

**St. Marys River Fish and Wildlife Restoration Plan
Prepared by St. Marys River BPAC Office Staff
FINAL draft as approved by BPAC December 2008**

Purpose of This Restoration Plan

This report provides a plan to restore fish and wildlife populations and fish and wildlife habitat identified as being impaired in the Stage I and Stage II St. Marys River Remedial Action Plans (RAP). The plan also highlights the significant achievements made by stakeholders to restore, protect, and preserve the St. Marys River aquatic resources. The priorities for restoration defined in this plan will serve to direct agencies working in Michigan on the restoration of the river and provide priorities for projects to be completed on the Michigan side of the river, as funding becomes available. Completion of these restoration projects will lead to the eventual removal of the fish and wildlife population and habitat beneficial use impairments (BUIs) on the Michigan side of the river.

Though this plan focuses on the Michigan portion of the St. Marys River Area of Concern (AOC), the agencies working under the Four Party Agreement (i.e., Michigan Department of Environment (MDEQ), Ontario Ministry of the Environment (MOE), US Environmental Protection Agency (USEPA), and Environment Canada (EC)), will continue to collaborate and coordinate their shared responsibilities under the Four Agency Letter of Commitment. Because the St. Marys River spans the international border, removal of each BUI for the river will require removal of that impairment on both the Canadian and US sides of the river. (The process of developing delisting criteria for the Canadian side is presently underway and should build on the delisting criteria suggested in the Stage II RAP report.) Each of these BUI removals will involve technical committee and stakeholder input. After all of the BUIs are removed from both the US and Canadian sides, the St. Marys River AOC will jointly delisted.

Beyond the coordination of efforts on both sides of the river, the efforts stated in this report should be seen as a minimum set of tasks that would need to be completed for removing the fish and wildlife populations and habitat BUIs, not as the final goal of restoration. Even after the removal of individual BUIs, the local government agencies, non-government organizations, educational institutions, other citizen groups, and the residents themselves will have to work together to continue in their vigilance and stewardship of the resources to ensure that they do not again become degraded. The Binational Public Advisory Council (BPAC), established in 1988, hopes to continue its outreach, education, and watchdog functions beyond the time when the St. Marys River is delisted as an AOC, since delisting is just one step towards achieving and maintaining the integrity of this shared resource.

Background

The St. Marys River AOC

In 1987, the St. Marys River was designated as one of 43 Great Lakes AOCs. RAP documents were developed to identify specific BUIs (Stage I), and to identify potential

remedial actions needed to restore those use impairments (Stage II). The St. Marys AOC boundary was defined as the entire river system, from the head of the river at Whitefish Bay (Point Iroquois - Gros Cap), downstream through the St. Joseph Channel to Humburg Point on the Ontario side, and to the straits of Detour on the Michigan side.. The following 10 BUIs are listed for the St. Marys River AOC: Fish consumption advisories, Fish tumors or other deformities, Bird or animal deformities or reproductive problems, Degradation of Benthos, Eutrophication or undesirable algae, Beach Closings, Degradation of Aesthetics, Restrictions on dredging, Degradation of fish and wildlife populations, Loss of fish and wildlife habitat.

The Development of This Plan

To consolidate progress toward delisting AOCs in Michigan, MDEQ published its *Guidance for Delisting Michigan's Great Lakes Areas of Concern* in 2006 (MDEQ 2006). That document, developed in consultation with the Statewide Public Advisory Council and other stakeholders, provides a standard set of restoration criteria Public Advisory Councils (PACs) can choose to use for all the BUIs except the Degradation of Fish and Wildlife Population and the Loss of Fish and Wildlife Habitat BUIs. In recognition of the unique nature of the fish and wildlife related BUIs in each AOC, MDEQ outlined a process for PACs to use to establish restoration criteria and develop a fish and wildlife restoration plan. Restoration criteria for the non-fish and wildlife BUIs are covered in another document titled, "St Marys River Delisting Criteria for Non-Fish and Wildlife Beneficial Use Impairments."

This document presents that restoration plan for the St. Marys River. It is based on information from the Stage I and Stage II RAPs along with information from other reports and projects addressing water quality issues. The restoration plan documents progress to date on addressing the fish and wildlife-related BUIs on the Michigan side of the AOC, and also brings in new information and projects not necessarily planned specifically for the AOC, but are thought to have, or will have, a positive impact on the St. Marys River fish and wildlife resources.

To develop the restoration plan, a technical committee was formed consisting of resource professionals that work in the river. Members were recruited from the St. Marys River Fisheries Task Group (SMRFTG), Lake Superior State University (LSSU), Chippewa/East Mackinac Conservation District, and other groups. The purpose of the initial technical committee meeting was to discuss the fish and wildlife impairments outline the RAPs and to identify potential restoration projects that would help address those key issues identified by the technical committee. Subsequent meetings focused on identifying specific projects for areas in need of restoration.

The recommendations in this report also reflect stakeholder input. Two stakeholder meetings were held over the winter and spring of 2007/8. The first meeting was to gage stakeholder concerns and to identify potential projects. The second meeting was to get stakeholder comments on the restoration projects identified in the draft plan. The final draft of the restoration plan [was presented and approved at the November 5, 2008], BPAC meeting, which stakeholders were invited to attend.

The Impairments Regarding Degradation of Fish and Wildlife Populations and Loss of Fish and Wildlife Habitat

Degradation of Fish and Wildlife Populations

As described in the Stage I and II RAPs, degraded fish and wildlife populations were listed mainly due to concerns over habitat loss, body burdens of contaminants, and impacts of sea lamprey on the fish populations (OMOE and MDNR, 1992; EC, USEPA, OMOE, and MDEQ, 2002). Whitefish and herring were two species specifically mentioned as species of concern because their numbers had declined in the lower river. The impact of sea lamprey on lake trout was also recognized. It is important to note that degradation of fish and wildlife populations was not the central issue of concern for the listing of the St. Marys River as an AOC. Contaminated sediments were and remain the major issue.

The issues related to body burdens of contaminants illustrate the overall concern with chemical contaminants in the RAPs. The RAP documents, for example, list chemical contaminants in herring gulls and terns as a concern. The issues related to chemical contaminants are more completely addressed in other BUIs, including fish consumption advisories, fish tumors or other deformities, and bird or animal deformities or reproductive problems. Because the contamination issues are better addressed under these BUIs, they are not further addressed in this document.

Invasive species represent a Great Lakes-wide problem, not an issue specific or unique to the St. Marys River AOC. As with practically any area in the Great Lakes, the St. Marys River has been subjected to numerous invasive species, including sea lamprey, spiny waterflea, zebra mussels, gobies, rusty crayfish, purple loosestrife, and Eurasian water milfoil. Property owners and government agencies continue to monitor and implement control measures. Because invasive species are a Great Lakes-wide problem, specific restoration criteria for the St. Marys River were not developed to address this issue. For more information about specific projects and programs regarding invasive species, such as the sea lamprey control program, see "Recent and Ongoing Restoration Efforts," page 11, below.

The Stage I RAP reported that a complex and diverse fish community exists in the river, providing dynamic, year around sport fishing (OMOE and MDNR, 1992). It also reported that an important tribal subsistence fishery exists for whitefish, walleye, and other fish species throughout the St Marys River. However, the RAP documents stressed the need for a comprehensive, binational effort to assess and monitor the health of the fish populations in the St. Marys River. Since that time, the SMRFTG was established under the Lake Huron Committee of the Great Lakes Fishery Commission. The Lake Huron Committee is reviewing fish community objectives for Lake Huron, which includes the St. Marys River. The Task Group and the Commission complements and supports the RAP process.

Loss of Fish and Wildlife Habitat

The Loss of Fish and Wildlife Habitat BUI was listed for the St. Marys River AOC for the following reasons, as described in the Stage II RAP Report (EC et al., 2002):

- Loss of the majority of the St. Marys River rapids due to construction of the compensating works in 1921 to control flow to the locks and existing hydro power plants, resulted in loss of rapids habitat and an unnatural flow regime through the remaining rapids;
- Loss of other rapids habitat due to road and river navigation projects;
- Loss of riparian habitat due to urban and industrial development;
- Additional habitat degradation due to invasive species;
- Increased nutrient and sediment loads from tributary streams due to inadequate watershed management.

The first three issues from the above list are the basis for the specific restoration projects called for by this plan. The latter three issues are general, Great Lakes-wide issues not unique or specific to the St. Marys River. Though specific targets and projects will not be further developed for these issues, the BPAC will continue to track progress made by programs, projects and plans in place to address these ongoing habitat-related concerns (see "Recent and Ongoing Restoration Efforts," page 11,, below.)

Loss of St. Marys River Rapids Habitat

Four significant rapids existed in the St. Marys River before the river was extensively modified for commercial shipping. (These modifications began as early as 1890s and continued through the 1930s.) The four rapids were: the St. Marys Rapids, the Little Rapids, a stretch of rapids between Sugar Island and Neebish Islands, and a rapids between the mainland and Neebish Island (the area now known as the Neebish Rock Cut). Development and operation of the locks and hydro power plants resulted in filling, dredging and diverting of significant water flow from the main St. Marys Rapids, reducing the surface area and water quantity within the rapids to a fraction of its original size and volume (US Army Corps of Engineers [USACE], 2005). Construction of the causeway from the Sugar Island Ferry dock to the island destroyed the Little Rapids by diverting flow away from the shallows. Channel excavation destroyed the other two rapids.

Further impacting the flow regime through the main rapids is the high priority for lock operations as set by the International Joint Commission. In 1978, the IJC established that the highest priority for water flow through the compensating works is shipping. But in recognition of the importance of the rapids for fish habitat, the second priority was protection of the rapids fishery. This secondary priority established a guaranteed minimum flow for the rapids under the current IJC operating plan (Regulation Plan 1977-A). Other approved uses including hydroelectric power generation were given third priority (EC et al., 2002), although even at third priority, power generation uses a large portion of the outflow from Lake Superior.

St. Marys Rapids

The construction of the hydroelectric plants and the navigation locks required installation of compensating works to channel the flow of the river through those projects.

According to the Stage I RAP, an increase in demand for water in the 1960s resulted in the concern that water levels over the rapids were not sufficient to maintain the aquatic biota in the rapids (OMOE and MDNR, 1992). This loss of rapids habitat was a major issue documented in the Stage I RAP. The compensating works reduced flow (and at some times completely cut off flow) to the rapids, thus reducing the value of the rapids as habitat for a number of native fish species, especially whitefish. In 1985 Great Lakes Power in Ontario requested opportunity to build a new and larger capacity hydro power plant. A mitigation agreement to compensated for diversion of more water from the rapids resulted in construction of a fisheries remedial berm along the north shoreline to ensure that the flow along the north side of the rapids would remain and be sufficient for the protection of aquatic biota and organisms. When flows are at agreed to levels (see below) the structure is largely effective in keeping a wetted surface area, however, water depths and flow rates have been reduced. Present day, periodic dewatering and flooding of portions of the rapids still occur for maintenance and flow testing and the permanent loss of rapids habitat remain a concern.

According to the Stage II RAP, a hydrological study estimated the gains in rapids habitat that would result from various incremental increases in minimum flow volumes through the gates at the compensating works (EC et al., 2002). After considering various flow scenarios, the International Lake Superior Board of Control, the binational body governing the flow through the compensating gates, issued an order to have the northernmost gate (Gate 1) open to permit 15 cu m/sec to keep a flow of water along the north shore of the rapids, held in place by the fisheries remedial berm. The remainder of the rapids south of the berm is watered by the equivalent of ½ gate open. But even with this mitigation, the size of the St. Marys Rapids remains drastically reduced.

It has also been recognized that gravel to cobble-sized substrate in the lower St. Marys Rapids has been swept away by surges of water through the years. Suggestions for enhancement of the remaining rapids habitat have included the addition of gravel to increase benthic macroinvertebrate production in the lower rapids (Geiling, 1997). Other studies have pointed out that wetlands that existed at the foot of the rapids along the Canadian shoreline, probably served an important role as a nursery and staging area for many fish species. The combination of rapids flowing into wetlands would have provided prime habitat for fish production (Bray, 1993). Most of these wetlands have been lost to infilling for parking lots, building construction and industrial shoreline facilities. That loss of wetland suggests that conservation of the remaining wetlands is important to maintenance of natural fish reproduction and that creation or restoration of wetlands would improve it.

Little Rapids at Sugar Island

The Little Rapids at the head of Sugar Island, located between the Sugar Island ferry terminal and the island proper, was impacted by the construction of the causeway from

the Sugar Island Ferry dock to the island. This project blocked off most of the flow of water through that channel and the pre-existing rapids.

Neebish Island Rapids and the Rock Cut

The rapids located between Sugar Island and Neebish Island was destroyed during the construction of the navigation channel. Also, the construction of the navigation channel between Neebish Island and the mainland (i.e., the Neebish Rock Cut) removed substantial amounts of rock-rubble/cobble habitat, which was thought to be used as a spawning bed for walleye and sturgeon. The remaining watered rock-rubble/cobble habitat in this area was also compromised by placement of excavated materials and now only has intermittent water flow over it (USACE, 2005).

Restoration Targets

During the development of the Stage II RAP, a Flora and Fauna Task Team was formed to develop a strategic plan for the restoration of fish and wildlife related BUIs. Task team participants included state, federal and provincial agency and BPAC representatives. The task team examined a number of options for the remediation of rapids habitat and associated wetlands. Their findings and recommendation, summarized in Appendix 1, were designed to restore and rehabilitate habitat in order to enhance fish and wildlife populations in the AOC (EC et al., 2002). The Task Team recognized that implementation of some or all of these options would only partially compensate for historic losses to aquatic habitat in the AOC.

The Stage II RAP document also outlined a range of other types of restoration activities. In terms of the Degradation Fish and Wildlife Populations BUI, the major activities were to support the work of Sea Lamprey Control, the SMRFTG and other monitoring programs. These activities have been ongoing and are described in more detail under “Recent and Ongoing Restoration Efforts,” page 11.

The delisting criteria specified in this restoration plan centers on the Loss of Fish and Wildlife Habitat BUI, specifically calling for the restoration of two rapids habitat areas located entirely in Michigan waters. These projects were selected based on feasibility and the likelihood that the project would be supported by natural resource agencies and other stakeholders.

- The two fish and wildlife BUIs will be considered restored in the Michigan’s portion of the St. Marys River AOC upon the completion of the two projects described below, which would restore approximately 100 acres of fish and wildlife habitat.

BPAC does not specify numerical restoration targets in terms of fish populations or other indicator organisms. Restoration targets are instead specified in terms of acreage of habitat restored. We presume that restoration of the habitat will result in increased numbers of desired species. Post-implementation monitoring will be included in the workplans of the agencies responsible for the restoration activities (viz., MDNR and USACE).

Scope of Work

The two proposed projects will result in the restoration of approximately 100 acres of rapids habitat, including 28 acres in the Little Rapids at Sugar Island, 26 acres on the west side of the Neebish Rock Cut, and 42 acres on the east side of the Neebish Rock Cut. The projects would likely be completed by MDNR and USACE, respectively.

However, these proposed projects do not commit these agencies or other parties identified to complete the projects as described in this plan. The actual work to be completed and the role to be played by the agencies and other stakeholders will be further developed in more detail once the sites are considered ready for implementation and/or when funding becomes available.

Proposed Activities

Restoration of the Little Rapids at Sugar Island

Twenty-eight acres of rapids habitat can be provided by the restoration of the Little Rapids at the head of Sugar Island (Acres International Corporation, 1997). This area of rapids habitat was filled in with the construction of causeway between the Sugar Island ferry terminal and the island proper. The project, as originally proposed by MDNR, would involve the installation of clear span bridges to permit a greater flow under the causeway. Rock and rubble remain in the former rapids area downstream of the causeway, however, water in this area is mainly stagnant. Restoration of this rapids habitat would greatly improve fish reproduction and foraging opportunities in the St. Marys River (Figure 1, Figure 2).

The MDNR had this project fully designed and ready for implementation in 1996, however, some local residents on Sugar Island, downstream of the causeway, objected due to the potential increase in fishing activity that it might bring. The BPAC, the AOC Fish and Wildlife Technical Committee, and other stakeholders recommend that this project be revisited, the residents' objections re-evaluated and a solution to those objections be found, such as establishing the area as a sanctuary focused on rehabilitation of the brook trout population.



Figure 1. Location of the proposed Little Rapids project.

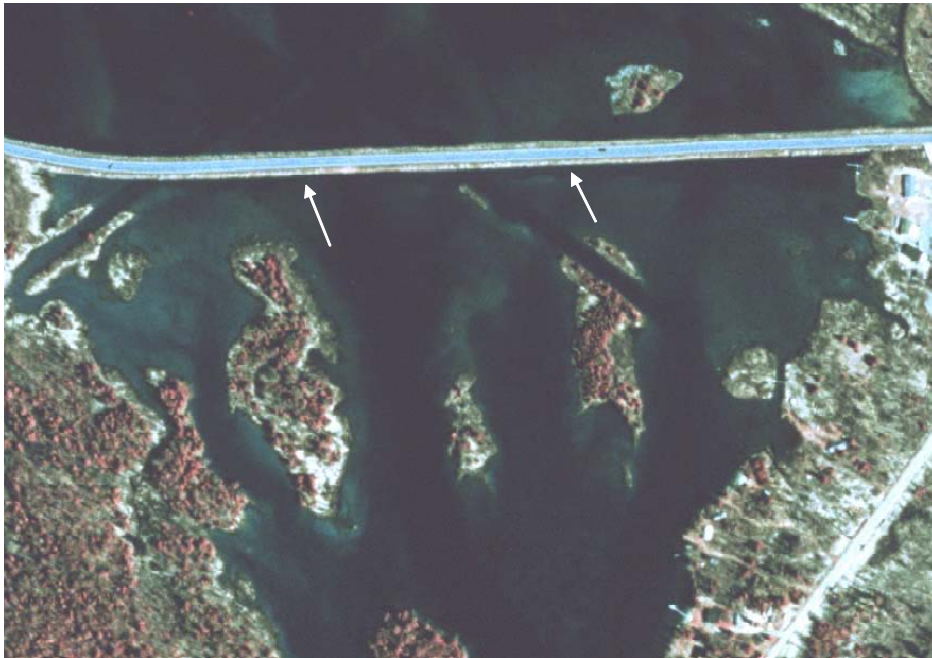


Figure 2. Closeup of the causeway. Presently, two, six-foot culverts, indicated by the arrows, are the only flow remaining.

Project Details

- Timetable: Depends on funding availability to MDNR.
- Acres: 28 acres
- Funding: MDNR. Cost estimated in the 1996 document was \$500,000 but that was without clear-span bridges.
- Responsible Entities: MDNR
- Indicator and Monitoring: The agencies associated with the SMRFTG (e.g., LSSU Aquatic Research Lab) would monitor the fish populations and the physical and biological aspects of the habitat periodically.
- Public Involvement: MDNR uses stakeholder processes in the planning and implementation of their projects.
- Project Reporting: All progress on project will be reported to MDEQ via the BPAC support staff or BPAC chair.

Restoration of Rapids at the Neebish Rock Cut

The USACE has proposed restoration of the rapids habitat in the Neebish Island Rock Cut (USACE, 2005). The proposed work includes a west and an east project site. According to the Corps' plan, "The west project site would consist of removal of old building foundations, excavation of a channel and the installation of a culvert to allow water to flow behind the existing rock piles over the natural rock-rubble/cobble substrate. The east project site would require the modification of the eastern remnants of the upper dam. A portion of the upper dam would be removed and culverts placed under the existing roadway. A channel would then be excavated to allow water to flow behind the existing rock piles over the natural rock-rubble/cobble substrate" (USACE, 2005).

The project is expected to significantly improve habitat for fish, especially walleye and sturgeon, and invertebrate species. Approximately 26 acres of river habitat on the west side of the Rock Cut and 42 acres on the east would result. According to the proposal document "the proposed project would provide essential flow to areas adjacent to the Rock Cut that would support and enhance the aquatic ecosystem...[and] improve water quality" (USACE, 2005). The project would occur entirely on USACE land.

The project is considered one of the top priorities in the latest Water Resources Development Act (WRDA) funding request. Specific details related to the planning of the project, examination of design alternatives, clearance through necessary approvals would be the responsibility of the USACE. The MDNR has expressed their support for the project and may have an interest in cost sharing as part of the required local match.

- Timetable: Dependent on funding through WRDA and availability of the local match.
- Acres: 68 acres
- Funding: WRDA. Cost estimated in the Corps' Planning Document ranges from one to two million dollars, depending on restoration alternative selected.
- Responsible Entities: USACE

- Indicator and Monitoring: SMRFTG or agencies within that group (e.g., LSSU Aquatic Research Lab) will most likely monitor the fish populations, and the physical and biological aspects of the restored habitat.
- Public Involvement: Formal coordination with federal agencies, state agencies, and regional and local agencies would be initiated during the planning, design, and analysis phase if the project proceeds. Public comment will likely be sought by some or all of the agencies involved.



Figure 3. Location of the proposed Neebish Rock Cut project (USACE, 2005).

Recent and On-Going Restoration Efforts

The AOC Program and the ultimate delisting of the St. Marys River as an AOC is not the final word on restoration and conservation of this resource. A significant number of projects have been completed and/or are underway for managing the resources in the river and its watershed. BPAC and other organizations have been instrumental in educating the residents and visitors of the area about the importance of conserving the resources represented by the St. Marys River. Some were a direct result of the AOC Program, others arose due to concern from groups of residents and other stakeholders. The list below includes many of those projects. The list was not intended to be comprehensive but rather an example of excellent work done in recent years by a wide range of people with a concern for the resource. It is groups and projects such as these that will ensure the future integrity of the St. Marys River is protected, maintained, and preserved.

St. Marys River Fisheries Task Group

SMRFTG was formed as part of the Lake Huron Technical Committee in 1997. The group consists of representatives from MDNR, US Fish and Wildlife Service, Chippewa Ottawa Resource Authority, Sault Sainte Marie Tribe of Chippewa Indians, Bay Mills Indian Community, OMNR, and EC's Department of Fisheries and Oceans. Also participating in the work of the group are LSSU and Sault College. The group assesses the health of the fish populations in the St. Marys River and works to coordinate and partner in fish assessment efforts on the river. To date the SMRFTG has completed several projects that were identified in the Stage II RAP as being instrumental in monitoring and assessing the status of the fisheries in the St. Marys River, including:

- Conducting the first Fish Harvest Survey in 1999-2000 as a cooperative effort by provincial, state, and native fisheries management agencies in Ontario and Michigan. The goal was to determine the total fish extraction from the St. Marys River by all sources (i.e., angling, commercial and subsistence fishing).
- Completed the St. Marys River Assessment Plan in 2002 (Gebhardt, Fielder, Greenwood, Robbins, and Sutton, 2002), which provides a standardized approach for regular assessment of the river's fishery and aquatic resources. The plan includes approaches for activities such as fish community assessment, fish harvest estimates, habitat mapping and data collection.
- Since 2002, the SMRFTG has undertaken angler fish harvest surveys, a fish population gillnet surveys, and an annual young of the year walleye electrofishing survey, among other routine monitoring efforts completed by the individual agency.

MDEQ's Surface Water Assessment Section Watershed Monitoring Program

The State of Michigan assesses water bodies (within targeted watersheds), including the St. Marys River, on a 5-year basin rotation. One component of the monitoring effort is to monitor fish and benthic invertebrate community structure, nuisance aquatic plants, algae, and slimes, as well as assess physical habitat.

Sea Lamprey Control

Sea Lamprey Control is the Great Lakes Fishery Commission's primary program which is delivered by the US Fish and Wildlife Service and Fisheries and Oceans Canada as the lead control agencies and the US Geological Survey as the lead research agency. Other agencies (MDNR, OMNR) and academic institutions (University of Guelph and Michigan State University) support the program through research and joint projects. LSSU is a contractor for collection from lamprey traps in the St. Marys River. The Sea Lamprey Control facility is located at the St. Marys Canal National Historic Site in Sault Ste. Marie, Ontario.

The program includes three main control measures: trapping, sterile male release and application of lampricide. The trapping program involves capture of females to remove them from the spawning population. Under the sterile-male program, male lamprey are trapped, sterilized and released back into the population. They compete for spawning females, but don't successfully breed. The lampricide program involves application of granular Baylucide in areas with high larval lamprey abundance. The control program includes an ongoing assessment of sea lamprey abundance by deepwater electro fishing for larvae. According to the assessment data, the combination of approaches seems to be effective in reducing sea lamprey numbers, but it will not be possible to eliminate sea lamprey from the St. Marys River system.

Watershed Planning

A number of watershed planning programs and specific watershed management projects have been implemented since the completion of the Stage II document.

The Sault Watershed Plan was completed in 2007 by the Chippewa/East Mackinac Conservation District. MDEQ has accepted the plan and the project is now entering the implementation phase. A stakeholder group is in place and provides input into the plan and its implementation. The goal of the plan is to enhance and protect the quality of the St. Marys tributary streams that flow through the watershed area surrounding Sault Sainte Marie, Michigan. These tributary streams include Ashmun Creek, Mission Creek, and Frechette Creek. The watershed plan will also help to address concerns expressed in the RAP documents regarding the point source pollution (e.g., urban/stormwater runoff) and non-point source pollution (e.g., agricultural runoff).

The Munuscong River Watershed Association was formed in the late 1990s. The objective of the group is to restore the quality of the Munuscong River, specifically to reduce siltation and improve fish habitat quality and the recreational potential of the river. This group of residents was instrumental in restoring the Sterlingville Bridge Site, a specific site identified in the Stage II RAP as in need of stabilization to address sedimentation to the river and Munuscong Bay. In cooperation with Chippewa County Road Commission, the former bridge pilings and resultant logjams were removed, the shoreline reseeded to native plants, a canoe slide and improved road access were installed. The group also installed a set of interpretive signs along the river.

The City of Sault Sainte Marie, Michigan is completing the separation of sanitary and storm sewers. As well, regulations regarding stormwater management have been put in place (namely through the National Pollution Discharge Elimination System – NPDES). Prior to this regulation, property development did not have to plan for stormwater runoff. Older developments, such as Cascades Crossings, discharge large amounts of water into the local streams after rain and snowmelt. Formal adoption of the Sault Sainte Marie Area Watershed Management Plan by the City will ensure that best management practices are implemented for new developments within the city in order to reduce stormwater runoff and improve water quality in the urban tributaries to the St. Marys River.

Other Research and Monitoring

LSSU Aquatic Research Lab and Department of Biological Sciences conducts several research and outreach projects related to the fish and wildlife that inhabit the river. Current projects include a sturgeon survey in the St. Marys River, recommended stream remediation projects for Ashmun Creek and Frechette Creek, and a major research project on the ecological integrity of the St. Marys River coastal wetlands.

The ecological integrity study began in 2004 to determine the ecosystem health of the St. Marys River. The LSSU researchers are investigating coastal marshes to determine the status of habitat and the wildlife by collecting biological, sediment, and water samples, and performing various types of chemical analyses. All field studies have been completed and indices of biotic integrity are being developed. Further refinement and development of biotic and chemical integrity models is ongoing. A final report will be completed in the summer of 2008.

Walleye stocking

The importance of sustenance and commercial fishing by native people and recreational angling in the St. Marys River is widely recognized by residents, various economic interests, units of government and others. One indication of the level of resources applied to supporting and enhancing fishing opportunities is the walleye stocking done by US, Canadian and Tribes/First Nations.

Marsh Monitoring Program

A marsh monitoring program that records instances of birds and amphibians has been in place in the St. Marys River for many years, mainly on the Canadian side. Recently, Bird Studies Canada (BSC) has re-invigorated the program with additional volunteers and additional study sites. Part of BSC's work has been in direct support of monitoring for AOCs and especially remediation projects in the AOCs.

Habitat Conservation

A number of habitat conservation projects have been completed for the St. Marys River.

Little Traverse Conservancy has acquired deed or conservation easements on 17 miles in nine properties along the Michigan shoreline of the St. Marys River. Some of these

preserves were secured in collaboration with MDNR and through funding by the National Wetlands Conservation Act (NAWCA).

The Nature Conservancy (TNC) also has a number of project sites along the St. Marys River, especially on Drummond Island and in the neighboring Les Cheneaux area. TNC recently received USEPA funding (summer 2008) to assist the Lake Huron Binational Partnership in the development of a Lake Huron Biodiversity Strategy. Working with a multitude of partners, the development of the Strategy will focus on compiling and integrating information about aquatic ecological systems, natural communities and species in both Canada and the US into an international strategy for conserving the biodiversity of Lake Huron and its watershed (including the St. Marys River). A Conservation Action Plan process is also presently underway (summer 2008) to identify critical unmet needs for the St. Marys River where TNC can make a contribution, develop a set of conservation objectives for TNC projects in the river and watershed, and increase networking of professionals working in the river and its watershed. The initial meeting with partners for the plan was held in August, 2008 at LSSU.

The City of Sault Sainte Marie, Michigan is involved in a project that could result in improved habitat conservation. The city recently acquired the Ashmun Bay property from Edison Sault Electric Company, under a grant from Michigan Natural Resources Trust Fund. The City held a series of planning workshops with stakeholders and the resulting plan called for much of the park to be a natural area. Ashmun Bay includes coastal wetland habitats and the mouth of Ashmun Creek. The City is presently looking for further funding to implement the plan.

Wetlands mitigation

A large number of constructed wetlands have been put in place in the St. Marys River watershed over the past several years. These wetlands often represent a collaboration between private land owners and the US Department of Agriculture Natural Resources Conservation Service, Chippewa/East Mackinac Conservation District, and Ducks Unlimited. Some of the constructed wetlands represent mitigation for wetlands lost to development but others are constructed simply to increase wetlands habitat. One example of these construction projects is the Munuscong Potholes Complex (also known as the Munuscong Bay Waterfowl Sanctuary), located just west of Munuscong Bay, near Pickford, Michigan. These wetlands have provided improved habitat for waterfowl and aquatic organisms.

Enhanced fish access

According to the Stage II RAP, the Michigan Department of Natural Resources bulldozed openings into the Munuscong Bay Waterfowl Sanctuary dike, allowing free water and fish movement into the rich emergent wetland matrix, unattainable by many fish since 1963 (S. Greenwood, pers. comm., as cited in EC et al., 2002).

Protecting Biodiversity

At the 2000 State of the Lakes Ecosystem Conference (SOLEC), the St. Marys River was recognized as having the highest biodiversity rating in the Great Lakes (De Philip et al.,

2000). This rating emphasizes the pressing need to protect the River's uniquely important riparian environment and to successfully address the habitat loss problems identified in the Stage I RAP. To address the need to protect unique species habitat and/or populations along the Great Lakes shoreline, the State of Michigan has designated 275 linear miles of essential habitat as Environmental Areas, including several reaches along the St. Marys River. Environmental area designation sets up a review program where the affected property owner must make application to the MDEQ for any dredging, filling, grading or other alteration of the soil, natural drainage or vegetation, or placement of permanent structures. This recognition by SOLEC was part of the rationale for TNC program described above.

Point Source Cleanup Projects

Cleanup of the *Cannelton Industries (Tannery)* site on the St. Marys River in Sault Sainte Marie, Michigan was completed in 2007. In a two-phase cleanup, many tons of contaminated soil and sediment were removed. In addition to removal of a potential source of chemical contaminants, the project resulted in cleaner habitat for waterfowl, fish and other aquatic organisms. Long-term monitoring of sediments, soil, and surface water is taking place to ensure protectiveness of human health and the environment. This long-term monitoring was specifically requested in the Stage II RAP.

Installation of the new *East End Sewage Treatment Plant* in Sault Sainte Marie, Ontario will protect the water quality of the river. The project was not billed as a direct benefit to fish and wildlife populations or fish and wildlife habitat, but it was a major improvement called for in the St. Marys River RAP documents.

Invasive species management

Sea lamprey was a major concern in the listing of the river as an AOC. The St. Marys River has been identified as a major source of sea lamprey reproduction and a vigorous control program is in place by the Sea Lamprey Control Program.

In addition to sea lamprey, the St. Marys River has received a long list of invasive species similar to any other site in the Great Lakes system. And like other communities in the Great Lakes, property owners and agencies along the St. Marys River have undertaken some invasive species management efforts. Biocontrol agents (i.e., *Gallerucella* beetles) have been successfully applied to purple loosestrife infestations, including Potagannising Flooding on Drummond Island; Bellevue Marine Park in Sault Ste. Marie, Ontario; and Echo Bay, Ontario.

Invasive species management across our region will be enhanced with the creation of the Invasive Species Research Institute, planned for Sault Ste. Marie, Ontario. This facility, which has been planned by Science Enterprises Algoma, will encourage collaboration in research and control of invasive species by government agencies, non-government organization and property owners in the upper Great Lakes region. While the focus will be terrestrial invasives, the existence of the Institute will bring additional attention to invasive species in general.

Other water and resource quality projects

Work on the specific AOCs is also complemented by two other programs directed toward improving resource quality in the Great Lakes. The St. Marys River is also covered by the Lake Superior Lakewide Area Management Plan (LaMP) and the Lake Huron Binational Partnership. For example, one specific project called for in the Lake Superior LaMP is the restoration of Ashmun Creek in Sault Sainte Marie, Michigan.

Restoration of the Great Lakes is also being addressed by the Great Lakes Regional Collaboration, a Great Lakes basin-wide program in the US designed to focus funding and efforts toward restoration of the Great Lakes. Restoration of AOCs is a key component of this initiative.

Other Habitat Related Issues Raised by the Technical Committee and Stakeholders

Over the course of developing this restoration plan, a couple important issues were raised by members of the Technical Committee and other stakeholders. They are included in the plan to raise awareness, and if addressed, may have a positive impact on the habitat conditions in the St. Marys River.

Issues Relating to Navigation

Shipping continues to be a vector by which pathogens and invasive species enter the Great Lakes and connecting channels through the release of contaminated ballast water. Although several states, including Michigan, have enacted legislation prohibiting the release of untreated ballast water within their jurisdictions, efforts to enact federal legislation which would require the treatment of ballast water have failed. It is hoped that legislation currently pending in Congress will be approved and that this source of invasive species to the Great Lakes will be eliminated.

Other navigation issues include the effects of bow wakes on streamside habitat. LSSU's research project regarding ecological integrity of the coastal wetlands partly documents such effects. During the Technical Committee and stakeholder meetings conducted as part of the present project, the idea of speed limits was raised. We encourage resource management agencies to look further into the feasibility of working with the Lake Carriers Association to find a solution to the issues related to bow wakes.

The fact that concerns over resource quality can influence navigation is illustrated by the decision not to permit winter navigation in the late 1970's (OMOE and MDNR, 1992) and again in the late 1990's, partly as a result of studies that demonstrated the impacts of winter navigation on fisheries and other aquatic life (e.g., Kauss, 1991).

Issues Related to the Operation of the Compensating Gates

An ongoing issue raised by the Technical Committee for the present report was the fact that when settings are changed at the compensating gates, they are changed suddenly instead of gradually. When the settings are changed on the compensating gates, the flow of water into the river rapidly changes. Sudden increases in flow can flush fish and other animals from their habitats. Sudden decreases in flow can leave fish and other animals stranded. Such sudden changes in flow rates can be detrimental to reproduction of fish

and other animals if the changes occur during critical life stages. A gradual change in the flow over a protracted period of time would let fish and other animals move to protected locations.

The OMNR has been working with the International Lake Superior Board of Control and its operational representatives, Brookfield Power (formerly Great Lakes Power), and the USACE since 1994 to mitigate such effects by timing the changes in water level fluctuations more appropriately for critical life stages. However, adherence to this request is not always communicated well enough to those supervising the change in gate setting. Thus, there appears to be a need to provide targeted outreach/education to raise more awareness about this important issue.

References

- Acres International Corporation. 1997. Little Rapids Restoration Project Feasibility Study. Prepared for Edison Sault Electric Company, Sault Ste. Marie, Michigan.
- Bray, K. 1993. *Preliminary Inventory and Evaluation of Littoral Habitat in the St. Marys River Area of Concern*. Report prepared for the St. Marys River Remedial Action Plan. Ontario Ministry of Natural Resources.
- Environment Canada, United States Environmental Protection Agency, Ontario Ministry of the Environment, Michigan Department of Environmental Quality. 2002. The St. Marys River Area of Concern Remedial Strategies for Ecosystem Restoration.
- DePhilip, M., Potter, H., Reid, R., and Rodriguez, K. 2000. *Great Lakes Shoreline Biodiversity Investment Areas*. Background Paper for discussion at the State of the Lakes Ecosystem Conference, Hamilton, Ontario.
- Gebhardt, K., D. Fielder, S. Greenwood, H. Robbins, and T. Sutton [Editors]. 2002. St. Marys River Fisheries Assessment Plan. Great Lakes Fisheries Commission, Special Report. Ann Arbor.
- Geiling, D. 1997. *St. Marys River: Options for Habitat Remediation*. Submitted by Department of Fisheries and Oceans to the Lake Superior Programs Office.
- Kauss, PB. 1991. Biota of the St. Marys River: habitat evaluation and environmental assessment *Hydrobiologia* 219: 1-35.
- Michigan Department of Environmental Quality. 2006. Guidance for Delisting Michigan's Great Lakes Areas of Concern. Report MI/DEQ/WB-06-001. http://www.michigan.gov/deq/0,1607,7-135-3313_3677_15430---,00.html
- Ontario Ministry of the Environment and Michigan Department of Natural Resources. 1992. The St. Marys River Area of Concern: Environmental Conditions and Problem Definitions. Remedial Action Plan Stage 1.
- US Army Corps of Engineers. 2005. SECTION 1135 Preliminary Restoration Plan. St. Mary's River Habitat Restoration, Chippewa County, Michigan. Dated September 6, 2005.

Appendix 1: Key recommendations by the Flora and Fauna Task Team to restore fish and wildlife habitat in the St. Marys River AOC, as outlined in the Stage II RAP (EC et al., 2002):

- Protect remnant rapids habitat from further reduction and degradation and maximize the productive capacity of the rapids area. In essence, this is a water quantity issue.
- Enhance remnant rapids habitat by placing additional spawning substrate in rapids area. This option would require the placement of additional substrate to potentially increase the size and productive capacity of the remnant rapids. The berm construction represents the first attempt to enhance the remnant rapids habitat.
- Create new rapids areas elsewhere in the St. Marys River, especially in the Little Rapids area.
- Create alternatives to rapids habitat such as artificial spawning substrate. A variety of methods are available to either create artificial spawning substrate or to cleanse existing habitat in order to enhance fishery production.
- Create wetlands downstream of Whitefish Island to connect wetland habitat to adjacent remnant rapids. This option would involve depositing suitable fill in the area between Whitefish Island and the channel leading to the former Canadian navigation lock.
- Create new wetland/rapids complexes. The Task Team believed that it may be possible to create riffle habitat along a series of islands and shoals that extend along the north shore of Sugar Island.
- Enhance habitat and water quality in tributary watersheds. Creating or enhancing wetlands in selected areas of tributary streams would provide a range of fish and wildlife habitats and would reduce sediment and nutrient inputs to the St. Marys River.
- Do nothing. The Task Team recognized that this option would maintain or increase dependence on hatcheries and stocking programs to enhance fish populations in the St. Marys River.