in Green Bay is part of the AOC because of its strong habitat value and biological link to Seagull Bar State Natural Area. There are six islands in the river within the AOC boundary. All of the islands are within the State of Wisconsin's territory. The AOC includes portions of Marinette County in Wisconsin and Menominee County in Michigan (WDNR, MDNR, and MDEQ, 1990 and 1996). Figure A shows the AOC boundaries and Figure C shows the entire Menominee River watershed.

Six of the potential fourteen beneficial use impairments were identified in the Lower Menominee River including: restrictions on fish and wildlife consumption; degradation of benthos; restrictions on dredging activities; restrictions on recreational contact (beach closings); degradation of fish and wildlife populations; and loss of fish and wildlife habitat. The restrictions on recreational contact BUI was removed in 2011. Contaminated sediments, combined sewer overflows (CSO), loss of historic wetlands, contaminants dissolved in or suspended in water, and unidentified contaminant sources are the drivers behind all impairments.

Most of these impairments are influenced by the presence of contaminated sediment, affecting the status of five of the six BUIs (Table 1). Poor water quality caused by contaminated sediment has contributed to designation of the "loss of fish and wildlife habitat", "degraded fish and wildlife populations", and "degradation of benthos" impairments. Contaminated sediment has also increased dredging costs and limited dredge spoil disposal options, resulting in the "restrictions on dredging" impairment. The major contaminated sediment source areas are referred to as the Ansul arsenic, WPSC coal tar, and Lloyd Flanders paint sludge (remediated) sites.

Prior to combined sewer separation and wastewater treatment plant upgrades, the Menominee River received high loads of bacteria during combined sewer overflow (CSO) events (RAP,

1990). These CSO related bacteria loads led to the “restrictions on recreational contact” (beach closings) BUI. An extensive wetland complex near the mouth of the river was destroyed by log driving activities in the 1800s. Afterwards, wetlands and nearshore areas surrounding the mouth of the River were filled for industrial expansion, and the shorelines hardened to prevent erosion or providing cargo vessel docking facilities. Remaining quality habitat and wetlands are threatened by encroaching invasive plants and access to spawning and juvenile habitat for potamodromous fish like lake sturgeon has been severely limited due to the lack of a safe passage beyond several dams (Figure C). The loss of historic wetlands has contributed to the “degradation of fish and wildlife populations” and the “loss of fish and wildlife habitat” impairment. There are additional unidentified toxic sources within or upstream of the AOC, as elevated levels of polychlorinated biphenyls (PCBs) and mercury can be detected in fish with no access to Lake Michigan (MDCH, 2011). Unidentified toxic sources within the AOC result in the “restrictions on fish consumption” impairment.

Table 1: Sources of Beneficial Use Impairments for the Lower Menominee River AOC.

Beneficial Use Impairment	Contaminated Sediments	Combined Sewer Overflow	Loss of Historic Wetlands	Loss of Historic Submerged Aquatic Vegetation	Loss of Historic Emergent Aquatic Vegetation	Unidentified Toxic Sources	Loss of Shoreline Habitat
Restrictions on Dredging Activities	X						
Restrictions on Fish Consumption						X	
Degradation of Benthos	X						
Degradation of Fish and Wildlife Populations	X		X	X	X		X
Loss of Fish and Wildlife Habitat	X		X	X	X		X
Restrictions on Recreational Contact		X					

There are likely additional unidentified toxic sources within or upstream of the AOC, as elevated levels of PCBs and mercury can be detected in fish upstream of the Lower Scott Dam. These sources are probably contaminated sediment. Lost historic wetlands include emergent, submergent, and riparian varieties. Also note that the “restrictions on recreational contact” BUI was removed in March of 2011 (see Appendices B & C).

RECENT PROGRESS

The current status of the AOC is strongly influenced by progress made since the 1996 RAP update. The status of each impairment is briefly summarized in Table 2. For a more thorough status of each impairment see Appendix A and Appendix F. Progress on specific areas of interest is described below.

Ansul Arsenic

In September of 2009 Ansul signed an Administrative Order on Consent with the United States Environmental Protection Agency (USEPA, 2007) to complete the following actions:

- Construct and maintain an impermeable below-ground barrier wall to control the flow of groundwater to the maximum extent practicable (Figures E & F).
- Cap surface soils on-site with arsenic concentrations equal to or above 32 parts per million (ppm).
- Remove surface soils near the railroads tracks with arsenic concentrations equal to or above 16 ppm.
- Collect and treat shallow groundwater on-site. Utilize trees cultivated for high rates of evapotranspiration to further suppress the water table. Conduct a technical review of the latest science for treating groundwater containing large quantities of arsenic every five years.
- Remove and properly dispose of all Menominee River soft sediments with arsenic concentrations equal to or greater than 50 ppm (Figures E & F).
- Remove and properly dispose of all Menominee River semi-consolidated silts and clays with arsenic concentrations equal to or greater than 50 ppm or, if removal is technically or economically impractical, provide an alternative to removal that protects human health and the environment, is legally implementable, and achieves arsenic concentrations of 20 ppm or less by November 1, 2023.
- Monitor remaining sediments natural recovery to a concentration of 20 ppm or less arsenic by November 1, 2023.

Prior to the signing of the Order on Consent in 2009, Ansul undertook other significant remedial efforts. During the 1970s arsenic salt storage piles were removed from the site and disposed of in a hazardous waste landfill (RAP, 1990). In the 1970s and 80s, arsenic contaminated groundwater was pumped from the site and treated. A groundwater interception trench was installed at the southern edge of the property to capture additional contaminated groundwater at this time. An earlier Order on Consent, signed by Ansul and USEPA in 1990, required the completion of investigations and corrective measures studies for the site. The 8th Street slip, the most highly contaminated area on-site, was contained and remediated from 1997 to 1999.

The following remedial efforts required in the Order of Consent have taken place since the 1996 RAP Update:

- Surface soil capping and removal was completed in 2009. Soils with arsenic concentrations equal to or above 32 ppm have been covered with a cap protective of human health (Figure D).
- Surface soils near the rail road tracks with arsenic concentrations equal to or above 16 ppm have been removed (Figure D).
- Construction of an impermeable below-ground barrier wall was completed in 2010.
- A shallow groundwater collection system was installed in 2010. Hybrid poplar trees and others are utilized to augment groundwater pumping.
- A Sediment Removal Work Plan to remediate soft and semi-consolidated sediment contaminated with 50 ppm arsenic or more was approved with conditions by USEPA in 2011.

WPSC Coal Tars

The Marinette Wastewater Treatment Plant was expanded in 1989, and during this expansion surveyors discovered soils contaminated with coal tars and associated polycyclic aromatic hydrocarbons (PAHs). PAHs are a by-product when coal tars, oils, and gases are burned as fuel (RAP, 1990). Site investigations from 1994 to 2002 discovered approximately 4 acres of contaminated soil, and 1.3 acres of contaminated sediment in the nearby Menominee River. The source was determined to be a coal gasification plant which operated prior to 1960. Wisconsin Public Service Corporation (WPSC) was found to be responsible for the remediation of contaminated soils and sediments. A significant portion of soil contamination was removed and properly disposed of during plant construction. Additional but limited, contaminated soil removal also took place in 2004 during a City of Marinette sewer system modification. The Wisconsin Department of Natural Resources (WDNR) conditionally approved a sediment removal work plan, but in 2006, WPSC chose to pursue the USEPA Superfund Alternatives program and the work plan has not been implemented. The Superfund Alternatives program allows WPSC to concurrently pursue site investigation and remedy development at six former coal gasification plants throughout Wisconsin. Soil and sediment investigations continue, as well as annual groundwater monitoring near the site.

Lloyd Flanders Paint Sludge

Paint sludge removal operations adjacent to the Lloyd Flanders Furniture Company in Menominee resulted in the excavation of more than 30 million pounds of hazardous waste and contaminated soil and sediments from Green Bay. Operations were completed in 1995 under Michigan Act 307 authority. See the *Lower Menominee River Remedial Action Plan, 1996* for more information. Shoreline monitoring continues in order to remove paint balls washed up as the result of wave action or ice scouring. Materials collected have decreased from several 55 gallon drums per year to now averaging less than a quarter drum per year.

Combined Sewer Overflows and Restrictions on Recreational Contact

The Restrictions on Recreational Contact (beach closings) BUI was primarily driven by municipal combined sewer overflows during wet weather events (RAP, 1990). Upgrades to the wastewater treatment plants for both Marinette and Menominee have resulted in both facilities operating within their respective state permit allowances (WDNR, MDNR, 2010). Menominee has had no direct combined sewer overflows or sanitary sewer overflows following the treatment plant upgrade (WDNR, MDNR, 2010). In March 2011, USEPA's Great Lakes National Program Office (GLNPO) approved a joint request from the CAC, WDNR and MDEQ to remove this impairment (see Appendices B & C).

North American Hydro Dam Relicensing

North American Hydro (NAH) is the owner/operator of two hydro electric dams within the AOC. Both Dams, Park Mill (Upper Scott) and Menominee (Lower Scott) dams, are scheduled for relicensing by the Federal Energy Regulatory Commission (FERC) in 2015. As part of a relicensing agreement, NAH will be funding assessments of the fisheries community, fish tissue contaminant burden, sediment contamination, native mussel community, riparian and aquatic vegetation, wetlands, archeological resources, endangered resources, erosion, and water quality within their areas of responsibility. The FERC required studies will take place upstream of the AOC and in segments 1 and 2 (Figure B). These studies are in various states of progress. All final reports are expected to be received between 2011 and 2013.

Through the relicensing process, NAH is working with State and Federal Agencies to facilitate lake sturgeon upstream and downstream passage for all species for both dams. The Fish Passage Project will be implemented in four phases (Alsberg and Utrup, 2009). Funding has been received through the Great Lakes Restoration Initiative (GLRI) and NAH partner contributions for phases one and two. The first phase will direct fish moving downstream through the Upper Scott Dam power canal into a chute and around the powerhouse. Until phase three is complete fish will be released into the tailrace below. Phase two will lift and sort lake sturgeon for passage from below the Lower Scott Dam (also known as the Menominee or Bridge Street Dam) to upstream of the Upper Scott Dam. The trip upstream will be completed by truck transport. As the sturgeon are sorted, biologists will check for fish health or disease and remove any invasive species including sea lamprey. The third phase expands phase one. Fish moving through the Upper Scott power canal will be directed downstream of the Lower Scott Dam. Phase four, transport of fish above these two dams, is still under discussions through the FERC process to determine how to best implement the upstream fish passage and adapt to existing conditions.

Fish passage efforts will be protective of upstream fish and wildlife populations. It is expected that this fish passage will add an additional 21 miles of riverine habitat (Figure C). Riverine habitat is important for young sturgeon, who need time to grow before reaching Green Bay. Larger young lake sturgeons are less vulnerable to predation when moving out into Green Bay. The upstream passage of lake sturgeon will also improve the sturgeon population genetics.

Green Island

Green Island is an approximately 80 acre privately owned island located 5 miles east of Seagull Bar State Natural Area (Figure D). Green Island was identified as critical wildlife habitat in the 1990 RAP, and included within the boundaries of the AOC to facilitate bird population recoveries. The CAC and TAC support acquisition of the Island for conservation purposes. Acquisition of island, or other conservation easements, are not required to achieve the removal of any impairment to the AOC. At this time, a plan to fully develop the Island as vacation housing and a resort has been proposed by the Islands owner.

STAKEHOLDER ENGAGEMENT

Citizen's Advisory Committee 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. For example, the goals, objectives and activities found in the Goals, Objectives, and Actions Table of the *Fish and Wildlife Population and Habitat Management and Restoration Plan* (Appendix F) were developed through CAC and TAC meetings from approximately 2009-2011. These meetings are open to the public and advertised through the WDNR Open Meeting Calendar, CAC/TAC list serve, and other means. Members of the CAC assisted the TAC in identifying local issues, targets, and goals, serving as a resource for historical information, and implementing actions. Members of the TAC provided input regarding current status of fish and wildlife populations, feasibility of actions, existing habitat conditions, and species habitat needs. They also helped identify restoration/protection opportunities. Ultimately, State agencies, the CAC, and TAC will assess the status of these BUIs, determine when targets have been met, and assist in or initiate the request to the federal government remove the fish and wildlife population and habitat BUIs addressed in this plan.

Citizen's Advisory Committee members also play a critical role in conducting community outreach, spending over forty man hours presenting the AOC educational display in the summer of 2011 as well as coordinating and participating in a Shoreline Cleanup and beginning work on the Strawberry Island habitat restoration project.

The CAC developed governing bylaws in June of 2011 to ensure the committee's long-term viability, representation by various stakeholder groups, and overall balance. There are presently nine memberships filled of a possible twenty-six. Dozens more local citizens, and state and federal agency staff members have participated at monthly meetings and currently receive meeting minutes and AOC updates through e-mail.

Table 2: Lower Menominee River Beneficial Use Impairment Status Summary (refer to Appendix A and Appendix F for more detail).

Beneficial Use Impairment	Impaired?	Summary of Status and Next Steps
Restrictions on Dredging	Yes	Remediation of paint sludge site was completed in 1995. Negotiations between WDNR, USEPA, and responsible parties are underway for arsenic and coal tar cleanups. Remediation of the arsenic site is scheduled to begin in 2012 under USEPA administrative order on consent. The City of Marinette and WDNR have partnered to remove contaminated sediment from Menekaunee Harbor in 2012. Sediment characterization work including contaminant sampling by NAH and source identification through MDEQ's semi-permeable membrane device study will be finished in 2012.
Restrictions on Fish Consumption	Yes	Sediment characterization work including contaminant sampling by NAH and source identification through MDEQ's semi-permeable membrane device study will be finished in 2012. MDCH and MDEQ are conducting a statewide fish consumption advisory assessment that will compare fish tissue contaminant levels in Michigan AOCs, including the Menominee River, to non-AOC reference sites. This assessment will include WI data. The TAC and CAC will review assessment results to determine impairment status.
Degradation of Benthos	Yes	Remediation of paint sludge site was completed in 1995. Negotiations between WDNR, USEPA, and responsible parties are underway for arsenic and coal tar cleanups. Remediation of the arsenic source is scheduled to begin in 2012 under USEPA Administrative Order on Consent. The City of Marinette and WDNR have partnered to remove contaminated sediment from Menekaunee Harbor in 2012. Sediment characterization work including contaminant sampling by NAH and source identification through MDEQ's semi-permeable membrane device study will be finished in 2012. WPSC and WI are in negotiations related to the coal tar site.
Degradation of Fish and Wildlife Populations & Loss of Fish and Wildlife Habitat	Yes	Restoration goals, objectives, and activities have been captured in the draft "Fish and Wildlife Habitat Management and Restoration Plan". Aquatic and riparian vegetation studies were conducted in 2010 and 2011. A qualitative mussel survey was also completed in 2011. Sturgeon passage planning is underway with construction expected in to begin in 2012 or 2013. Analysis of the outcomes of sediment remediation, recent baseline surveys, bird restoration objectives, and existing fisheries data are the next steps.
Restrictions on Recreational Contact	No	Source control has been achieved. Recommendation to remove impaired status approved by GLNPO March 2011, see Appendices B & C.

Table 3. Summary of Relevant Environmental Studies. *These studies were not originally designed for the purpose of BUI assessment.

Study	Data Gathering	Data Review	Data Uses	BUI Removal Effort Benefited	Date Results Available
fisheries assessments	WDNR, MDNR	WDNR, MDNR, TAC	evaluate evidence of recruitment for appropriate fish species	loss of fish and wildlife populations	Upon request
aquatic vegetation survey	WDNR, MDEQ	MDCH, MDEQ, WDNR	evaluate potential aquatic natural areas	degradation of fish and wildlife habitat	2010
riparian vegetation survey	WDNR	MDCH, MDEQ, WDNR	evaluate potential riparian natural areas, document undesirable species infestations	degradation of fish and wildlife habitat	2011
mussel survey	NAH, WDNR	WDNR, MDEQ, MDNR, NAH	evaluate evidence of native mussel recruitment	loss of fish and wildlife populations	2011
Semi-Permeable Membrane Device (SPMD)	MDEQ, WDNR	MDEQ, MDNR, WDNR, TAC	detect PCBs, pesticides, and PAHs	restrictions on dredging activities, restrictions on fish consumption, degradation of benthos	2012
*FERC required sediment sampling	NAH	WDNR, MDEQ, MDNR, NAH	detect metals, mercury, PCBs, PAHs	restrictions on dredging activities, restrictions on fish consumption, degradation of benthos	2012
*FERC required fish tissue sampling	NAH, WDNR	WDNR, MDEQ, MDNR, NAH	detect metals and PCBs in fish tissue	restrictions on fish consumption	2012
*NOAA Mussel Watch	NOAA	NOAA, WDNR, MDEQ, MDNR	detect PCBs and mercury in mussel tissue	restrictions on fish consumption	2012
*WPSC coal tar site investigation	WPSC	WPSC, EPA, WDNR	Define the degree and extent of landward and waterward contamination	restrictions on dredging activities, degradation of benthos, degradation of F&W habitat, loss of F&W populations	2012
MDCH fish consumption advisory assessment	MDCH, MDNR	MDCH, MDEQ, WDNR	detect metals and PCBs in fish tissue, compare contaminants in the AOC to those at a reference site	restrictions on fish consumption	2013
USGS Benthos and Plankton Assessment	USGS	USGS, WDNR, MDEQ, MDNR	assess benthic conditions	degradation of benthos	2013

BENEFICIAL USE IMPAIRMENT UPDATES

The following pages summarize the current status of each Beneficial Use Impairment using the format below. An explanation of each section is provided after the heading.

Restoration Target and Status

Beneficial Use Impairment Name	Status
The 2008 Lower Menominee River AOC Beneficial Use Impairment Restoration Targets (WDNR and MDEQ, 2008) are listed here as separate target components on each row to clearly show the status of each part of the target.	May be: - "Complete" - "Assessment in progress" - "Incomplete" - "Incomplete, in progress"

Target Concerns

This section may discuss one or more of the following:

- potential concerns about the target, particularly if the target is not specific enough to define a measurable endpoint for the BUI
- if revisions are anticipated and how such changes might be approached including responsible party and timeline
- if the 2008 target was modified and details of any changes

Rationale for Listing

The section briefly summarizes the reason the BUI was known or suspected at the time of listing. If sources contributing to the impairment have been identified since listing, those are included in this section as well.

Summary of key remedial actions since the last RAP and current status

"Key remedial actions" are those that directly contributed to the current status of the BUI. A table may be included as an appendix to capture a detailed list of past projects. The narrative here explains and leads to the "Next action needed."

Next action(s) needed

This section is a narrative listing of assessments, on-the-ground projects, and stakeholder engagement processes that are clearly delineated and directly address the specific BUI. Plans for verifying achievement of delisting targets are listed here if known.

Issues (challenges, risks) affecting progress on this BUI

This section lists project contingencies (i.e., one thing has to happen before another can occur), funding obstacles and any other considerations that could affect the timeline for delisting.

RESTRICTIONS ON DREDGING ACTIVITIES

Restoration Target and Status

Restrictions on Dredging Activities	Status
All remediation actions for known contaminated sediment sources are completed and monitored according to the approved remediation plans and the remedial action goals have been achieved; and	Incomplete, in progress
An AOC dredge management plan is developed by the communities and agencies that includes an evaluation of: o Restrictions that must remain in place to protect human health and the environment o Restrictions that must remain in place due to RCRA requirements that are based upon state and federal law o Priority areas for navigational use o Priority areas for utility dredging, e.g. utility crossings o Identify costs and funding options for removing dredging restrictions in priority areas	Incomplete

Target Concerns

The Michigan Department of Environmental Quality (MDEQ) and WDNR have established that when a disagreement regarding restoration targets arose, the more restrictive target would be used. In this case, MDEQ normally considers only federally designated navigational channels when assessing this impairment, while WDNR considers the entire AOC. The entire AOC will be considered per interstate agreement above.

Rationale for Listing

The Lower Menominee River is classified as a federal navigable harbor and is used as a diversified cargo port and shipyard. Dredging activities are restricted due to the presence of toxic contaminants in the river's sediments. Their presence increases dredging costs and limits dredge spoil disposal options. The shipping channel in the Lower Menominee River and Harbor has been regularly dredged since 1982. Recent dredged spoils have been deposited into the open waters of Lake Michigan in Michigan's waters. However, the turning basin was not dredged because of increased costs and limited dredge spoil disposal options from the arsenic contamination. The contamination was so severe that sediments from this portion of the river could have been classified as a hazardous waste if an attempt were made to remove them via dredging (RAP, 1996).

It is important to note that contaminated sediment sites outside the boundaries of the federal navigation channel also contribute to the impairment. Any location within the AOC where the presence of contaminated sediment increases dredging costs and limits dredge spoil disposal options contributes to the listing of this impairment. This includes the Ansul arsenic, WPSC coal tar, and Lloyd Flanders paint sludge sites, Menekaunee Harbor, and any remaining sites yet to be identified.

Summary of key remedial actions since the last RAP and current status

See, Ansul Arsenic, WPSC Coal Tar, and Lloyd Flanders Paint Sludge sections in RECENT PROGRESS for background information. Dredging was conducted in the late 1990s/early 2000s along the north shoreline of the river from K&K Integrated Logistics to the mouth of the river. Dredge spoils were piled east of the K&K facility. Marinette Marine conducted dredging in the early 2000s in front of their facility. The dredge spoils were stock piled/spread south of their facility. The shipping channel was again dredged by the U.S. Army Corps of Engineers (USACE) during the summer of 2008 and completed during the summer of 2009. The dredge spoils were disposed of in the open waters of Lake Michigan in State of Michigan's waters.

Next action(s) needed

Several activities are underway to remediate known contaminated sediment sites, and investigate suspected sites. These activities include:

- Per the USEPA 2009 Administrative Order on Consent, Ansul will complete sediment remediation activities in the river by November 1, 2013.
- WPSC needs to complete site investigations, currently underway, followed by submission of a sediment removal work plan, or amending the existing approved work plan.
- The City of Marinette and WDNR have entered into an intergovernmental agreement to remove sediment contaminated with heavy metals and petroleum organics from Menekaunee Harbor (Figure B, Segment 6b). The City will be reimbursed by WDNR for up to 65% of total project costs. Approximately 40,000 cubic yards of sediment will be removed from the Harbor and properly disposed of in 2012.
- Michigan deployed semi-permeable membrane devices (SPMDs) in the summer of 2011. SPMDs are used to detect trace waterborne contaminants like PCBs, pesticides, and PAHs. A final report is expected in 2012. AOC Coordinators will evaluate the findings in consultation with technical experts and advisory committee members, and will assess any implications for the AOC. Study results will help direct future sediment sampling, if required.
- As part of the FERC relicensing agreement, NAH has funded sediment contamination assessments upstream of the AOC and in segment 1 (Figure B). Surface sediment samples will be collected by ponar dredge and analyzed for metals and organics: including arsenic, mercury, PCBs, and PAHs. Three samples were collected in the Upper Scott Flowage and combined into a single composite sample. Three samples were also collected in the Lower Scott Flowage and combined into a single composite sample. Field work was completed in 2011; lab results are expected in early 2012.

Issues (challenges, risks) affecting progress on this BUI

Several scenarios exist that could slow progress regarding this BUI. For example, if the below-ground barrier wall is not effective at controlling the transport of arsenic contaminated groundwater into the Menominee River, then the deadline for Ansul to complete sediment remediation may be extended beyond 2013. Additionally, a 2006 agreement between WPSC

and USEPA allows WPSC to prioritize its remediation sites. WPSC is currently remediating a coal tar site in Sheboygan, WI, and has not yet declared which site will be targeted next. Lastly, if sediment investigations or the SPMD study detect additional contamination in the AOC, these sources will need to be identified and remediated prior to removal of this impairment.

RESTRICTIONS ON FISH CONSUMPTION

Restoration Target and Status

Restrictions on Fish Consumption	Status
Sources of PCBs, mercury, and dioxins within the AOC have been controlled or eliminated; and	Incomplete, in progress
Waters within the Lower Menominee River AOC are no longer listed as impaired due to PCB or dioxin fish consumption advisories in the most recent Impaired Waters (303(d)) list for either state; or	Incomplete
Fish tissue contaminants causing advisories in the AOC are the same or lower than those in the associated Great Lake or appropriate control site.	Assessment in progress

Target Concerns

Fish from the Bay of Green Bay and the Fox River have access to all segments of the AOC except segment 1 (Figure B). Those fish are known to have elevated levels of PCBs in their tissue. To be protective of human health, the fish consumption advisories from both states for these segments are the same as advisories for Green Bay. An SPMD study will determine whether additional sources of PCBs or pesticides, including dioxins, are present in the Menominee River upstream and within the AOC. It's unlikely that all fish consumption advisories in AOC waters will be lifted due to the presence of Green Bay and Lake Michigan fish. BUI removal could occur once studies indicate that fish are not impacted by contamination within the AOC.

Rationale for Listing

This beneficial use is considered impaired, because of elevated levels of mercury and PCBs in fish tissue that do not meet Wisconsin Department of Health Services (WDHS), U.S. Food and Drug Association, and/or Michigan Department of Community Health's (MDCH's) health advisory limits (RAP, 1990). Fish from Green Bay have access to all segments of the AOC except segment 1 (Figure B) and may carry contamination in their tissues originating outside of the AOC. Those fish are known to have elevated levels of PCBs and mercury in their tissue. There is potential for unidentified toxic sources within or upstream of the AOC, as elevated levels of PCBs and mercury can be detected in fish upstream of the Lower Scott Dam (MDCH, 2011). It is anticipated the MDEQ's SMPD study will answer source questions as the SPMDs were placed at key points upstream of and within the AOC.

Michigan issues fish consumption advisories for Green Bay south of the Cedar River including the Menominee River below the first dam for PCBs, dioxins, and mercury (MDCH, 2011). Michigan also issues advisories for the Menominee River below Quinnesec and the first dam for mercury and PCBs (MDCH, 2011). Wisconsin issues fish consumption advisories for Green Bay and its tributaries, including the Menominee River, up to the first dam for PCBs and mercury (WDNR, 2011). Wisconsin issues advisories on the Menominee River from Pier's Gorge, near Quinnesec, to the first dam also for PCBs and mercury (WDNR, 2011).

Summary of key remedial actions since the last RAP and current status

Fish consumption advisories have changed in the AOC very little since the 1996 RAP Update. Michigan's current fish consumption advisory for segment 1 (Figure B) is for mercury and PCBs found in carp, sturgeon, suckers, and walleye. The Michigan advisory for Green Bay includes segments 2 through 7 of the AOC. The advisory is due to PCBs and mercury in smallmouth bass and walleye, dioxins in lake whitefish, and PCBs and dioxins in carp.

Wisconsin's advice is similar to Michigan's but differs slightly because Wisconsin follows stricter mercury guidelines. Wisconsin advises restricted panfish and walleye consumption in the lower Scott Flowage (Figure 2, segment 1) due to mercury levels, and restricted carp consumption due to PCBs. The Wisconsin Advisory for Green Bay includes segments 2-6b and 8 of the AOC. The Green Bay advisory includes many species of fish to various degrees, and is specifically for PCBs.

Both states update guidance frequently based on the most current monitoring information. Current Michigan and Wisconsin fish consumption advice may be found online at www.michigan.gov/eatsafefish, and www.dnr.wi.gov/fish/consumption respectively.

Next action(s) needed

Several activities are underway to identify and eliminate sources of PCBs, mercury, and dioxins within the AOC. These activities include:

- Michigan deployed SPMDs in the summer of 2011. SPMDs are used to detect trace waterborne contaminants like pesticides (including dioxins), PCBs, and PAHs. A final report is expected in 2012. AOC Coordinators will evaluate the findings in consultation with technical experts, TAC, and CAC members, and will assess any implications for the AOC. Study results will help direct future sediment sampling, if required.
- As part of the FERC relicensing agreement, NAH has funded sediment contamination assessments upstream of the AOC and in segment 1 (Figure B). Surface sediment samples will be collected by ponar dredge and analyzed for metals and organics: including arsenic, mercury, PCBs, and PAHs. Three samples were collected in the Upper Scott Flowage and combined into a single composite sample. Three samples were also collected in the Lower Scott Flowage and combined into a single composite sample. Field work was completed in 2011 and lab results are expected in early 2012.
- North American Hydro has also facilitated the collection of fish tissue samples as part of the FERC relicensing agreement. Samples are being collected by WDNR and analyzed for mercury and PCB content by a private lab. Sampling and tissue analysis began in 2011 and a final report is expected in 2012.
- The National Oceanic and Atmospheric Administration (NOAA) collected zebra mussel tissue and sediment in three locations near the mouth of the Menominee River. Both will be analyzed for chemicals including PCBs and dioxins. Results are expected in 2012.
- MDCH successfully competed for GLRI funding to conduct a fish consumption advisory assessment in the AOC. The assessment will collect fish tissue samples from the AOC in 2012 and compare them to samples collected at appropriate reference locations. The

study will also use existing MI and WI data. The assessment and analysis of the fish data is expected to be completed in 2013.

Fish tissue analysis results will also be used, where possible, when evaluating the Lower Menominee River as impaired due to PCB or dioxin fish consumption advisories in the most recent 303(d) list. If SPMD and sediment sampling efforts indicate that additional investigation is required to ensure the absence of previously unknown contamination sources in the AOC, state agencies will pursue additional sediment characterization through the Great Lakes Legacy Act and remediation funding as appropriate.

Issues (challenges, risks) affecting progress on this BUI

It is important to note that remediation of the arsenic, coal tar, and paint sludge sites does not significantly affect the removal of this BUI. There is no advisory at this time for consuming fish contaminated with arsenic or PAHs in the AOC. Several scenarios exist that could slow progress regarding this BUI. If fish tissue sampling efforts detect contaminants higher than background in Lake Michigan or other the reference site(s) used, progress will be delayed. If sediment investigations detect sources of mercury, PCBs, or dioxins in the AOC, they will need to be remediated prior to removal of this impairment.

DEGRADATION OF BENTHOS

Restoration Target and Status

Degradation of Benthos	Status
All remediation actions for known contaminated sediment sources are completed and monitored according to the approved plan and have met their remedial action goal.	Incomplete, in progress

Target Concerns

Some concerns have arisen because restoration targets for this BUI do not include monitoring efforts to document the recovery of the benthic community. Sites not impacted by contaminated sediments in the AOC have a relatively healthy benthic community. It's assumed that these communities will re-colonize degraded areas once contaminated sediment site have met their remedial goals.

The Lower Menominee River AOC was included in a GLRI-funded study, initiated by WDNR and carried out by the U.S. Geological Survey (USGS), to characterize benthic invertebrate and planktonic communities in Wisconsin's Lake Michigan AOCs and six reference sites. The Lower Menominee AOC site was included to increase the statistical power of the study. Although the BUI removal target does not require such data, it may be useful for gaining a better understanding of benthic conditions in the AOC.

Rationale for Listing

The 1990 Remedial Action Plan attributes degradation of the benthos in otherwise suitable habitat to toxic conditions caused by contaminated sediment (WDNR, 1990). A WDNR Menominee River Survey conducted in August 1957 sampled just below the Ansul Chemical Company, found few bottom-dwelling organisms at this point and were composed almost entirely of pollution tolerant varieties [Letter, Committee on Water Pollution, Theodore F. Wisniewski, Director, Division of Water Pollution Control]. Studies conducted in the area over a period between 1974 and 1989 found degraded benthic communities in and around the Turning Basin (Figure B, Segment 5) and some studies determined there was an absence of benthic organisms. Elevated levels of arsenic, cadmium and mercury were detected in subsequent benthic tissue analyses. According to the 1990 RAP, benthic impairments were due to a variety of causes but heavy arsenic pollution was interpreted by USEPA as the likely cause since there were substrate and nutrients available to support a diverse benthic population (USEPA, 1975, Stage One Report, PUBL WR-246-90).

Summary of key remedial actions since the last RAP and current status

See "Introduction sections, Arsenic, Coal Tars, and Paint Sludge" sections for background information.

Next action(s) needed

Several activities are underway to remediate known contaminated sediment sites, and investigate suspected sites. These activities include:

- Per the USEPA 2009 Administrative Order on Consent, Ansul will complete sediment remediation activities in the River by November 1, 2013.
- WPSC needs to complete site investigations, currently underway, and submit a sediment removal work plan, or amend the existing work plan.
- The City of Marinette and WDNR have entered into an intergovernmental agreement to remove sediment contaminated with heavy metals and petroleum organics from Menekaunee Harbor (Figure B, Segment 6b). The City will be reimbursed by WDNR for up to 65% of total project costs. Approximately 40,000 cubic yards of sediment will be removed from the Harbor and properly disposed of in 2012.
- Michigan deployed SPMDs in the summer of 2011. SPMDs are used to detect trace waterborne contaminants like pesticides (including dioxins), PCBs, and PAHs. A final report is expected in 2012. AOC Coordinators will evaluate the findings in consultation with TAC and CAC members, and will assess any implications for the AOC. Study results will help direct future sediment sampling, if required.
- As part of the FERC relicensing agreement, NAH has funded sediment contamination assessments upstream of the AOC and in segment 1 (Figure B). Surface sediment samples will be collected by ponar dredge and analyzed for metals and organics: including arsenic, mercury, PCBs, and PAHs. Three samples were collected in the Upper Scott Flowage and combined into a single composite sample. Three samples were also collected in the Lower Scott Flowage and combined into a single composite sample. Field work was completed in 2011 and lab results are expected in early 2012.
- USGS benthos data will be collected in spring, summer, and fall 2012. Review the data and assess any implications for the AOC.

If sediment sampling efforts indicate that additional investigation is required to ensure the absence of contamination sources in the AOC, state agencies will pursue full sediment characterization through the Great Lakes Legacy Act and funding for remediation as appropriate.

Issues (challenges, risks) affecting progress on this BUI

Several scenarios exist that could slow progress regarding this BUI. For example, if the below-ground barrier wall is not effective at controlling the transport of arsenic contaminated groundwater into the Menominee River, then the deadline for Ansul to complete sediment remediation may be extended beyond 2013. Additionally, a 2006 agreement between WPSC and USEPA allows WPSC to prioritize its remediation sites. WPSC is currently remediating a coal tar site in Sheboygan, WI, and has not yet declared which site will be targeted next. Lastly, if sediment investigations or the SPMD study detect additional contamination in the AOC, these sources will need to be identified and remediated prior to removal of this impairment.

DEGRADATION OF FISH AND WILDLIFE POPULATIONS & LOSS OF FISH AND WILDLIFE HABITAT

Restoration Target and Status

Degradation of Fish and Wildlife Populations & Loss of Fish and Wildlife Habitat	Status
A local fish and wildlife habitat management and restoration plan has been developed and implemented for the Lower Menominee River AOC that: o Defines the causes of fish and wildlife population and habitat impairments within the AOC o Establishes site specific habitat and population objectives for fish and wildlife species within the AOC o 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; and	Development complete, implementation in progress
o The programs and actions necessary to accomplish the recommendations are identified in the fish and wildlife management and restoration plan are implemented; and	Incomplete, in progress
o 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	Incomplete
Please note o Removal of this BUI will be based on achievement of implementation of actions in the steps above, including monitoring conducted according to site plans and showing consistent improvement in quantity or quality of habitat or populations addressed in the criteria. Habitat values and populations need not be fully restored prior to delisting, as some may take many years to recover after actions are complete. o Actions already implemented in AOCs may be reported and evaluated as long as the reports contain all the elements above.	

Target Concerns

These BUIs are interdependent and are discussed and addressed together. Removal of these BUIs will take place concurrently through implementation of the *Fish and Wildlife Population and Habitat Management and Restoration Plan*.

Rationale for Listing

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 log driving activities in the 1800s. Afterwards, land near the mouth of the River was filled for industrial expansion, and the shorelines hardened to prevent erosion. Remaining quality habitat and wetlands are threatened by encroaching invasive plants and access to spawning and juvenile habitat for potamodromous fish like lake sturgeon has been severely limited due to the lack of a safe passage beyond several dams (Figure C).

Sediment contaminated with arsenic, PAHs, and other heavy metals including cadmium, chromium, copper, lead, mercury, nickel, and zinc have impacted fish populations throughout the AOC (RAP, 1996 and 1990). Sediment was contaminated through industrial activities and stormwater discharges that took place throughout the 1900s.

Summary of remedial actions since the last RAP and current status

Fisheries goals and local attitudes regarding this BUI have changed since the 1996 RAP update. Increased interest in lake sturgeon, spotted muskellunge, native mussels, marsh birds, and native vegetation is reflected in the goals and objectives assembled in the fish and wildlife habitat management and restoration plan. Protection and enhancement of existing wetlands and riverine islands remains a strong priority.

Much of the remedial effort since the 1996 RAP has focused on data collection. Bi-annual fisheries surveys are conducted by the Michigan Department of Natural Resources (MDNR) and WDNR targeting lake sturgeon below the Hattie Street dam. A fyke netting survey targeting spotted muskellunge was completed in May 2006 by WDNR, and produced 21 adult musky. Electrofishing surveys in the fall of 2008 and 2009 captured young-of-year spotted musky. These electrofishing surveys, along with one young-of-year captured in the Little Sturgeon Bay area in 2009, were the first evidence of natural spotted muskellunge reproduction since rehabilitation of that species began in 1989 within Green Bay. Funding was provided by NAH and WNDR in 2011 to conduct a Lower Menominee River native mussel survey.

Baseline information on fish and wildlife habitat has also been collected. In 2010 a survey of aquatic vegetation in the AOC was completed. In 2011 a companion survey of riparian vegetation was conducted. Additional studies funded or conducted by NAH are noted in the RECENT PROGRESS section, North American Hydro Dam Relicensing.

Considerable progress has been made drafting a *Fish and Wildlife Habitat Management and Restoration Plan*. The plan outlines a path to remove these impairments, including a list of activities to meet the restoration goals and objectives. A draft plan has been completed and public and agency comments have been solicited. A complete draft is expected to be submitted to GLNPO in early 2012.

Next action(s) needed

In general, implementation of the *Fish and Wildlife Habitat Management and Restoration Plan* is needed to continue making progress in removing these BUIs. More specifically, the next actions necessary can be generalized into three steps. Step one, review existing data and use it to set measureable restoration objectives. Step two, implement activities to meet those objectives. Step three, monitor the outcomes of activities to decide if each objective has been met.

Step One

This step consists primarily of the analysis of existing and forthcoming data. TAC members and state agencies will be largely responsible for this step, although other partners may also assist. Additional funding for data analysis is not requested. This step should be completed during 2012.

- Significant contaminated sediment data is available with more data coming. How sediment remediation affects the removal of these impairments will have to be determined regularly by the TAC as new information comes forward.
- Analysis of the aquatic vegetation survey (2010) and riparian vegetation survey (2011) will be used to determine the acres and linear feet of habitat to protect and what natural areas are already protected or already composed of less than 33% undesirable species.
- The TAC has yet to determine what the restoration objective should be for bird populations. Surveying methodology and statistical significance considerations need to be resolved. The TAC must decide whether to commit to a quantitative target for bird populations, as is presently the course, or pursue other options.
- CAC and TAC members must continue to support those involved with the Fish Passage and Protection Plan. Activities will include submitting letters of support for the project and assisting with project outreach as requested. This will be a continuous activity until funding is secured for phase 3 (passive downstream passage below the Upper and Lower Scott Dams).
- TAC members need to compile existing fisheries recruitment data for the applicable species, including mussels, in the AOC. Analysis of this data will allow the TAC to determine weather fish populations show evidence of recruitment, evidence of impaired recruitment, or if more information needs to be gathered to make a determination.

Step Two

Once existing data has been analyzed the second step will commence. The TAC will work with state and federal agencies and the CAC to begin implementing activities to meet objectives. If data gaps were identified as part of step one they will be addressed in step two. The CAC does not have a tax identification number and cannot apply for grant funding directly. It is expected that State agencies and local partners will apply for the funding that will be required to accomplish all necessary activities. The TAC believes that this step could be completed within two years of completing all contaminated sediment remediation projects, if not sooner. The CAC is presently restoring habitat and removing invasive species from a natural area (Strawberry Island) under the direction of the Federal Bureau of Land Management. This work may be used as in-kind match when applying for funding to complete additional habitat restoration activities.

Step Three

As activities are implemented the TAC will continuously measure progress towards meeting objectives. Funding need depends on the type and quantity of monitoring that is required to demonstrate progress. If all objectives have been met, except those associated with fish recruitment or populations, these BUIs will be considered in a state of recovery. Long term monitoring will be used to meet remaining objectives associated with fish recruitment or

populations. Once an objective has been met, any remaining activities for it will no longer be pursued. Conversely, if all identified activities for an objective have been completed and monitoring shows that the objective is still not met, additional activities may be sought to meet that objective.

Issues (challenges, risks) affecting progress on this BUI

Although the existing restoration target doesn't require the remediation of contaminated sediment sites, sediment remediation may be necessary to complete all required projects for removing this BUI. In the case of Ansul, if monitoring of the below-ground barrier indicates that it has not been effective at controlling the transport of arsenic contaminated groundwater from the site to the river, the 2013 deadline for removing sediment may be extended. It's difficult to estimate how long that extension may be, but the walls performance is critical to the overall site remedy. The 2006 agreement between WPSC and USEPA allows WPSC to prioritize which sites it remediates first based on need. WPSC is currently remediating a coal tar site in Sheboygan, WI, and has not yet declared which site will targeted next. Lastly, if sediment investigations or the SPMD study detect additional contamination in the AOC, they may have to be remediated prior to implementing all projects necessary to remove this impairment.

Project implementation is largely contingent on funding from the GLRI. Local partners will be responsible for analysis of existing data and data collected by NAH.

RESTRICTIONS ON RECREATIONAL CONTACT (BEACH CLOSINGS)

Restoration Target and Status

Restrictions on Recreational Contact	Status
No waterbodies within the AOC are included on the list of non-attaining waters due to contamination with pathogens *from combined sewer overflows*[1] in the most recent Clean Water Act Water Quality and Pollution Control in either states: Section 303(d) and 305(b) Integrated Report (Integrated Report), which are submitted to USEPA every two years; or	Complete. Status change to "unimpaired" requested from GLNPO, approved 2011 (Gulezian, 2011; Appendices B&C)
In cases where the waterbodies within the AOC are on the list of non-attaining waters due to the presence of Combined Sewer Overflows (CSOs) or are impacted by upstream CSOs, this BUI will be considered restored when CSOs have been eliminated or are being treated; or	
In cases where CSOs still exist and significant progress has been made towards their elimination or treatment, this BUI will be considered restored when: o All known sources of bacterial contamination to the AOC originating in the AOC and tributary watersheds have been controlled or treated to reduce exposures; and o No unpermitted sanitary sewer overflows have occurred within the AOC during the previous five year period as a result of a less than 25-year precipitation event or snow/ice melt conditions; and o Marinette, WI and Menominee, MI have adopted and are implementing storm water reduction programs including an illicit discharge elimination program	

Target Concerns

The restoration target set in 2008 has been modified to identify combined sewer overflows as the primary reason for this impairment, see footnote below and Appendix D.

Rationale for Listing

Elevated levels of bacteria exceeding water quality standards had been documented in the Menominee River (RAP 1990). These exceedances were associated with wet weather events causing combined sewer overflows.

Summary of remedial actions since the last RAP and current status

Significant upgrades to the City of Menominee and City of Marinette wastewater treatment plants have resulted in no combined sewer overflows. Both municipalities are operating within their respective state wastewater discharge permits. See Appendix B for more information.

[1] The CAC voted to add the phrase, "from combined sewer overflows," to bullet 1 of the delisting target at its August 25, 2010 meeting to clarify that delisting could occur when the primary issue of combined sewer overflows identified in the 1990 RAP and 1996 RAP Update had been addressed. The meeting notes are attached as Appendix D.

SUMMARY AND CONCLUSIONS

Five of the six BUIs identified in the Lower Menominee River AOC still remain. The “restrictions on recreational contact” BUI was removed from the AOC after its cause, combined sewer overflows, was remedied. Causes of the remaining impairments have been identified or are currently under investigation.

Contaminated sediment affects all of the remaining BUIs (Table 1). Remediation of known and undiscovered contaminated sediment sites within the AOC will lead to the removal the “restrictions on dredging” and “degradation of benthos” impairments. It will also benefit the “degradation of fish and wildlife populations” and “loss of fish and wildlife habitat” BUI removal effort. Paint sludge remediation was completed in 1995 by the Lloyd Flanders Furniture Company through Michigan Act 307 authority (RAP, 1996). Negotiations between regulatory agencies and parties found responsible for remediation of the Ansul arsenic and coal tars contaminated sediment sites are underway. Contaminated sediment remediation is expected to be completed in five to seven years (2017-2019), but may take longer if additional sites are identified in the AOC.

Loss of historic wetlands, submerged, and emergent plant communities contributes to the “degradation of fish and wildlife populations” and “loss of fish and wildlife habitat” impairments. Implementation of the “Fish and Wildlife Population and Habitat Management and Restoration Plan” along with contaminated sediment remediation will remove these two impairments. Total costs and funding sources to complete the required activities have not been identified. The Great Lakes Restoration Initiative is expected to play a critical role in funding. Partners along with local and state agencies will need to investigate costs and apply for funding to complete these projects. Complete implementation of the Fish and Wildlife Plan is expected to take three to five years (2015-2017), but may take longer if additional contaminated sediment sites are identified in the AOC.

Unidentified toxic sources are considered the cause of the “restrictions on fish consumption” impairment. Though a direct link to the contaminant levels in sediments cannot be made to those levels seen in fish, because fish tissue does not sequester all contaminants, there is a significant correlation. Results from sediment sampling and the SPMD study are expected in early 2012. Additional sediment characterization may be required to fully understand toxic sources in the AOC. State agencies may request sediment characterization through the Great Lakes Legacy Act as appropriate. If sediment sampling, the SPMD study, and Michigan’s fish consumption advisory assessment conclude that there are no toxic sources of PCBs or mercury within the AOC, the “restrictions on fish consumption” BUI could be delisted as early as 2013. If additional toxic sources are found within the AOC, funding for their remediation would be required and the timeline would be slowed.

Wisconsin and Michigan will use the Stage 2 RAP as the primary tool needed to remove BUIs and delist the AOC. The Stage 2 RAP documents progress made since the 1996 RAP update, the current status of each BUI, and activities needed to remove all BUIs. This document will be

updated on an as needed basis to effectively communicate progress to the public as well as local, state, and federal agencies.

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APPENDICES

Appendix A	Lower Menominee River AOC Beneficial Use Impairment Tracking Matrix
Appendix B	Lower Menominee River Area of Concern Remedial Action Plan Proposed Removal Recommendation for the Restrictions on Recreational Contact Beneficial Use Impairment
Appendix C	Official response to delisting request of the Restrictions on Recreational Contact Beneficial Use Impairment in the Lower Menominee River Area of Concern
Appendix D	August 25, 2010 CAC meeting minutes concerning the changes made to the restrictions on recreational contact delisting target
Appendix E	Letters of Support for the Stage 2 RAP from the Citizen's Advisory Committee
Appendix F	Goals, Objectives, and Activities Table from the Fish and Wildlife Population and Habitat Management and Restoration Plan
Appendix G	Technical and Citizen's Advisory Committee Members

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Appendix A

Lower Menominee River AOC Beneficial Use Impairment Tracking Matrix

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Beneficial Use Impairment Name	Project Lead	*Project Type	Actions/Tasks Needed	Funding Source	Start Date	Targeted Completion Date	Comments
Degradation of Benthos	TYCO, EPA, WDNR	3	completion of arsenic contaminated sediments remediation by TYCO	TYCO	2012	November 1, 2013	TYCO and EPA still in design negotiations for sediment cleanup
Degradation of Benthos	WPSC, EPA, WDNR	3	completion of coal tar contaminated sediments remediation by WPSC	WPSC	unknown	unknown	WPSC needs to complete site investigations before submitting a sediment removal work plan to EPA or amending the existing work plan
Degradation of Benthos	TYCO, WPSC, EPA	5	monitor and access sediment contamination after sediment cleanups	TYCO, WPSC	After sediment remediation is completed	unknown	Start and completion dates are contigent on completion of arsenic and coal tar sites
Degradation of Fish and Wildlife Populations	MDEQ, WDNR, CAC, TAC	1,2,3,4,5	See Appendix F for a list of activities	MI, WI GLRI State Capacity	2010	2015-2017	
Loss of Fish and Wildlife Habitat	MDEQ, WDNR, CAC, TAC	1,2,3,4,5	See Appendix F for a list of activities	MI, WI GLRI State Capacity	2010	2015-2017	
Restrictions on Dredging Activities	MDEQ, WDNR, NAH	1, 2	Investigate potential of additional contaminated sediment sites	MI, WI GLRI State Capacity, NAH	2010	unknown	SPMD study, and North American Hydro's FERC required sediment analysis work
Restrictions on Dredging Activities	TYCO, WPSC, EPA, WDNR	3, 5	completion of actions required under "Degradation of Benthos"	TYCO, WPSC	2012	unknown	
Restrictions on Dredging Activities	Cities of Marinette and Menominee, WDNR, MDEQ	4, 5	develop a dredge management plan	unknown	After sediment remediation is completed	unknown	Start and completion dates are contigent on completion of remediation plans for the arsenic and coal tar sites
Restrictions on Dredging Activities	WDNR, City of Marinette	3	Menekaunee Harbor sediment cleanup	WI natural resources environmental repair fund	Spring 2012	Fall 2012	
Restrictions on Fish Consumption	MDEQ	1, 2	SPMD Study	MI GLRI State Capacity	August 1, 2011	May 1, 2012	SPMD study will analyze PCBs, PAHs, pesticides. Study will determine if additional sediment sampling required
Restrictions on Fish Consumption	MDEQ	1	Sediment characterization	GLNPO Sediments Team	unknown	unknown	Sediment characterization if indicated by SPMD study for source identification, and North American Hydro's FERC required sediment analysis work
Restrictions on Fish Consumption	NAH, WDNR	1	Fish Tissue Sampling	NAH	May 1, 2012	unknown	WDNR and MDEQ are assisting NAH with sample collection
Restrictions on Fish Consumption	MDCH, MDNR, MDEQ	1, 2	Fish consumption advisory assessment	GLRI	January, 2011	2013	Compare contaminates in collected fish to fish in reference sites.

***Project types**
1:Baseline assessment through data gathering
2:Compile & analyze existing data
3:On-the-ground remediation or restoration project
4:Stakeholder engagement and/or community education & outreach
5:Verification of target achievement through monitoring or other documentation

Appendix B

Lower Menominee River Area of Concern Remedial Action Plan
Proposed Removal Recommendation for the Restrictions on Recreational Contact Beneficial Use Impairment

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Lower Menominee River Area of Concern Remedial Action Plan
Proposed Removal Recommendation
for the
Restrictions on Recreational Contact
Beneficial Use Impairment
October 27, 2010

PURPOSE

The purpose of this document is to delineate restoration activities and support the recommendation to remove the Restrictions on Recreational Contact (Beach Closings) Beneficial Use Impairment (BUI) in the Lower Menominee River Area of Concern (AOC).

BACKGROUND

The 1990 Lower Menominee River Remedial Action Plan (RAP) recognized that the International Joint Commission (IJC) "Beach Closings" BUI designation was not consistent with the issues present in the Lower Menominee AOC. The RAP indicated that although closings of designated swimming beaches had not occurred within the AOC, elevated bacterial levels in the riverine portion of the AOC were associated with wet weather events. The RAP advisory committees therefore determined that Total or Partial Body Contact Restrictions, now referred to as Restrictions on Recreational Contact, more accurately described the bacteria-related impairment in the AOC. As described in the 1990 and 1996 RAPs, this issue was due primarily to combined sanitary sewer overflows from the cities of Menominee, Michigan and Marinette, Wisconsin. It was determined that once these sources were controlled through sewer separation projects, the issues leading to restrictions on recreational contact under the AOC program would be resolved.

Geographical Description/AOC Boundary

The Menominee River is a river in northwestern Michigan and northeastern Wisconsin. It is approximately 118 miles (190 km) long, draining a primarily rural forested area of northern Wisconsin and the Upper Peninsula of Michigan into Lake Michigan. Combined with its major tributaries, the Brule River and Michigamme River, the Menominee River forms one of the largest watersheds in the Lake Michigan Basin. The entire course of the Menominee forms part of the boundary between Wisconsin and Michigan and therefore the responsibility for the management of the watershed is shared by both states.

The AOC is jointly managed by the Wisconsin Department of Natural Resources (WDNR) and the Michigan Department of Natural Resources and Environment (MDNRE). The AOC is comprised of the lower three miles of the river, from the Upper Scott Dam (also known as the Park Mill Dam), to the river mouth. It also includes the adjacent Green Bay shoreline from the river mouth south to Seagull Bar in Marinette, Wisconsin, and from the river mouth north to John Henes Park in Menominee, Michigan. Green Island in Green Bay is also included in the AOC (RAP, 1990; RAP, 1996).

Area of Concern/Beneficial Use Impairments History

Areas of Concern (AOCs) were identified in the mid 1980s through work completed by the federal governments of the United States and Canada, in cooperation with state and provincial governments under the Great Lakes Water Quality Agreement (GLWQA). The 1987 amendments to the GLWQA further defined the BUIs (IJC, 1987). Identified BUIs for the Lower Menominee River AOC are as follows:

1. Restrictions on fish consumption;
2. Degradation of benthos;
3. Restrictions on dredging activities;
4. Degradation of fish populations;
5. Loss of fish and wildlife habitat; and,
6. Restrictions on recreational contact (also referred to as beach closings or restrictions on total or partial body contact).

The first five of these six BUIs are primarily the result of historic industrial and municipal waste discharges leading to contaminated sediments and water quality degradation. Some known ongoing contamination exists within the AOC and these areas are currently in negotiations with the responsible parties related to source control and associated remedial actions. The primary industrial contaminants identified in the 1990 Lower Menominee River RAP included paint sludge with associated heavy metals (remediated), PCBs, arsenic, and coal tars with associated polycyclic aromatic hydrocarbons (PAHs).

The sixth BUI is primarily the result of bacterial contamination from combined sewer overflows from the cities of Marinette and Menominee. A secondary and relatively minor source of contamination inside the Menominee Marina was thought to be related to wildlife or boat holding tanks (RAP, 1990). The terminology "Beach Closings" remains the accepted designation listed in the 1987 Amendments to the Great Lakes Water Quality Agreement (IJC, 1987).

The 1990 RAP concerns were related to bacterial contamination exceeding the Wisconsin and Michigan water quality standards. The 1996 RAP considered that although bacterial levels in the Menominee Marina were no longer an issue, concerns remained related to combined sewer overflows and sanitary sewer overflows from the City of Menominee. These issues were resolved with wastewater and stormwater infrastructure improvements (MDEQ, 2009a).

Beneficial Use Impairment Restoration Targets

The restoration targets developed by the states are described in the *Lower Menominee River BUI Restoration Targets* dated December 22, 2008 (WDNR-MDEQ, 2008). We will follow the BUI removal process outlined in the *Guidance for Delisting Michigan's Great Lakes Areas of Concern (Guidance)* (MDEQ, 2008a) but modified to include approval steps for both states. The BUI removal process described in the guidance includes AOC Citizens Advisory Committee (CAC) involvement as well as a public meeting. The Lower Menominee River CAC has been involved throughout the development of this document, and the specified public meeting was held on November

3, 2010, in conjunction with the CAC meeting (Appendix A). Meeting attendees did not offer comments on the document. The CAC voted to endorse it by providing a letter of support (Appendix B). CAC members that were not present for the meeting were contacted individually by the UW-Extension CAC facilitator to cast a vote.

The public comment period was open from November 3, 2010 to December 2, 2010. A news release announcing the public informational meeting was published in the Marinette-Menominee EagleHerald newspaper and GLIN-announce listserv on Tuesday, Ocober 26 (Appendix C). A separate news release with details of the public comment opportunity was sent to the EagleHerald and GLIN-announce listserv on November 10, 2010 (Appendix D). No public comments were submitted.

Restrictions on Recreational Contact BUI Restoration Criteria
The restoration criteria for the Restrictions on Recreational Contact BUI in the Lower Menominee River AOC are as follows:

This BUI will be considered restored when:

1. No waterbodies within the AOC are included on the list of non-attaining waters due to contamination with pathogens ***from combined sewer overflows***[1] in the most recent Clean Water Act Water Quality and Pollution Control in either states: Section 303(d) and 305(b) Integrated Report (Integrated Report), which are submitted to the United States Environmental Protection Agency (U.S. EPA) every two years.

2. OR, in cases where the waterbodies within the AOC are on the list of non-attaining waters due to the presence of Combined Sewer Overflows (CSOs) or are impacted by upstream CSOs, this BUI will be considered restored when CSOs have been eliminated or are being treated.

3. OR, in cases where CSOs still exist and significant progress has been made towards their elimination or treatment, this BUI will be considered restored when:

    - All known sources of bacterial contamination to the AOC originating in the AOC and tributary watersheds have been controlled or treated to reduce exposures; and
    - No unpermitted sanitary sewer overflows have occurred within the AOC during the previous five year period as a result of a less than 25-year precipitation event or snow/ice melt conditions; and
    - Marinette, WI and Menominee, MI have adopted and are implementing storm water reduction programs including an illicit discharge elimination program

TECHNICAL TEAM

The Lower Menominee River Technical Team is comprised of members of state agency staff and the Lower Menominee River CAC. The technical team worked closely with the

[1] The CAC voted to add the phrase, "from combined sewer overflows," to bullet 1 of the delisting target at its August 25, 2010 meeting to clarify that delisting could occur when the primary issue of combined sewer overflows identified in the 1990 RAP and 1996 RAP Update had been addressed. The meeting notes are attached as Appendix E.

U.S. EPA Great Lakes National Program Office (GLNPO) to obtain their technical review comments. The Technical Team used the first criteria established in the *BUI Targets* for the Beach Closings/Recreational Use BUI to determine they were ready to proceed with the removal of this BUI. Specifically, the technical team found that no waters within the AOC were proposed for listing by either state on the list of non-attaining waters due to controllable contamination with pathogens in the most recent Section 303(d) and 305(b) Integrated Report submitted to U.S. EPA (MDEQ, 2010; WDNR, 2010).

SUMMARY OF REMEDIAL ACTIONS OR SOURCE CONTROLS IMPLEMENTED TO ADDRESS THE BUI

Since the area was designated as an AOC, there have been several changes that affect the status of the Restrictions on Recreational Contact BUI. Among the most notable changes were upgrades to the wastewater treatment plants for both Marinette and Menominee which have resulted in both facilities operating within their respective state permit allowances (WDNR, 2010a; MDEQ, 2009a). In fact, Menominee has had no direct combined sewer overflows or sanitary sewer overflows following the treatment plant upgrade (MDEQ, 2009a). These upgrades are documented in detail in the 1996 RAP and include the following actions:

- 1974: City of Menominee upgraded their WWTP to a secondary treatment facility with conventional activated sludge with modifications to the primary clarifiers, aeration basins, final clarifiers, new chlorine contact chambers, new high rate diffusers, and new influent and effluent facilities.
- 1989: City of Menominee upgraded their WWTP with the addition of fine bubble diffusers, modifications to the chlorine chambers, and a new intake structure for the blowers.
- 1990: City of Marinette completed a combined sewer separation program to eliminate sewage bypassing by separating its previously combined sewer system. Work included 6.2 miles of new sanitary sewer and 6.5 miles of new storm sewer, rehabilitation of existing sewers, and repairs to deteriorated and leaking manholes.
- 1990: City of Marinette upgraded the wastewater treatment plant with major additions that reduced basement backups and bypasses previously caused by spring rains.
- 1992-1996: City of Menominee upgraded sections of the sewer system to eliminate the use of combined sewer overflow (CSO) pipe and installed almost 13 miles of new sewer pipe. This upgrade addressed the primary concerns related to CSO #2 which had provided the bulk of the overflows resulting from the core area of the city.
- 1996: Menominee Marina bacteria levels no longer considered an issue. Management included actions to reduce duck populations and increase flow by opening the north gates to allow for water to circulate inside the confines of the breakwater.
- 2002-2003: The City of Menominee upgraded their WWTP by completing further updates to facilitate wastewater treatment processes.

- 2005: The City of Menominee upgraded their WWTP through the installation of a 1,000 KW backup diesel generator with automatic switchgear for emergency backup power.
- 2006: The City of Menominee installed a fine screen (auger monster) onto the muffin monster.
- 2008: The City of Menominee installed a 500,000 gallon sludge tank with a truck loading station.

Given the extensive nature of these complete upgrades, the Technical Team has determined that Wisconsin and Michigan have addressed the original sources of bacteria contamination that were the basis for listing this use as impaired. Furthermore, neither Wisconsin nor Michigan has proposed to add any part of the AOC to the 303(d) list of impaired waters for pathogen contamination in their most recent Integrated Reports submitted to U.S. EPA. Current *E. coli* monitoring data suggest that the one monitored Michigan beach, John Henes Park, met water quality standards in 2008 and 2009 (MDEQ, 2009b; data available at http://www.deq.state.mi.us/beach/Default.aspx). Applicable criteria are based on the federal Water Quality Standards for Coastal and Recreational Waters published in the Federal Register (Vol. 69 – No. 220. pgs. 67218-67243) by U.S. EPA on November 16, 2004. In Wisconsin, no current bacteria data are available for beaches within the Menominee River AOC.

RECOMMENDATION

Based upon review of the Michigan and Wisconsin most recent Integrated Reports submitted to U.S. EPA (MDNRE 2010 and WDNR 2010b) and input from the Technical Team it is agreed that this BUI is meeting the Lower Menominee River AOC Delisting Criteria. Therefore, we recommend removal of the Restrictions on Recreational Contact BUI in the Lower Menominee River AOC.

Prepared by:

Sharon Baker, AOC Coordinator
Office of the Great lakes
MDNRE

Stephen Galarneau, Director
Office of the Great Lakes
WDNR

Appendix C

Official response to delisting request of the Restrictions on Recreational Contact Beneficial Use Impairment in the Lower Menominee River Area of Concern

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

MAR 3 2011

REPLY TO THE ATTENTION OF:

Stephen G. Galarneau, Director
Office of the Great Lakes
Wisconsin Department of Natural Resources
101 S. Webster Street
P.O. Box 7921
Madison, Wisconsin 53707-7921

Dear Mr. Galarneau:

This letter is the U.S. Environmental Protection Agency's (EPA) official response to your letter of January 27, 2011, requesting the delisting of the Restrictions on Recreational Contact Beneficial Use Impairment (BUI) in the Lower Menominee River Area of Concern (AOC). Since this AOC is on the border between Wisconsin and Michigan, this is a joint request from the Wisconsin Department of Natural Resources (WDNR) and the Michigan Department of Natural Resources and Environment (MDNRE). As your request points out and the supplied data supports, the following restoration criteria for the Recreational Contact BUI in the Lower Menominee River AOC have been met:

- No waterbodies within the AOC are included on the list of non-attaining waters due to contamination with pathogens from combined sewer overflows in the most recent Clean Water Act Water Quality and Pollution Control in either states: Section 303(d) and 305(b) Integrated Report, which are submitted to the EPA every two years.

Your supporting documentation states that existing WDNR monitoring records indicate that the Recreational Contact BUI criteria for water quality have been met and that the Wisconsin portion of the Lower Menominee River AOC is not listed as impaired for pathogens in the 2008 or 2010 Integrated Reports.

Based upon EPA's review of your request and the supporting data, and upon our shared desire to show progress as we move all of the Great Lakes AOCs toward restoration of all BUIs and formal delisting, EPA approves your request for the delisting of the Recreational Contact BUI in the Lower Menominee River AOC. EPA will notify the International Joint Commission (IJC) of this significant positive change in the environmental health of this AOC.

We congratulate all of the parties involved in this Federal/State/local partnership. This has been instrumental in achieving this important environmental improvement

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which will benefit the citizens of the Lower Menominee River AOC, the States of Wisconsin and Michigan, and of the Great Lakes Basin. We look forward to the continuation of this important and productive relationship with the WDNR and the local coordinating committees as we work together to fully restore all of Wisconsin's AOCs.

If I or my staff can be of further service to you, please do not hesitate to contact us.

Sincerely,

Gary V. Gulezian
Director

cc:
Patricia Birkholz, MDNRE
Sharon Baker, MDNRE
Ben Uvass, WDNR
Kendra Axness, WDNR
Dr. Saad Jasim, Director, Great Lakes Regional Office, IJC
John Perrecone, RAP Coordinator, USEPA-GLNPO
USEPA-Office of International Activities

Appendix D

August 25, 2010 CAC meeting minutes concerning the changes made to the restrictions on recreational contact delisting target

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APPENDIX D: August 25, 2010 CAC meeting minutes concerning the changes made to the restrictions on recreational contact BUI delisting target.

Citizens Advisory Committee for the Remedial Action Plan in the Lower Menominee River Area of Concern
Meeting Minutes

August 25, 2010
7-9 p.m., CDT

Geography/Geology Classroom
University YMCA/Max E. Peterson Field House
UW-Marinette
Corner of University Drive and Shore Drive, Marinette, Wisconsin

Attending: Kendra Axness (UWEX), Sharon Baker (MDNRE), Gail Clark (Resident and member of M&M Great Lakes Sport Fishermen), John Clark (Resident and member of M&M Great Lakes Sport Fishermen), Mike Donofrio (WDNR), Mark Erickson (Lloyd Flanders), John Groleau (Fibrek), Erin Hanson (USFWS), Brian Hinrichs (Foth Infrastructure & Environment), Trygve Rhude (Chappee Rapids Audubon), Rick Stoll (WDNR), Keith West (UW-Marinette), Steve Zander (Place Perfect Realty)
Via Conference Line: Jeff Danko (CH2M Hill), John Perrecone (USEPA-GLNPO)

Summary of Key Points and Action Items:
Prepare and distribute meeting notes – Kendra
Coordinate the September CAC meeting – Kendra
Update the Total & Partial Body Contact (formerly "Beach Closing") BUI delisting doc per CAC changes – Sharon
Work with co-chairs to generate a letter of support for the TPBC delisting document – Kendra
Explore the possibility of getting GIS layer showing USACE nav channels for Menominee Harbor - Keith
Work with co-chairs to generate a letter of support for the SPAC RFP outreach project - Kendra

Welcome and introductions – Steve Zander, CAC Co-Chair
Steve Z. started the meeting and asked attendees to state name and organization.

Update on Beach Closings BUI Delisting – John Perrecone, USEPA
The basis for delisting is option 1 in the delisting target, "No waterbodies within the AOC are included on the list of non-attaining waters due to contamination with pathogens in the most recent Clean Water Act Water Quality and Pollution Control in either states: Section 303(d) and 305(b) Integrated Report (Integrated Report), which are submitted to U.S. EPA every two years." A USEPA reviewer observed that there is no Wisconsin data to determine whether any beaches on the Wisconsin side of the river should (or should not) be added to the list of non-attaining waters. A similar comment was offered by a WDNR Office of Great Lakes reviewer.

Bay-Lake Regional Planning Commission received GLRI funds to conduct Beach Health Assessments at a number of beaches in northeast Wisconsin, including Red Arrow Park in City of Marinette. Through this project, data will be collected which would allow WDNR staff to make a determination about whether to add Red Arrow Park beach to the list of non-attaining waters. John pointed out that if the project identifies issues, then they could be addressed through BEACH Act or other programs, not necessarily through the AOC program.

Given the agency reviewers' comments, and the potential to have beach data for Wisconsin, John wanted to check in with the CAC before going ahead with delisting, to make sure that the CAC was aware of the project and the agency comments and still wanted to go ahead with delisting.

Sharon stated that Henes Park beach is not on the list of non-attaining waters, and that conditions at the Wisconsin beach are likely to be similar to those at Henes Park beach. Further, the initial reason for listing the Beach Closings BUI was related to combined sewer overflows (CSOs), not beach closings, and thus delisting should not be tied to beach issues. The CSOs have been resolved by comprehensive sewer separation efforts undertaken by the municipalities in the 1990s. Any problems at the beaches, if they exist, are likely due to waterfowl which is not an AOC-specific issue but instead is a lake-wide issue. Sharon and John both feel that it is appropriate to move ahead with delisting for those reasons.

Trygve noted that he'd seen an article in the local paper within the last few weeks that Henes Park beach had been closed for some amount of time due to the geese problem.

Overview of Bay-Lake RPC Beach Health Assessment Project – Brian Hinrichs, Foth Infrastructure & Environment
The goal of the beach health assessment project is to do a study (collect samples at beaches), identify issues, then look at causes and design best management practices to correct them. Foth will prepare documents that would be bid-ready, so that municipalities can show that they have "shovel-ready" projects for future grant opportunities.

A second Bay-Lake and Foth GLRI proposal that was not funded involved sediment characterization up to the first dam, to identify areas of scouring and deposition. This would help to identify fish habitat and also help to identify where contaminants are collecting. Brian would like to submit this project again when the next GLRI RFP is released. Sharon encouraged him to talk more about the project with herself and Steve Galarneau.

Discussion & Feedback on Beach Closings Delisting Document
Discussion about whether delisting the Beach BUI would hinder the ability of the BMPs identified in the Beach Health project to be funded by grant programs. It was generally thought that the AOC program would be an unlikely source of funding for the BMPs and other sources are available. Brian mentioned that the Wisconsin Coastal Management Program grants would be a possibility. Trygve stated that he was not comfortable holding up delisting if the reason for doing so was only to chase grant funds.

Steve stated that the "beach closing" term is problematic because the original Lower Menominee Remedial Action Plan (RAP) committee had stated the BUI as "Total and Partial Body Contact."

Each of the three options for delisting the BUI were reviewed by the group. None of them are currently a perfect fit because of the way they are written. Kendra suggested modifying option 1 to specify "No waterbodies within the AOC are included on the list of non-attaining waters due to contamination with pathogens ***from combined sewer overflows*** in the most recent Clean Water Act Water Quality and Pollution Control in either states: Section 303(d) and 305(b) Integrated Report (Integrated Report), which are submitted to U.S. EPA every two years."

Steve made a motion to modify the target in this way, and Mark seconded the motion. All CAC members voted in favor of making the change. John indicated that it would be okay to modify the target in that way so long as the delisting document explicitly identifies the modification with an explanatory footnote referring to the CAC meeting.

CAC members also agreed that they would prefer to see the delisting document use the "total and partial body contact" term instead of "beach closings." Sharon will make the changes to the document. A public informational session about the BUI delisting is expected to be part of the October CAC meeting. Erin recommended that the group be prepared to say a word about the number of beach closings that have occurred to emphasize that the Henes Park closing was an isolated event.

Kendra will work with CAC Co-Chairs to generate a letter of endorsement for the delisting document. The hope is that the BUI could be delisted by the end of the year.

Fish & Wildlife Plan Technical Advisory Committee Update – Kendra Axness, UWEX
Technical Advisory Committee meetings were held on July 13 and 22. Kendra handed out the draft goals/objectives/project summaries that TAC work groups generated on the 22nd and emphasized that they are still works in progress. She will present the TAC's work in more detail at the September CAC meeting. The Habitat TAC will meet again on September 9.

CAC members expressed concern about the statement under Goal 1 on the Habitat and Vegetation Work Group handout that "Green Island was removed from the goal statement…" Attendees did not want Green Island to be left out of the habitat plan altogether. Kendra explained that the habitat plan will include a list of projects that are supportive of AOC goals but not necessary for delisting, and Green Island would fit there. This is because Green Island is privately owned and it is unknown whether it could ever be acquired for public ownership, so the work group didn't want to have eventual delisting contingent upon acquiring Green Island. Steve pointed out that achievement of the objective, "50% of XX acres (to be determined) of natural areas are protected…" would be affected by whether or not Green Island is included in the calculation of total acres of natural areas.

There was discussion about the turning basin & whether it has been used in the recent past and if it should be identified as a project area in the habitat plan. Trygve noted that it was used once earlier this year. Tom Kuber had told Sharon that he uses it up to ten times per year. CAC members used an aerial photo provided by Brian to show where they thought the turning basin was located. The actual area that the U.S. Army Corps of Engineers dredges

for navigation is smaller than what folks think of as the "turning basin." The CAC agreed that the dredged area shown on USACE project maps should not be identified as a project area, but that adjacent downstream areas (between nav channel and 6th Street slip) should be considered. Kendra asked Keith if it might be possible to get a GIS layer showing USACE project areas to use in generating habitat plan maps, and he agreed to look into it.

Kendra described a grant application that she, Greg Cleereman, and Sharon are developing to submit for the Michigan SPAC RFP of July 30, 2010. It involves habitat plan outreach as well as purchasing equipment to support future outreach activities. Marinette County Land and Water Conservation will be the applicant and will assist with carrying out the project. The CAC approved the project, and the co-chairs will work with Kendra to generate a letter of support for the application.

Nominate a CAC member to attend AOC Program Meeting in Buffalo, NY – Co-Chairs
The CAC agreed to endorse Trygve as the representative, with Steve Zander as an alternate in case Trygve isn't able to attend.

Exhibit for NAH Fish Passage Open House – Kendra Axness, UWEX
North American Hydro is hosting a fish passage open house on October 9 and Kendra is planning to set up a display for the event. Several CAC members offered to help staff the display and Kendra will send a sign-up sheet around with details of the event.

Announcements and identify agenda items for September 29, 2010
The next meeting is scheduled for September 29th and will include the following:

- Update on Total/Partial Body Contact (Beach Closings) BUI Delisting
- Report on U.S. Areas of Concern Program Annual Meeting
- Presentation on Habitat Plan TAC progress and discussion of draft documents
- Presentation of display materials for fish passage open house & CAC feedback
- Update on fall GLRI RFP, if it has been released

Meetings were scheduled for Oct 27 and Dec 8 and Kendra will send a save the date notice.

Minutes respectfully submitted by Kendra Axness.

Appendix E

Letter of Support for the Stage 2 RAP from the Citizen's Advisory Committee

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LOWER MENOMINEE RIVER
CITIZEN'S ADVISORY COMMITTEE

Michigan Department of Environmental Quality
Office of the Great Lakes
Richard Hobrla, AOC Program Manager
Constitution Hall 6 Floor, South Tower
525 West Allegan Street
Lansing, Michigan 48909-7973

Wisconsin Department of Natural Resources
Office of the Great Lakes
Kendra Axness, LaMP and AOC Coordinator
PO Box 7921
101 S Webster Street
Madison, WI 53703-7921

Dear Mr. Hobrla and Mrs. Axness,

The Lower Menominee River Citizens Advisory Committee (CAC) supports the Draft Lower Menominee River Area of Concern Stage 2 Remedial Action Plan (RAP) and requests your review and concurrence. The Stage 2 RAP was prepared by the Michigan Department of Environmental Quality (MDEQ) and Wisconsin Department of Natural Resources Lower (WDNR) in cooperation with the Lower Menominee River CAC Technical Committee. The Technical Committee is comprised of CAC members and representatives from state and federal agencies. We understand that this Stage 2 RAP is the primary document that will be used to track progress on BUI restoration, assessment, and removal, as well as describing the path for delisting the AOC.

The format of the document consists of two parts. The first part is an overview of the AOC that is intended to be very concise and fairly static, with only infrequent updates. This part references all the documents relevant to the AOC history, including past RAPs where those who are interested can go for more comprehensive information. The BUI Tracking Matrix is the second part of the document and is meant to provide an easy reference guide to ongoing and future remedial activities. The matrix includes, where identified: targeted start and end dates, funding sources, the project lead for each, etc. The tracking matrix is intended to be fairly dynamic, frequently changing with continuous updates as progress is made or additional issues identified.

If you have any questions please contact Mark Erickson Michigan CAC Co-chair (906-863-1954), Steve Zander Wisconsin CAC Co-chair (715-923-7776), or Sharon Baker Michigan AOC Coordinator (517-335-3310, or Ben Uvaas Wisconsin AOC Coordinator (920-662-5465).

Sincerely,

Mark Erickson, Michigan Co-chair

Steve Zander, Wisconsin Co-chair

C.C. Stephen Galarneau, WDNR
Victor Pappas, WDNR

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Appendix F

Goals, Objectives, and Activities Table from the Fish and Wildlife Population and Habitat Management and Restoration Plan

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GOALS, OBJECTIVES, AND ACTIVITIES TABLE

GOALS				
Long-term protection is in place for natural areas[1] and wetlands within the AOC, including Seagull Bar and riverine islands	Nesting populations of a diverse array of wetland-dependent and riparian-associated birds are consistently present within the AOC.	Enhanced lake sturgeon population	Diverse & functional native fish and mussel assemblages in the AOC that sustain natural recruitment.	Restore a healthy and diverse native vegetation community
APPLICABLE AOC SEGMENTS				
1-6 and 7-8	(needs more investigating)	All	Designate appropriate segments for each species	Specify based on natural areas delineation and prioritization
OBJECTIVES				
XX acres of natural areas within reaches 1-6 and XX linear feet within reaches 7-8 are protected.	At least five nesting pair of birds per acre representing at least 10 different species from the Lower Menominee River AOC Bird List (to be developed) is found within segments XXX (to be determined) of the AOC.	Provide access to approximately 21 river miles to the Lake Michigan sturgeon population (version 1.1 of the Fish Passage and Protection Plan, October 29, 2009).	There is evidence of recruitment within the AOC below the Lower Scott Dam for the following fish species: walleye, yellow perch, muskellunge, whitefish, smallmouth bass, largemouth bass, and northern pike.	Invasive species comprise no more than 33% of the vegetation community in protected natural areas of the AOC.
		Provide safe downstream passage beyond AOC segment 1 to sturgeon (version 1.1 of the Fish Passage and Protection Plan, October 29, 2009).	There is evidence of recruitment in segment 1 for the following fish species: walleye, yellow perch, smallmouth bass, largemouth bass, and northern pike.	
			There is evidence of recruitment within the AOC for native mussel species.	

AOC Segments:

1: Lower Scott Flowage
2: Lower Scott Dam to western edge of the Tyco property
3: Maintained shipping channel
4: Maintained shipping channel/breakwater
5: Adjacent to Tyco property; includes USACE-designated turning basin
6: South Channel and Menekaunee Harbor
7: Green Bay shoreline - Michigan
8: Green Bay shoreline - Wisconsin

[1] 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 publically or privately held, and can include wetlands or riparian lands within the AOC. Natural areas are not necessarily formally designated State Natural Areas.

	Conducted By	Completed	Tracking Number	ACTIVITIES TO MEET RESTORATION GOALS	GOALS: Long-term protection is in place for natural areas[1] and wetlands within the AOC, including Seagull Bar and riverine islands	Nesting populations of a diverse array of wetland-dependent and riparian-associated birds are consistently present within the AOC.	Enhanced lake sturgeon population	Diverse & functional native fish and mussel assemblages in the AOC that sustain natural recruitment.	A healthy and diverse native vegetation community
Inventory & Analysis	NES ECOLOGICAL	2012	1	Inventory, map, and ground-truth lands within the AOC: wetlands, islands, natural areas and riparian zones; include information about ownership and protection status for these lands.	X				X
	Fisheries TAC members	2011	2	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.				X	
	TAC	2012	3	Analyze the results of the 2010 aquatic vegetation survey and 2011 riparian vegetation survey. Identify areas for habitat improvement projects.	X				X
	TAC/ NES Eco	2012	4	Identify existing mechanisms in place for wetlands & riparian protection, identify possible gaps, and identify ways to fill the gaps.	X				
	MDEQ	2012	5	Analyze results of the 2011 semi-permeable membrane device (SPMD) study and assess implications of the study for the habitat plan.		X	X	X	
	TAC	2012	6	Review results from Ansul's 2010 sediment characterization project and assess the implications of the study for the habitat plan.		X	X	X	
	TAC, WDNR, MDNR	2012	7	Assess the AOC to determine where there are lands that can be protected. Use the assessment to refine habitat plan as appropriate. Use existing tools such as conservation easements, local (city and county) ordinances, conservation programs, state and federal regulations and acquisition to achieve natural areas protection goal.	X				
	TAC	2012	8	Review results from 2011 riparian vegetation survey to identify natural areas along the lakeshore.	X	X			X

	Conducted By	Completed	Tracking Number	ACTIVITIES TO MEET RESTORATION GOALS	GOALS: Long-term protection is in place for natural areas[1] and wetlands within the AOC, including Seagull Bar and riverine islands	Nesting populations of a diverse array of wetland-dependent and riparian-associated birds are consistently present within the AOC.	Enhanced lake sturgeon population	Diverse & functional native fish and mussel assemblages in the AOC that sustain natural recruitment.	A healthy and diverse native vegetation community
Field Studies	TAC/CAC	2013	9	Conduct an enhanced bird study (beyond the Presence/Absence survey of 2010), possibly using Marsh Monitoring protocol and engaging volunteers. Use survey results to develop a bird list for the AOC.		X			
	ONTERRA	2010	10	Conduct an aquatic vegetation survey.	X				X
	NES ECOLOGICAL	2011	11	Conduct a riparian vegetation survey.					X
	GLNPO/ NAH	2012	12	Characterize Menominee Dam Flowage sediments and assess the implications of the study for the habitat plan.		X	X	X	
	GLNPO	2010	13	Characterize Menekaunee Harbor sediments and assess results for F&W implications.		X	X	X	
	ANSUL	2010	14	Characterize South Channel sediments and assess results for F&W implications.		X	X	X	
	WDNR/ FERC	2012	15	Conduct a mussel survey in the following areas: Park Mill Flowage, Menominee Flowage, and Segment 6A. Surveys will assess hydro dam impacts as well as serve as a baseline for evaluating subsequent sediment remediation & habitat enhancement efforts.				X	
	WDNR/ MDNR	2012	16	Complete a Menominee Flowage fish survey and compare assemblages to Park Mill Flowage to determine the status of the fishery. Develop and carry out recommendations for improving the Menominee Flowage fishery if warranted by survey data.				X	
	WDNR/ MDNR	2013	17	If existing efforts are not sufficient to understand recruitment, conduct recruitment studies below the Menominee Dam. If warranted by the studies, develop and carry out recommendations for enhancing recruitment within the AOC for selected species.			X	X	
	WDNR/ MDNR	2012	18	Seagull Bar- Identify whether fish currently access the pocket and determine what actions would be needed to enhance access if necessary.				X	

	Conducted By	Completed	Tracking Number	ACTIVITIES TO MEET RESTORATION GOALS	GOALS: Long-term protection is in place for natural areas[1] and wetlands within the AOC, including Seagull Bar and riverine islands	Nesting populations of a diverse array of wetland-dependent and riparian-associated birds are consistently present within the AOC.	Enhanced lake sturgeon population	Diverse & functional native fish and mussel assemblages in the AOC that sustain natural recruitment.	A healthy and diverse native vegetation community
Habitat Restoration and Protection Projects[2]	NAH		19	Complete the first three (of four) phases of the fish passage and protection plan: 1) Downstream passage around the Park Mill Dam; 2) Fish lift and research facility construction at the Menominee Dam; and 3) downstream passage around the Menominee Dam.			X		
	NAH		20	Complete phase four of the fish passage and protection plan, upstream passage around the Park Mill Dam. (not required to for delisting).			X		
	MDEQ	2015	21	Complete a wetland restoration project in the Menominee Housing/Rio Vista Slough				X	X
	BLM	2012	22	Enhance Strawberry Island and adjacent island by managing invasive species and improving native vegetation.		X		X	X
	WDNR	2015	23	Improve hydrologic connection between South Channel, and Menekaunee Harbor.				X	
	WDNR	2015	24	Complete a wetland restoration in Menekaunee Harbor for improved fish recruitment.	X			X	X
	WDNR		25	Within 2 years of completing dredging of arsenic-contaminated sediments from the river, enhance and/or restore aquatic and riparian vegetation in the area between 6th street slip and USACE designated navigation channel including the area just upstream of Waupaca Foundry.	X			X	X
	WDNR/MDNR	2015	26	Treat select terrestrial invasive species within the River corridor.					X
	MDNR	2015	27	Conduct a restoration project in the river channels adjacent to River Park Campground in Menominee.				X	X
	NAH		28	Treat Eurasian water milfoil in the Lower Scott Flowage (consistent with actions taken by NAH through FERC).				X	X

	Conducted By	Completed	Tracking Number		GOALS				
					Long-term protection is in place for natural areas[1] and wetlands within the AOC, including Seagull Bar and riverine islands	Nesting populations of a diverse array of wetland-dependent and riparian-associated birds are consistently present within the AOC.	Enhanced lake sturgeon population	Diverse & functional native fish and mussel assemblages in the AOC that sustain natural recruitment.	A healthy and diverse native vegetation community
				ACTIVITIES TO MEET RESTORATION GOALS					
Monitoring	USFWS		29	Establish a monitoring program to evaluate fish passage efforts, upon project completion. The program could include larval assessments, fish counts, tagging, or other means of documenting the movements of fish within the system.			X		
	WDNR/ MDNR		30	Repeat fish recruitment studies, mussel survey, bird survey, and aquatic vegetation survey after the restoration & protection projects have been completed and the target acreage for aquatic habitat sites has been achieved.		X	X	X	X

1 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 publically or privately

2 Additional Habitat Restoration and Protection Projects may be identified once the activities in the Inventory &Analysis, Field Studies, and Planning categories have been accomplished.

TAC- Technical Advisory Committee, MDEQ- Michigan Department of Environmental Quality, WDNR- Wisconsin Department of Natural Resources, MDNR- Michigan Department of Natural Resources, NAH- North American Hydro, GLNPO- Great Lakes National Program Office, BLM- Bureau of Land Management, USFWS- United States Fish and Wildlife Service, and CAC Members

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Appendix G

Technical and Citizen's Advisory Committee Members

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Technical Advisory Committee (TAC) Members

Organization	Representing	Individual
USFWS: Fisheries	Agency - Federal	Nick Utrup
USFWS: Habitat/NRDA	Agency - Federal	Betsy Galbraith
USACE	Agency - Federal	Martin Kuhn
USEPA	Agency - Federal	John Perrecone
Bureau of Land Management	Agency - Federal	Derek Strohl
Marinette County: LWCD	Agency - Local	Greg Cleereman
Bay-Lake Regional Planning Commission	Agency - regional	Angela Pierce
MDNR: Fisheries	Agency - State	Jessica Mistak
MDNR: Fisheries	Agency - State	Nick Legler
MDNR: Wildlife	Agency - State	Craig Albright
MDEQ: Aquatic Biologist	Agency - State	Sharon Baker
WDNR: Fisheries	Agency - State	Mike Donofrio,
WDNR: Fisheries	Agency - State	Tammie Paoli
WDNR: Wildlife	Agency - State	John Huff
WDNR: Aquatic Biologist	Agency - State	Greg Sevener
WDNR: Area of Concern	Agency - State	Rick Stoll
WDNR: Area of Concern	Agency - State	Benjamin Uvaas
Lower Menominee CAC	CAC	Mark Erickson
Lower Menominee CAC	CAC	Steve Zander
Stantec	Consulting Firm	Jon Gumtow
CH2M Hill	Consulting Firm	Jeff Danko
UP Architects & Engineers	Consulting Firm	Lee Bunting
Chappee Rapids Audubon	Env Group/Cons Club	Trygve Rhude
Great Lakes Sport Fishermen/ CAC	Env Group/Cons Club	Gail Clark
SFK Pulp Recycling/ CAC	Industry	John Groleau
North American Hydro	Industry	Rick Loeffler
UW-Marinette	University	Keith West

Citizens Advisory Committee Members

Citizens Advisory Committee Members

Education Community (2)	Keith West	
Environmental Interests (4)	Trygve Rhude	Steve Zander*
Local Business and Industry (6)	Nancy Douglas	Mark Erickson*
	John Groleau	
Local Government (6)		
Local Residents (2)		
Recreational Users (4)	John Clark	Gail Clark
	John Kukuk	
Tyco International (1)		
Integrys Energy Services Inc. (1)		

* Indicates Co-Chair