

Section 9: Remedial Action Plans and Watershed Implementation

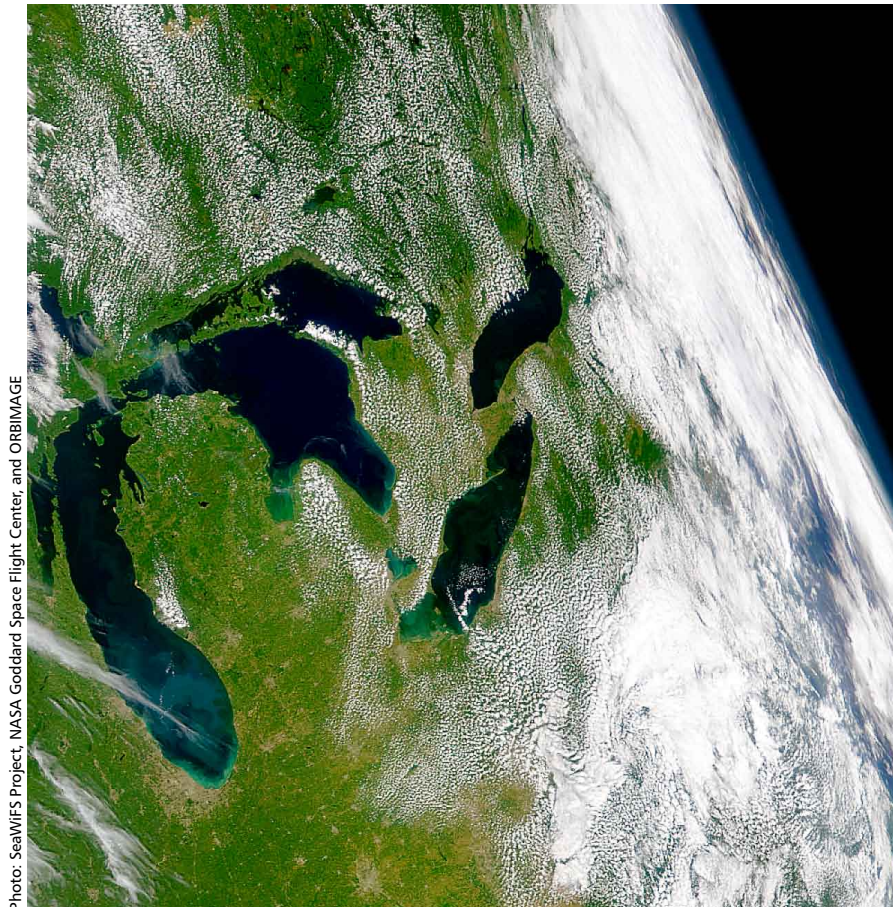


Photo: SeaWiFS Project, NASA Goddard Space Flight Center, and ORBIMAGE

9.1 Introduction

In addition to the development of LaMPs, Annex 2 of the Great Lakes Water Quality Agreement called for the development of Remedial Action Plans (RAPs) for the most environmentally degraded Areas of Concern (AOCs) around the Great Lakes. There are 12 AOCs in the Lake Erie watershed: two bi-national, one Canadian and nine U.S. (Figure 9.1). The RAPs have a smaller geographic focus than the LaMP, often encompassing only part of a watershed, and focus on restoring locally impaired beneficial uses. Implementation of remedial actions has been underway in most RAPs for over 15 years, using a combination of federal, state, provincial and local resources. The restoration of the AOCs will help to improve Lake Erie, and actions to restore Lake Erie will often benefit the AOCs. It is essential for the Lake Erie LaMP to continue to cultivate

communication with the RAPs and to benefit from the successful partnerships and programs that the RAPs have already created. In many ways the success of the LaMP depends on the success of the RAPs and vice versa.

Source track-down conducted for the LaMP identified the AOCs, as well as certain other watersheds, as key source areas and also where remediation could most benefit the lake. Land use management practices in particular have a significant impact on tributary loading to the lake. Therefore, the LaMP will support the implementation of management actions in the AOCs and at the watershed level as the primary steps toward restoring beneficial uses to the lake. This further reflects the intent of the Great Lakes Water Quality Agreement to focus on remedial action plans at AOCs (Annex 2) as well as address the input and contributions from watershed management plans (Annex 13).

The watershed is widely regarded as an appropriate unit to manage natural resources. As part of the Lake Erie LaMP process, the Fuzzy Logic model developed by and for the Lake Erie LaMP identified land use as the single biggest driver of in-lake conditions (Colavecchia, M., S. Ludsin, P. Bertram, R. Knight, S. George, H. Biberhofer, and P. Ryan 2000, Identification of ecosystem alternatives for Lake Erie to support development of ecosystem objectives, Lake Erie LaMP Technical Report Series). Watershed management focuses on land use and the sources of contaminants that are associated with land based activities. On a broader scale, Justice O'Connor's reports stemming from the Walkerton, Ontario tragedy reaffirmed the importance of watershed management. He focused many of his recommendations on mechanisms to strengthen and institutionalize watershed management through Source Water Protection Plans for drinking water in Ontario as a means to protect

human health and the environment. Municipal drinking water protection plans are now being prepared for the Canadian side of the Lake through the provincial *Clean Water Act*.

As the Lake Erie LaMP progresses, the LaMP partners will continue to assess the RAPs and existing watershed projects, encouraging better connections between the watersheds and the overall state of the lake. Watershed action plans and Total Maximum Daily Load plans (TMDLs) underway in the U.S. will be important to follow and tie into the LaMP. In Ontario, the Conservation Authorities' initiatives in support of watershed-based source protection in the Lake Erie basin will provide critical information that can be used to address the stresses imposed on the lake by adverse conditions in key tributaries.

A workshop held in Erie, Pennsylvania in 2006 attempted to bridge the gap between better communication among the Lake Erie LaMP, Lake Erie RAPs and Lake Erie watershed plans/programs. Workshop participants concluded that better land/water connections must be made to improve Lake Erie. A workshop summary can be found at www.glc.org/aocsummits/lakeerie/proceedings.html.

The following sections highlight the major activities completed or underway in the Lake Erie AOCs and several selected watersheds. Note that these activities are only a small representation of the ongoing watershed work throughout the basin. For the most part, these updates cover the actions implemented or initiated since the Lake Erie LaMP 2006 Report was published. Table 9.1 provides a "snapshot" of the AOC and watershed programs. In the future, this section will continue to expand the presentation of accomplishments in other watersheds as they become more focused on implementation of management efforts to assist in achieving the goals of the Lake Erie LaMP.

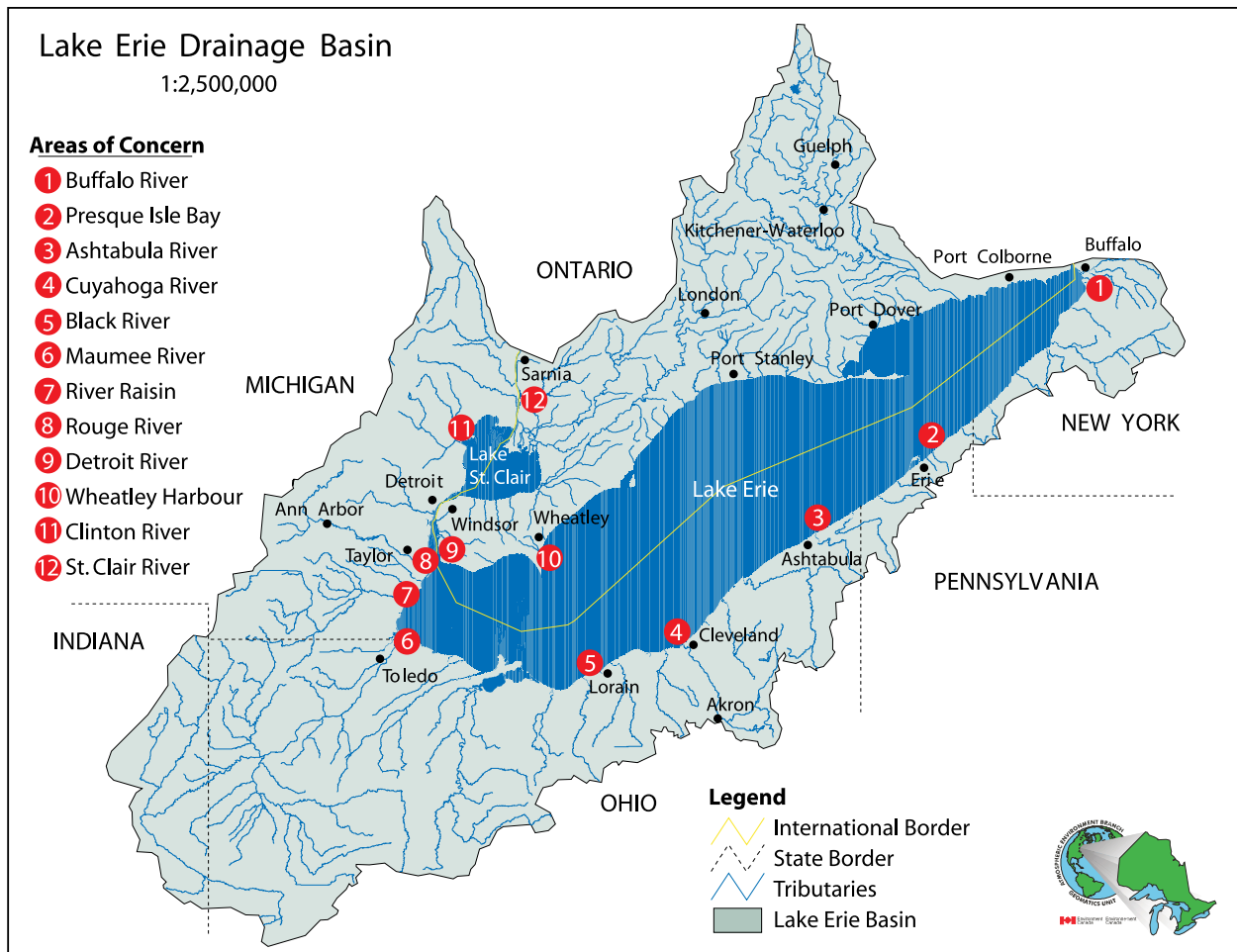


Figure 9.1: Areas of Concern in the Lake Erie drainage basin

Table 9.1: Summary of Lake Erie Remedial Action Plan and Watershed Implementation Programs

AOC / Watershed Name	Geographic Area	Stressors	Beneficial Use Impairments/ Management Issues	Restoration Activities Completed (2004 & 2005)	Restoration Activities Needed	Challenges	Next Steps
AREAS OF CONCERN							
Buffalo River	Lower 6.2 miles of river	Sediments, CSOs, past industrial practices, watershed nonpoint sources	Fish consumption advisory, fish tumors, degraded benthos, dredging restrictions, loss of fish habitat	Local RAP coordinator funded (Buffalo Niagara Riverkeepers); sediment and source assessment underway; 3 habitat improvement projects constructed	Haz. waste site remediation; address NPS; improve access and shore cleanup; sediment remediation	Funding; development pressures; CSOs; contaminated sediment; public involvement	Project feasibility study and implementation; beneficial use monitoring and reporting
Presque Isle Bay	3718 acre embayment	Contaminated sediments	Fish tumors, dredging restrictions	Continued brown bullhead monitoring; initiated studies to determine reference tumor incidence rates for Lake Erie and to better understand brown bullhead populations in PIB; implemented sediment monitoring program; held workshops to address fish tumor and dredging restriction BUIs.	No further remedial actions anticipated	Developing delisting targets for tumors and contaminated sediment; standardizing tumor assessment methodology	Develop delisting targets; monitor
Ashtabula River	Lower 2 miles of river	Past industrial practices; contaminated sediments; loss of habitat	Fish consumption advisory; degraded fish populations; fish tumors; degraded benthos; dredging restrictions; loss of habitat	Comprehensive Management Plan approved; landfill location selected; NRDA underway; GLLA funding approved.	Contaminated sediment remediation; habitat restoration	Funding	Prepare final remedial plan under GLLA and WRDA; monitor for improvements; implement habitat restoration under NRDA
Cuyahoga River	Lower 45 miles of river, tributaries and 10 miles adjacent nearshore. Approximately 475 sq.miles	CSOs and bypasses; urban storm water runoff; flow alterations; navigation channel; bank erosion; point sources; hazardous waste disposal sites	Fish consumption advisory; degraded fish populations; fish tumors and other deformities; degraded benthos; dredging restrictions; eutrophication; beach closings; aesthetics; loss of habitat	Stearns Farm streambank remediation; GIS wetland inventory; over 300 wetlands surveyed for quality; dam removal upstream of AOC; adoption of LTCP for Cleveland and Akron CSOs; storm water Phase 2 plans; conservation easements; TMDL; initiated feasibility of dam removal in AOC.	Increased DO and habitat restoration in navigation channel; sediment remediation in old navigation channel; long term management of navigation channel dredgings; dam removal; implementation of storm water plans	Funding for local RAP support and implementation; creating long-term stewardship	Reassessment of sub-watersheds based on Ohio delisting targets; establishment and maintenance of sub-watershed stewardship groups; installation of fish habitat in navigation channel; implementation of LTCPs; creation of additional conservation easements

Section 9:
Remedial Action
Plans and
Watershed
Implementation

AOC/ Watershed Name	Geographic Area	Stressors	Beneficial Use Impairments/ Management Issues	Restoration Activities Completed (2004 & 2005)	Restoration Activities Needed	Challenges	Next Steps
Black River	Entire watershed 467 sq.mi	NPS runoff; sediment; loss of habitat	Fish consumption advisory; degraded fish populations; fish tumors and other deformities; degraded benthos; dredging restrictions; eutrophication; beach closings; aesthetics; loss of habitat; restrictions on drinking water	Redesignation of tumor BUI to "in recovery"; delisting of benthos degradation in East Branch; installation of fish shelf along lower river significantly improved habitat and the fish population; sub-watershed group established for West Branch.	Continue focus on reduction of NPS loads	Funding; public outreach and participation	Establishment of local sub-watershed groups; TMDL; additional sampling on West Branch.
Maumee River	RM 22.8 to Maumee Bay, including Duck, Otter, Cedar, Grassy, Crane, Packer, Turtle and Rusha Creeks and the Ottawa and Toussaint Rivers, 636 sq.mi.	Contaminated sediments; loss of habitat; CSOs; ag and urban NPS runoff; hazardous waste sites	Fish consumption advisory; degraded fish populations; fish tumors; degraded benthos; dredging restrictions; drinking water; eutrophication; beach closings; aesthetics; loss of habitat	Toledo LTCP approved; intensive storm water and conservation education/outreach; Stage 2/watershed completed; initiated reassessment of BUIs by sub-watershed	Contaminated sediment remediation; habitat restoration; ag runoff control; wetland restoration; CSO abatement	Funding; sustained public participation; monitoring	Risk assessment for Duck/Otter; TMDL for Swan and smaller tribs; TMDL for Toussaint; TMDL for Duck; approval of Stage 2
River Raisin	Lower 2.6 miles, 1/2 mile into lake and nearshore	Industrial and municipal discharges; contaminated sediment; water flow variability	Fish and wildlife consumption; degraded fish and wildlife; bird or animal deformities; degraded benthos; dredging restrictions; eutrophication; beach closings; degraded aesthetics; loss of habitat	240 acre Eagle Island Marsh incorporated into Detroit International Wildlife Refuge; field assessment of open waters initiated; sediment assessment of nav. channel; benthos and habitat survey	Sediment remediation; control sources of contaminants	Funding; remedial options for contaminated sediments	GLLA funding request; BUI assessment; development of fish and wildlife habitat and populations restoration targets
Rouge River	466 sq. mi. includes entire watershed	CSOs; SSOs; NPS; industrial discharges; contaminated sediment; high flow variability	Fish and wildlife consumption; degraded fish and wildlife; fish tumors; degraded benthos; dredging restrictions; eutrophication; beach closings; degraded aesthetics; loss of habitat	Legislation enacted to create Alliance of Rouge Communities; updated RAP including 20-year implementation program; monitoring showing improvement w/6 BUIs potentially eligible for removal/delisting; 77 of 83 CSOs now under control or eliminated; 32 community projects completed	Address NPS; sediment remediation; habitat restoration; manage storm water runoff.	Funding; development pressures, habitat loss	Volunteer monitoring program initiated; GIS system to map critical habitat and assist in developing fish and wildlife habitat delisting targets

AOC/ Watershed Name	Geographic Area	Stressors	Beneficial Use Impairments/ Management Issues	Restoration Activities Completed (2004 & 2005)	Restoration Activities Needed	Challenges	Next Steps
Detroit River (binational)	32 mile connecting channel with 607 sq.mi. watershed in Michigan	Habitat loss; contaminated sediments; past industrial practices; ag runoff; urban development and subsequent storm water runoff; CSOs; non-native invasive species	Fish consumption advisories and tainting; degraded fish and wildlife populations; fish tumours and deformities; bird and animal deformities and reproductive problems; degraded benthos; dredging restrictions; drinking water taste; beach closings; degraded aesthetics; loss of fish and wildlife habitat; exceedance of water quality objectives.	Improved Cdn RAP coordination; 5-year Cdn work plan developed; Cdn delisting criteria finalized; Cdn monitoring and research plan finalized; various monitoring and research programs implemented and ongoing; 220 lbs of mercury collected under Windsor household mercury program; increased Cdn public involvement and outreach; Friends of the Detroit River reconvened US PAC; GLLA funded removal of 115,600 cu.yds contaminated sediment from Black Lagoon; > 900ft. of shoreline restored; numerous ag BMPs implemented; 211 acres of upland forest habitat restored.	Ongoing implementation of large-scale monitoring program; sediment remediation; habitat conservation and restoration; address urban and rural NPS; increase public investment and involvement in the cleanup	Funding; development pressures; CSOs; contaminated sediments; insufficient public involvement; transportation issues.	Aquatic habitat management plan finalization and implementation; bi- national approval of delisting criteria; implementation of monitoring and research framework; BUI update report; expansion of household mercury collection to include pharmaceuticals; increase public involvement and awareness of RAP; creation of RAP report card.
Wheatley Harbour	Wheatley Harbour and Muddy Creek wetland in Essex Region of southwestern Ontario.	PCB contaminated sediments; nutrient enrichment and bacteria loading from ag land use and faulty septic systems; habitat loss due to development and expansion of the commercial harbour in the 1950s and 1970s respectively.	Restriction on dredging activities; restrictions on fish and wildlife consumption; loss of fish and wildlife habitat; eutrophication or undesirable algae; degradation of fish and wildlife populations.	Wetland sediment and YOY fish sampling conducted; surface soil sampling conducted at historical dredge disposal sites; wetland hydrology and sediment transport study initiated; delisting criteria revised; 40 NPS projects conducted in Muddy Creek watershed; 5 habitat restoration projects restored 6.4 hectares of habitat; held "State of Wheatley Harbour" workshop; outfall water sampling completed.	Complete PCB source trackdown; continue to implement upstream NPS projects; complete Muddy Creek hydrology and sediment transport study.	Determining if active sources of PCBs remain in the Muddy Creek wetland; engaging local community and government.	Reassessment of BUIs; development of sediment remediation strategy; development of long-term monitoring plan; meetings with general public, local industry, and local governments to present updated status and revised delisting criteria.

Section 9:
Remedial Action
Plans and
Watershed
Implementation

AOC/ Watershed Name	Geographic Area	Stressors	Beneficial Use Impairments/ Management Issues	Restoration Activities Completed (2004 & 2005)	Restoration Activities Needed	Challenges	Next Steps
Clinton River	760 sq. mi. includes entire watershed	Storm water runoff; NPS; CSOs; contaminated sediment	Fish and wildlife consumption; degraded fish and wildlife populations; degraded benthos; dredging restrictions; eutrophication; beach closings; degraded aesthetics; loss of habitat	Grant to develop delisting targets; assessment of contaminated sediments; storm water education; 7 watershed groups developing sub-watershed management plans and Phase 2 P2	CSO and SSO control; NPS management; superfund remediation; habitat restoration; elimination of illicit connections and failing septic systems	Funding; development pressures	Refinement of delisting criteria; RAP update; WWTP upgrades; public education
St. Clair River (binational)	40 mile connecting channel from the Bluewater Bridge to Lake St. Clair and includes the St. Clair Flats from St. John's Marsh in the west, to the southern tip of Seaway Island, and east to the north shore of Mitchell's Bay on Lake St. Clair.	Chemical spills from Industry; mercury contaminated sediment; urban and ag NPS; loss of fish and wildlife habitat	Restrictions on fish consumption and tainting; bird and animal deformities (based on chironomid mouthpart deformities); degradation of benthos; restrictions on dredging activities; restrictions on drinking water consumption and taste and odour problems; beach closings; degradation of aesthetics; added cost to agriculture and industry; and loss of fish and wildlife habitat	Removal of 13,370 cu.m. of mercury-contaminated sediment; replacement of fish mix offshore of Dow Chemical Canada Inc.; NPS pollution control programs and aquatic and terrestrial habitat restoration/enhancement on private and industry owned lands; progress report completed; RAP implementation committee reformed; receipt of federal grant for real-time water monitoring.	Address remaining mercury- contaminated sediment in Zones 2 and 3 and NPS pollution; identify potential for further aquatic habitat restoration projects; further assess effect of contaminants on bird and animal deformities and reproductive problems; develop chemical spill control and notification procedures; CSO and SSO control; NPS management.	Preventing industrial chemical spills to the St. Clair River and establishing suitable delisting criteria; understanding causes of beach closings and NPS pollution; restoring and protecting existing terrestrial and aquatic habitat in spite of continued urban and agricultural pressures; funding; interagency/ industry coordination.	Assessment of all BUIs and their delisting criteria with review by all agencies, the BPAC and the RAP Implementation Committee; additional contaminant monitoring and affects studies that will address degradation to benthos, fish consumption advisories and bird/ animal deformities; host facilitated workshop to comprehensively assess habitat gains and losses in the AOC, identify potential for aquatic restoration and review the delisting criteria; develop user-friendly report card.

AOC/ Watershed Name	Geographic Area	Stressors	Beneficial Use Impairments/ Management Issues	Restoration Activities Completed (2004 & 2005)	Restoration Activities Needed	Challenges	Next Steps
WATERSHEDS							
Kettle Creek	520 sq km watershed in southwestern Ontario, drains south London and St. Thomas to Port Stanley on Lake Erie	Highly erodible soils and steep run-off landscape; agricultural and urban development pressures	High sediment, nutrient and bacteria loadings; ag NPS pollution; river hydrology (flash flooding, low base flow); habitat degradation	\$250,000 worth of environmental rehabilitation works including tree plantings, watercourse buffers, wetland creation, streambank erosion control, environmental education, watershed cleanup days, and resource management planning at the community and municipal level.	Monitor point and NPS pollution and habitat changes, evaluate results and target remedial work for measurable results.	Need to develop and implement monitoring, protection, and restoration activities that are required to address priorities at all three levels of government - which overlap in impacts to Lake Erie.	Complete Source Protection Planning initiatives that will identify areas of NPS pollution.
Big Otter Creek, Big Creek, Lynn River, Nanticoke Creek, Sandusk Creek and Stoney Creek	Approximately 2782 km ² , and includes approximately 170 km of Lake Erie shoreline entering Lake Erie east & west of Long Point.	Erosion	High sediment, nutrient, and bacteria loadings have resulted in fish and wildlife habitat loss; pathogen problems have resulted in waterfowl mortality in Long Point Bay, seasonally low water levels.	400 acres replanted/restored; restored 60 acres of acquired floodplain agricultural land along Big Creek; acquired 79-acre parcel of floodplain/wetland + 85 acres of upland forest and agricultural land; developed a restoration action plan for lower Big Creek watershed	Source water protection planning, "state of watershed" monitoring and reporting for Big Otter and Big Creek watersheds; surface & ground water monitoring programs	Private landowner extension and stewardship efforts will be a high priority in identified subwatersheds suffering erosion and sedimentation problems, and utilizing new funding as available from provincial and federal programs.	
Catfish Creek	490 sq km watershed in southwestern Ontario, draining south to Port Bruce on Lake Erie	Continued agricultural and urban development pressures resulting in nutrient and sediment loading; habitat loss; and increased flooding in the lower reaches	High sediment, nutrient and bacteria loadings; ag and urban NPS pollution; habitat loss & degradation; flooding of lower watershed	Elgin Landscape Strategy completed to help identify habitat restoration sites; over \$400,000 generated for special environmental rehabilitation projects and inventories.	Local watershed studies to better target areas of concern; identify, monitor, and address point and NPS pollution and habitat changes	Land use pressures; funding for watershed strategies, monitoring and implementation measures.	Complete Source Protection Planning initiatives that will identify areas of NPS pollution; work in partnership with Environment Canada and other affected government agencies to identify and implement restoration and monitoring activities needed to address land use impacts on Lake Erie.

AOC/ Watershed Name	Geographic Area	Stressors	Beneficial Use Impairments/ Management Issues	Restoration Activities Completed (2004 & 2005)	Restoration Activities Needed	Challenges	Next Steps
Grand River	6800 sq. km. Watershed in central SW Ontario	Urban growth and ag development pressures	Need to connect watershed issues with Lake Erie needs; impaired fish habitat;	Implementation of Grand River Fisheries Management Plan; COA assessment work on S. Grand; "Exceptional Waters" implementation; Mill Creek stewardship ranger rehabilitation; recovery team for fishes at risk; more than 1300 projects implemented under Rural Water Quality Program; removed 3 dams; Grand River and tributaries Instream/Environmental Flows Study; sub-watershed plans initiated, completed and/or implemented	Increase forest cover in the watershed from 19 to 30%; completion of source water protection plan; integrated watershed monitoring program;	Funding; addressing pressures of growth on water supply, water treatment and the environment; magnitude of rural NPS problem; coordination among federal, provincial and municipal programs for implementation	Develop integrated agency funding mechanism; implementation of GRFM, sub-watershed plans; GRSimulation model refinement; complete Grand S. Grand River assessment and initiate recommendations;
Essex Region Watersheds	425,000 acre (172,000 hectare) watershed in extreme southwestern Ontario. This peninsular region is surrounded on three sides by the Detroit River, Lake St. Clair and Lake Erie and is drained by 20 watersheds.	Land use pressures, including urban and agricultural impacts on natural lands and water quality.	Additional funding to increase NPS and habitat improvement projects; more integrated and/or additional watershed studies to better target remedial work; require ongoing municipal engagement to address land use issues	Over 100 water quality improvement projects completed utilizing landowner incentive grants, over 200 acres of forest lands restored utilizing over 170,000 trees, over 20 community events engaging over 1,500 adults and youth, and almost 280 acres of significant natural areas protected through acquisition.	Despite ongoing progress an increased number of water quality improvement and habitat restoration projects are required to address local goals of 12% natural areas coverage and acceptable water quality.	Land use pressures; resources for watershed stewardship activities; imperfect integration of natural resource management activities across the region.	Aggressive pursuit of resources (funding, landowners, etc.) to restore habitat and water quality with concurrent emphasis on prevention of same in the future through landowner education and effective partnerships with municipalities, other governments, etc.

AOC/ Watershed Name	Geographic Area	Stressors	Beneficial Use Impairments/ Management Issues	Restoration Activities Completed (2004 & 2005)	Restoration Activities Needed	Challenges	Next Steps
Lake St. Clair Watershed Initiative	Canadian watershed (excluding St. Clair River) and US watershed, including St. Clair River	Land use; point and NPS source pollution; commercial & recreational boating; habitat and biodiversity loss; pathogens; spills	Degradation of fish and wildlife habitat; reduced water quality; fish consumption advisories; beach closings; chemical spills; altered hydrology; lack of defined environmental performance measures and requisite monitoring data; stable organizational support	Lake St. Clair Coastal Habitat Assessment complete; Lake St. Clair Canadian Watershed Draft Technical Report; USACE Comprehensive Mgt. Plan for lake and river; completed consultation of proposed Cdn Management Recommendations; US TMDL for Metro & Mem. Beach begun; St. Clair Shores PCB source track down; US Lake St. Clair Regional Monitoring Project; flow modeling on the St. Clair River, Detroit River, and Lake St. Clair; third biennial Lake St. Clair Conference; Lake St. Clair Bi-national Coordinating Councils established; US Management Plan Implementation Strategy development	Detailed topographic map of lake bottom and 3D hydrological model of the Huron - Erie corridor to facilitate implementation of restoration activities; BMPs for NPS pollution; support for Lake St. Clair Coordinating Teams; development of environmental endpoints; support for implementation of USACE Management Plan	Funding; undefined measurable environmental endpoints; lack of mechanisms to ensure long-term implementation of USACE Management Plan	Complete management recommendations and develop implementation strategy; initiate US St. Clair River/Lake St. Clair drinking water monitoring project; continue Lake St. Clair Coordinating Teams' management activities
Thames River Watershed	5825 km ² watershed in southwestern Ontario, river is 273 km long, drains into Lake St. Clair	Continued land use pressures (agricultural and urban development) resulting in nutrient and sediment loads and habitat loss.	Additional funding to increase NPS projects and habitat improvement projects to address Lake Erie needs; need local watershed studies to better target remedial work.	204 rural best management projects, watershed education for 40,000 students, 120,000 trees planted for habitat improvement, local resource management plans developed or in progress, protection and rehabilitation of significant habitat.	Address NPS pollution, habitat improvement and further studies to understand source of pollution.	Land use pressures degrading watershed resources; lack of funding for watershed plans; limited monitoring and implementation.	Implementation or protection, restoration and monitoring activities need to be increased to address land use pressures and Lake Erie impacts.

9.2 Remedial Action Plan Updates

Buffalo River RAP, New York

www.bnriverkeeper.org

www.epa.gov/glnpo/aoc/buffalo.html

History

The Buffalo River Remedial Action Plan (RAP) process was originally developed as a partnership among U.S. EPA, the New York State Department of Environmental Conservation (NYSDEC) and the Buffalo River Citizens' Committee. The committee was established by NYSDEC in 1987 and is made up of representatives from community, environmental, academic, sporting, and local government interests. The Area of Concern (AOC) includes the lower 6.2 miles of the Buffalo River (10 km). The combined Stage 1 and Stage 2 RAP document was completed in November 1989. A number of RAP status reports have been published since 1991 to update commitments, track implementation, and celebrate accomplishments.

Remedial activity efforts have been focused on six major areas: stream water quality monitoring; river bottom sediments; inactive hazardous waste sites; municipal and industrial wastewater treatment facilities; combined sewer overflows; and fish and wildlife habitat. Strategies and remedial activity progress are updated annually in the Buffalo River RAP Status Report produced by the Buffalo Niagara Riverkeeper (BNR). Five beneficial uses are rated as impaired in the AOC: fish and wildlife consumption advisories; the presence of fish tumors; degraded benthos; dredging restrictions; and loss of fish and wildlife habitat.

The Riverkeeper (BNR) has received U.S. EPA funding to continue RAP coordination. The focus is on research, priority project implementation, and restoring the beneficial uses through delisting considerations. The RAP process assesses project costs for implementation. Current priorities are addressing contaminated sediments and stream corridor protection to benefit public use.

A "Report Card" has been developed that clearly defines environmental categories (e.g., water quality, land use), successes and improvements, current conditions, and steps for resolution. The Report Card applies a grade and a trend rating the current status. This report card, RAP Status Reports and other Buffalo River watershed information are posted on the BNR website www.bnriverkeeper.org.

Progress since the 2006 LaMP Report

The Buffalo Niagara Riverkeeper (BNR) provides management, reporting, and oversight for various projects, including: the Buffalo River RAP; the Buffalo River Sediment Remediation Feasibility Study; the City of Buffalo's waterfront revitalization; and the Buffalo Sewer Authority's Combined Sewer Overflow (CSO) correction. Provisions for the Buffalo Sewer Authority's (BSA) Long Term Control Plan (LTCP) for CSO abatement are incorporated into the city's point source SPDES water discharge permit under the requirements and supervision of NYSDEC.

BNR and the Remedial Advisory Committee have developed restoration targets and delisting criteria for the following Buffalo River AOC Beneficial Use Impairments (BUIs):

- Restrictions on Fish and Wildlife Consumption
- Fish Tumors and Other Deformities
- Degradation of Benthos
- Restrictions on Dredging
- Degradation of Aesthetics
- Loss of Habitat (drafted)

Final assessments are being conducted for the BUI addressing: tainting, degradation of fish and wildlife populations, and bird/animal deformities or reproductive problems. Two BUIs were officially determined to be "not impaired" in 2007, including eutrophication and degradation of phytoplankton populations. The Buffalo Niagara Riverkeeper is currently updating the original Buffalo River RAP with a draft expected by June 1, 2008.

Remediation has addressed nonpoint source industrial pollution at the following sites:

1. Steelfields (aka Donner-Hanna Coke/Republic Steel/LTV Steel) - Substantive completion of nearly all remedial actions. The site is eligible for re-development under New York's Voluntary Cleanup program.
2. Buffalo Color Plant Site - The final installation and operational testing of a groundwater leachate collection and treatment system was completed. A Remedial Investigation and draft Feasibility Study was completed and is under review.
3. ExxonMobil - Implementation of a Conceptual Site Plan under New York's Brownfield Cleanup Program continues. Remediation was completed on former residential properties; a feasibility study is under review for property along Elk Street. Interim Remedial Measures continue on the landfill area adjacent to the river.

Further, ExxonMobil and Honeywell have funded a planning document entitled "Redevelopment Plan for the Elk Street Corridor." This effort will study economic development strategies for this former heavy industrial use area that is now a brownfield. The study is expected to be completed in the fall of 2008 and will assist with the development of cleanup strategies along the Buffalo River.

On March 9, 2007, the Buffalo Niagara Riverkeeper became the first non-profit organization to serve as the local non-federal sponsor for a Great Lakes Legacy Act (GLLA) project agreement with U.S. EPA for the lower Buffalo River. This complements the ongoing Feasibility Study for the Upper Buffalo River currently being funded by U.S. EPA, as well as the ongoing USACE "312 study for environmental dredging of the Buffalo River", which is funded through a cost-share agreement with the Riverkeeper.

Similar to their efforts in 2005 in the upper Buffalo River, NYSDEC conducted sediment sampling in the lower Buffalo River during 2006, and final results were made available in 2007. U.S. EPA's consultant completed a human health and ecological risk assessment for the river in 2007, and "kriged" maps were created to visualize the location and quantity of contaminated sediment within the upper Buffalo River.

U.S. EPA has agreed to fund the completion of the Feasibility Study for the entire Buffalo River, and the \$400,000 GLLA project agreement will be modified to allow for Remedial Design to begin for the entire river in late 2008. EPA's Great Lakes National Program Office (GLNPO) is playing a key role here.

In order to accelerate the pace of CSO abatement actions, the Buffalo Sewer Authority (BSA) began designing several sewer overflow abatement projects that will reduce the number of outfalls and the volume of wet-weather overflows within the AOC. Simultaneously, BSA, the DEC and U.S. EPA are negotiating a final Long-Term Control Plan for CSO abatement.

Due to improvements in water quality within the AOC and upstream habitat, the annual spawning run of Lake Erie steelhead up the Buffalo River and tributaries continues to increase. The quality of the run and addition of public fishing access sites along the tributaries upstream of the AOC have enabled steelhead fishing (e.g. in the upper tributaries of Cayuga and Cazenovia Creeks) to become increasingly popular in this urbanized Buffalo area. Efforts by the DEC to establish a self-reproducing population of walleye in the river continue to show promising though early results.

Habitat improvements were completed at the Seneca Bluffs Wetland and Aquatic Habitat Restoration site. The Buffalo Niagara Riverkeeper has drafted community-based goals and benchmarks for habitat restoration for the Buffalo River. Riverkeeper has also developed an annotated bibliography on all research conducted on habitat and species; researched historic conditions of the Buffalo River; and developed a detailed GIS database and mapping of past and current habitat conditions for both quantity and quality.

Reconstruction of the historic terminus of the Erie Barge Canal is nearing completion. The project, located towards the lower end of the AOC within the City of Buffalo's Inner Harbor, will become an important cultural tourism site that includes restoration of the canal's terminal section in its actual location, a museum and urban park setting.

The Buffalo Niagara Riverkeeper coordinated the efforts of the USFWS, NYSDEC and U.S. EPA Region 2 to plan and implement a comprehensive fish contaminant study within

the AOC during 2007. Samples are being analyzed and the results are expected in late spring 2008. The data will be used to update the fish consumption advisory for the AOC, update the human health and ecological risk assessments associated with the ongoing Feasibility Study, and assess the tainting BUI. The data will also serve as a baseline for future monitoring.

In 2006, Buffalo Niagara Riverkeeper, in partnership with the City of Buffalo, received a \$390,000 NYSDOS grant for implementation of various segments of the Buffalo River Greenway. And in 2008, Riverkeeper, again in partnership with the City of Buffalo, received a \$500,000 NYSDOS “Brownfield Opportunity Area (BOA)” grant to assess the environmental condition of brownfields along the Buffalo River Corridor.

Next Steps

Meetings continue among the local sediment team, U.S. EPA-GLNPO, consultants, and other project partners to detail the ongoing efforts in the process and planning of the Remedial Investigation/Feasibility Study (RI/FS) to address contaminated sediments in the Buffalo River. An updated scope of work with goals, objectives and remedial alternatives considerations is being developed.

Ongoing Activities

- BNR has revitalized the Remedial Action Committee (RAC) and receives federal funding to continue RAP implementation. An organizational structure involving an executive committee with four working groups is leading the RAP to address: 1) project implementation, BUI assessment and evaluation; 2) RAP reporting; 3) remedial strategies and monitoring; and 4) public outreach and involvement.
- Development of AOC delisting criteria continues as well as planning and conducting studies for supporting data to be used in the assessment of the BUIs.
- Continued development of the Sediment Remediation Investigation/ Feasibility Study and identification of alternative sources of funding for remediation.
- Continued fish stocking (walleye) and evaluation of the long-term restoration of this sport fishery.
- Continued work with the Buffalo Sewer Authority and other upstream municipalities to address CSO/SSO abatement and elimination plans.
- Continued work with the Erie County Soil & Water Conservation District is coordinating municipal and private landowners to reduce soil erosion and nutrients from the upper watershed buffer zone areas.
- Continued work to commence the Buffalo River Greenway Implementation Project.

Presque Isle Bay RAP, Pennsylvania

www.epa.gov/glnpo/aoc/presque.html

History

Located in the northwest corner of Pennsylvania on the southern shore of Lake Erie, Presque Isle Bay is a 3718 acre (1505 hectare) natural embayment formed by a 7 mile long (11.3 km) re-curved sand spit. Over 80% of the Bay’s watershed is comprised of urban and industrial land uses in the City of Erie and its outlying townships. As a relatively closed system with a hydrologic detention time of almost 2.5 years, Presque Isle Bay tends to act as a natural “settling basin” for sediment entering its waters. Given the urban nature of the majority of the watershed, much of this sediment is contaminated with heavy metals and various organic compounds.

Presque Isle Bay was designated as the 43rd Great Lakes Area of Concern by the US Department of State in 1991. The Pennsylvania Department of Environmental Protection (PADEP) evaluated the 14 beneficial uses and submitted a Stage 1 Report to the IJC in 1993 listing fish tumors or other deformities, and restrictions on dredging as impaired. Numerous investigations of these BUIs have been conducted by PADEP and its partners since the early 1980s.

History of the Fish Tumor Beneficial Use Impairment

Evaluation began in the 1980s when the United States Fish and Wildlife Service began receiving reports from anglers of “tumorous” growths on the bay’s brown bullhead catfish (*Ameiurus nebulosus*). Over the next 22 years, PADEP and its partners conducted numerous studies of the bay’s brown bullheads. Two studies were done to estimate and evaluate the overall bullhead population in the bay. Both studies estimated a population of 31,000 bullheads that was stable and reproducing. A study of the migration patterns of the bullheads suggested that the bullheads were primarily resident species of the bay as only two of the 2000 tagged fish migrated outside the bay.

Five studies were conducted that examined the bay’s brown bullheads for both internal and external growths and deformities. Subsamples of these fish were autopsied and tissue was examined for the presence of tumors. Liver tumor rates fell steadily from a high of 22% in 1992 to 0% in 1999. External tumors rates showed a similar decline from 64% in 1992 to 17.4% in 1999.

History of the Restrictions on Dredging Beneficial Use Impairment

Sediment studies have varied in scope and focus but draw similar conclusions. Sediment in the bay contains widespread but relatively low levels of PAHs and a few heavy metals (i.e., nickel, lead, and cadmium). Generally, the concentrations of contaminants found were fairly homogeneous and no specific hot spots were defined. In addition, sediment dredged from the navigation channel and turning basin within the bay by the U.S. Army Corp of Engineers has consistently met the requirements for open lake disposal in Lake Erie.

A 1997 comprehensive review of sediment quality data by Battelle Ocean Sciences found PAH concentrations in the bay surface sediment were higher than in sediment from most coastal environments but typical of urban areas. Additionally, the review found no clear impacts on the macroinvertebrates in the bay attributed to sediment concentrations of PAHs or other contaminants. To date, there has been no proven correlation shown between bay sediment contamination and fish tumors. These factors, coupled with elimination of point source discharges and combined sewer overflows to the bay and its tributaries, as well as economic considerations, resulted in the decision to allow natural recovery rather than pursue active remediation of the sediment.

Recovery Stage Designation

Since 1989, the City of Erie has spent over \$100 million to upgrade its sewage system. Many CSOs that contributed up to 50 million gallons per day of untreated sewage to the bay were eliminated. In 1991, a large coal-fired power plant (a source of metals and PAHs) along the bayfront was decommissioned and converted to a library and museum. The rest of Erie’s bayfront was undergoing a dramatic transformation from a highly industrialized corridor to a recreational, residential and light commercial zone.

Given the trends of decreasing tumor rates in the brown bullhead and the decision to allow natural recovery of sediment quality rather than pursue active remediation, the Presque Isle Bay Public Advisory Committee recommended that PADEP prepare a RAP Update to pursue a Recovery Stage designation for the bay.

In December 2002, Presque Isle Bay became the first U.S. AOC to attain Recovery Stage designation. This milestone marked a shift in PADEP’s focus from assessment and remedial action to monitoring, pollution prevention, and the development of delisting targets for the Bay’s BUIs.

Progress since the 2006 LaMP Report

Delisting of the Restrictions on Sediment Dredging Beneficial Use Impairment

A major milestone was achieved in March 2007 when U.S. EPA concurred with PADEP’s recommendation to delist the “restrictions on dredging activities” BUI for the AOC. In developing this recommendation, PADEP collaborated with government agencies, academia, and its Presque Isle Bay Public Advisory Committee (PAC) to identify a primary delisting target related to dredging and disposal activities, and secondary ecosystem health targets related to sediment quality. In 2005 and 2006, U.S. EPA Great Lakes National Program Office sponsored a series of workshops bringing together a panel of nationally recognized sediment

experts to assist in the development of these specific targets. The experts also assisted with the development and implementation of a comprehensive sediment quality survey.

The ecosystem health targets looked at the impact of toxic and bioaccumulative contaminants in sediment on benthic organisms, fish, and aquatic-dependent wildlife. Measures of chemical contamination, bioavailability, and direct toxicity were used to evaluate these targets.

Analysis of the sediment quality data showed that metals and PAHs do not or rarely occur in the AOC sediments at concentrations sufficient to adversely affect benthic organisms, fish, or aquatic dependent wildlife. The data further suggested that the bioavailability of contaminants may be limited by the high levels of total organic carbon and sulfides present in the bay sediment. Existing sediment quality conditions are sufficient to support benthic invertebrate communities and risks to fish and aquatic-dependent wildlife using habitats in Presque Isle Bay are unlikely to be higher than those for fish or aquatic-dependent wildlife using habitats elsewhere in Lake Erie. Based on this analysis, PADEP concluded that ecosystem health targets are being met in the AOC.

The restriction on dredging beneficial use impairment was evaluated against a delisting target based on discharges from the disposal of dredged material. The target takes into account the limitation on disposal options placed by Pennsylvania's laws and regulations, and current permitting practices by evaluating discharges from the Confined Disposal Facility (CDF) located at the entrance to the Bay. Material can be placed in the CDF when the concentrations of contaminants of potential concern in the CDF effluent mixing zone are below Pennsylvania's Water Quality Standards at the 15-minute compliance point for acute criteria and 12-hour compliance point for chronic criteria. At least 90% of samples must meet this target.

Using elutriate data from areas routinely dredged from within the AOC, it was determined that the primary delisting target for the restrictions on dredging beneficial use impairment is being met for areas currently being dredged within the AOC. In addition, calculations were done to estimate the predicted concentrations of contaminants of potential concern in the CDF discharge based on concentrations detected in the sediment. If dredging were required in any location in the AOC, the material could be placed in the CDF. Given that the only "restriction" on dredging activities is regulatory and sediment from any location within the AOC can meet those requirements, the restrictions on dredging beneficial use is no longer considered impaired. Details of this significant achievement are contained in a report entitled *Delisting the Restrictions on Dredging Activities Beneficial Use Impairment in the Presque Isle Bay Area of Concern* (Pennsylvania Department of Environmental Protection, Office of the Great Lakes, December 10, 2006).

Progress on the Fish Tumors or Other Deformities Beneficial Use Impairment

The incidence of tumors and other deformities in brown bullhead catfish in Presque Isle Bay has been monitored annually since the AOC was declared to be in a "Recovery Stage" in 2002. Pursuant to IJC list/delist guidelines, PADEP has also sampled numerous potential reference sites throughout Lake Erie and inland Pennsylvania for comparison to Presque Isle Bay. Based on pooled data from 2002-2005, the incidence rate of liver tumors in Presque Isle Bay was found to be 8.1%--a rate that is not statistically different than the Lake Erie (11.0%) or inland Pennsylvania (5.8%) waterbodies investigated. Conversely, the incidence of external skin and lip tumors for this four-year period was found to be 27.9%--a rate that is significantly higher than elsewhere in Lake Erie (9.7%) which, in turn, was significantly higher than the inland Pennsylvania sites (6.4%). PADEP has partnered with USGS and others in an attempt to reconcile these apparently contradictory data and to better understand the causes of the external lesions occurring in this species.

Following the approach used for sediment, PADEP and Pennsylvania Sea Grant have held a series of expert workshops to address the "fish tumors or other deformities" BUI. These workshops have generated a number of recommendations related to assessing the BUI, including the need to standardize sampling and assessment protocols, the strong positive correlation between specimen age and tumor rate, and the need to develop delisting targets based on a comparison to appropriate reference sites in Lake Erie.

Building upon the expert workshop recommendations, PADEP has partnered with a biostatistician to determine appropriate reference sites for comparison to Presque Isle Bay. Based on a logistic regression analysis of PADEP brown bullhead tumor data for Lake Erie, Long Point Inner Bay in Ontario was identified as the “least impacted” of the sites evaluated in terms of the incidence of bullhead liver and external neoplasms. In order to increase the statistical power of the study, PADEP collected and necropsied an additional 149 brown bullhead from Long Point Inner Bay in April 2007. These samples are currently undergoing histopathological analysis. Once results are available, they will be subjected to statistical analysis and used to support the development of appropriate delisting targets for the Fish Tumors or Other Deformities BUI.

As additional outcomes from the expert workshops, PADEP and PA Sea Grant have jointly published a manual for field biologists entitled *Field Manual for Assessing Internal and External Anomalies in Brown Bullhead (Ameiurus nebulosus)*. A companion guide for pathologists entitled *Manual for the Microscopic Diagnosis of Proliferative Liver and Skin Lesions in the Brown Bullhead (Ameiurus nebulosus)* was also developed by pathologists participating in the expert workshops with support from PA Sea Grant.

PADEP and its partners have also undertaken several lines of research to better understand the environmental biology and behavior of the Bay’s brown bullhead population. This research includes a radio telemetry study of bullhead migration and sediment exposure patterns, a study of the reproductive success of brown bullhead in Presque Isle Bay, and an investigation into the role that hybridization may play in the development of tumors.

Significant research findings to date include:

- There is no solid evidence of bullhead migration into or out of Presque Isle Bay. While some migration within the Bay does occur, the fish studied appear to spend most of their life in close proximity to their spawning territories. This finding suggests that localized environmental conditions may play an important role in the development of lesions in these fish,
- Young-of-year brown and yellow bullhead were collected in small numbers in 2007 at several locations throughout Presque Isle Bay. This is compelling evidence that bullhead reproduction is occurring. However, recruitment into the population may be reduced due to environmental (e.g., sediment contamination) and/or ecological (e.g., round goby predation) reasons.
- The level of hybridization of bullhead species in Presque Isle Bay does not appear to be different than at other sites investigated. Therefore, genetic hybrid predisposition to tumor development does not explain the phenomenon of neoplasia in the bay’s brown bullhead population.

Details of the research are available on Pennsylvania Sea Grant’s website at <http://seagrant.psu.edu/research/research.htm>.

Next Steps

- U.S. EPA’s Great Lakes National Program Office has provided financial support to PADEP and its partners for the development of a comprehensive fish tumor database and to investigate the role of viruses in the development of tumors and other deformities in brown bullhead.
- Data in the database will be statistically analyzed to develop appropriate delisting targets for the fish tumors or other deformities BUI in the AOC. The recommendation to delist the BUI, when appropriate, will be developed by the Department with input from its Public Advisory Committee.
- PADEP has partnered with Pennsylvania Sea Grant to develop a comprehensive management plan for the Bay watershed and develop a comprehensive library of literature related to the AOC. This work is ongoing.

Ashtabula River RAP, Ohio

www.epa.gov/glnpo/aoc/ashtabula.html

History

The Ashtabula River is located in far northeastern Ohio. Years of unregulated discharge and mismanagement of wastes along the river and Fields Brook (a superfund site) seriously contaminated sediments and degraded biological communities. The lower two miles of the river encompass the AOC.

The Ashtabula River RAP process began in 1988 with the establishment of the Ashtabula River RAP Advisory Council. The 1991 Stage 1 Report documented six beneficial use impairments, all related to contaminated sediment. These impairments included: restrictions on fish and wildlife consumption; degradation of fish and wildlife populations; fish tumors or other deformities; degradation of benthos; restrictions on dredging; and loss of fish and wildlife habitat. PCBs are the major contaminant driving the cleanup, but mercury, PAHs, low level radionuclides and other chlorinated organics are also of concern. An interim dredging project in 1993 removed several feet of relatively uncontaminated sediments to keep the recreational navigation channel open.

The Ashtabula River Partnership (ARP) was created in 1994 to serve as a more formally structured, concentrated effort to get the river dredged. As an alternative to the impending designation of the river as an extension of the Fields Brook superfund site, the ARP's goal was to look beyond traditional approaches to determine a comprehensive solution for remediating contaminated sediments and restoring beneficial uses. An oversight committee and several technical committees were established and a local coordinator was hired. The nonprofit Ashtabula River Foundation was incorporated in 1997 to manage financing for the river cleanup.

Since 1990, extensive sediment characterization studies have been implemented to: map concentrations of pollutants (particularly PCBs); estimate sediment volume to be removed; delineate PAH distribution; ensure sediments did not qualify as hazardous waste; screen for low level radioactive waste; and model sediment transport, scouring and deposition rates. A creative mix of funding from local partners, U.S. EPA, US Army Corps of Engineers (USACE), GLNPO, Ohio EPA and potentially responsible parties funded the above studies and the preparation of a comprehensive management plan and environmental impact study (CMP/EIS). Extensive reviews of all agencies' authorities were conducted to determine critical decision points and responsibilities. Targets were set for sediment cleanup and effluent water quality related to dewatering at the disposal site. Property was purchased for the upland disposal facility. Plans were developed to minimize and monitor the environmental impact during dredging.

Progress since the 2006 LaMP Report

Although it was expected that dredging would be done under USACE authorities, uncertainties in the federal budget prompted the ARP to apply for newly authorized Great Lakes Legacy Act (GLLA) funding as well. Under this scenario, Legacy Act funds would be used to remediate the more contaminated upstream area, while USACE funds would be used in the downstream portion that currently supports commercial navigation. Approval of \$25 million in GLLA funding was announced on December 12, 2005. An additional \$7 million from the State and \$18 million from the PRPs resulted in a 50/50 cost-share for the \$50 million GLLA project.

The long-awaited remedial dredging commenced September 9, 2006. By winter shutdown on November 27, 2006, 62,000 yd³ of contaminated sediments were removed. Primary barriers to 2006 production were: experimentation to determine the correct dosing frequency of polymers used to enhance sediment settling at the disposal site; water treatment plant capacity; and exceedances of effluent standards for total suspended solids. During winter 2006, several important modifications and additional project features greatly improved overall production and operations.

Full-scale dredging again commenced April 6, 2007 with 500,000 yd³ removed by the October 14, 2007 remedial dredging completion. Sediments were removed via a hydraulic dredge and pumped three miles upland to the disposal site. Sediments were deposited

into geo-tubes from which effluent was collected, treated and pumped back to the river. Hydraulic dredging was followed by a smaller Vic-Vac® dredge that essentially vacuumed the remaining fine, fluffier sediment from the river bottom. Meetings held over the last 12 months with river property owners kept them informed about the dredging project and helped coordinate a smooth transition between the 24-hour dredging work and daily operation of marinas and yacht clubs. Most fortunate, the specter of river bulkheads failing during dredging never materialized.

During dredging, an observable sheen near the confluence of Strong Brook led Ohio EPA and U.S. EPA enforcement to discover and eliminate an upstream source of PCB. Post-dredging confirmation sampling results indicated a sediment surface weighted average concentration (SWAC) of approximately 2.5 ppm PCBs. Placement of six inch sand cover in several areas further lowered the SWAC to approximately 1.2 ppm. All of these SWAC values are significantly lower than the 7.5 ppm projected at the start of the project. After several years of natural sediment deposition, the final cleanup goal is expected to be 0.25 ppm.

Next Steps

- Additional coordination continues with the USACE to dredge 150,000 yd³ of polluted sediment from below the 5th Street Bridge and in Ashtabula Harbor – the last piece where remedial dredging is needed. This second phase of the dredging is expected to begin in April 2008 and be complete by July 2008. The USACE open bid process does allow integration and project resumption using the same dredge equipment, treatment train, and confined disposal facility utilized in the upstream remedial dredging project.
- Once USACE completes its dredging, monitoring throughout the AOC will be conducted to determine if the remedy is sufficient to restore beneficial uses and eventually delist the two-mile AOC. As such, at appropriate intervals ranging from three to five years post-remedy, Ohio EPA and U.S. EPA intend to monitor the fish and aquatic insect communities, caged fish, fish tissue, sediment toxicity, sediment chemistry, water chemistry, and sediment bioaccumulation.
- Habitat mitigation for the GLLA dredging is presently being designed.
- A Habitat Enhancement Plan is currently being developed to outline the need and impact of additional habitat restoration/improvement throughout the AOC.
- It is likely that additional habitat restoration/improvement work will be conducted through negotiated settlements under Natural Resource Damage claims in the AOC.
- The RAP Council is now operating as a subcommittee under the Ashtabula Watershed Steering Committee (Steering Group) formed two years ago to assist with State Scenic River designation and development of a comprehensive Watershed Action Plan (WAP) for the entire 37-mile Ashtabula River. The RAP Stage 3 post-monitoring, post-evaluation and AOC delisting are recognized as necessary steps toward long-term watershed management.
- Given the length of time needed to allow the AOC to reach a steady state and for the multiple post-monitoring intervals, it is conceivable to designate the Ashtabula AOC as an Area of Recovery during the post-remedy interim. All of that time and work, in turn, will allow a credible case to be made for AOC delisting sometime five to ten years post-remedy. It is possible that the dredging restriction BUI may be delisted sooner.

Cuyahoga River RAP, Ohio

www.crcpo.org

www.epa.state.oh.us/dsw/rap/cuyahog.html

www.epa.gov/glnpo/aoc/cuyahoga.html

History

The Cuyahoga River RAP Coordinating Committee, representing multiple sectors, was appointed by the Ohio EPA in 1988. The non-profit Cuyahoga River Community Planning Organization (CRCPO) was formed to receive funds and to provide local staff to support RAP activities. The AOC covers the lower 45 miles of the river and 10 miles of shoreline

from Edgewater Park to Wildwood Park.

The 1992 Stage 1 Report identified 10 beneficial use impairments, including: restrictions on fish consumption; degradation of fish populations; fish tumors or other deformities; degradation of benthos; restrictions on dredging activities; eutrophication; beach closings; degradation of aesthetics; and loss of fish and wildlife habitat. Several update reports have been prepared since the 1992 report.

The Cuyahoga was named an American Heritage River (AHR) in 1998. Although the AHR program covers the entire river and the RAP only the lower portion, the two initiatives work together to leverage the resources needed to improve the river. Over the past several years, the RAP has worked to break the AOC down into smaller watershed units and establish individual watershed stewardship groups. The RAP is also participating in the TMDL development and implementation in the lower river. The RAP worked with the Ohio EPA to develop and adopt water quality standards for the navigation channel as part of the first step in what became a phased TMDL process for the river.

Over the years, the Cuyahoga RAP has hosted workshops and conferences, prepared numerous educational brochures and guides, implemented a number of habitat restoration projects, completed a wetland location and categorization inventory to provide options for mitigation and protection within the AOC, fostered adoption of conservation easements, and worked with several local initiatives to preserve green space and better tie environmental protection with economic development. Field studies have also been done to better characterize fish communities, habitat needs and sediment contaminant quantification, particularly in the navigation channel of the river.

Following several studies that examined options to improve the dissolved oxygen levels and habitat in the navigation channel, the RAP began exploring options to install fish habitat units along/behind the sheet piling-lined riverbanks.

The RAP has begun a reassessment of BUIs on a subwatershed basis and as compared to the Ohio Delisting Targets for AOCs.

Several RAP partners completed a Community Riparian and Wetland Guidance manual providing guidance on the utility of local setback ordinances. These partners also produced a detailed brochure on the advantages of conservation easements, how to establish them, and the current organizations holding them for the entire U.S. Lake Erie watershed.

Progress since the 2006 LaMP Report

As a follow-up to the 2003 approved TMDL for the lower river, a stressor identification study was done on Tinkers Creek to determine the source of degraded stream conditions. Also, a feasibility study was begun for the removal of the Route 82 dam.

Upstream of the AOC, the Kent Dam was redesigned to improve flow and eliminate stagnant upstream pools as well as create a challenging passage for kayakers and a riparian park. The Munroe Falls dam was also removed, uncovering a natural succession of smaller falls. These dam removals as well as others anticipated further downstream are helping to restore the natural hydrology of the Cuyahoga River.

Watershed groups were established for Big Creek, Yellow Creek, Tinkers Creek, Chippewa Creek, and Brandywine Creek.

The Cuyahoga RAP hosted a Cuyahoga River Watershed Symposium – “Cuyahoga River Connections” – with primary funding from Ohio EPA/U.S. EPA-GLNPO. This successful event highlighted the numerous research projects, tributary watershed group programs, community action, and progress that are all leading to restoration and sustainable stewardship of both the AOC and the entire watershed. Proceedings of the event are available at www.crcpo.org.

The RAP and partners conducted further assessment of wetlands in the AOC to measure their quality to provide the basis for prioritizing protection and restoration. The *Cuyahoga River Watershed Wetland Assessment Report* is now available at www.epa.state.oh.us/dsw/wetlands/CuyReportFinal_08Sept2007.pdf. In 2007, the RAP received funding from Ohio EPA/U.S. EPA-GLNPO to further their wetland analyses and identify specific wetland restoration and protection projects within the AOC that will assist in eventually delisting the habitat BUIs.

Next Steps

- Both Akron and Cleveland have developed long term control plans for the reduction or elimination of CSOs; however, both plans are currently the subject of litigation by U.S. EPA and Ohio EPA. Once officially approved, it will be 20 to 30 years before all construction is completed.
- Further improvement in river conditions from sediment and nonpoint source reductions is expected as Phase II Storm Water Management Plans are implemented by permitted communities within the AOC. These communities are required to adopt local measures to control storm water runoff from construction activities and municipal operations, remove illicit discharges, and institute public education and involvement activities by early 2008. Ohio EPA has initiated a series of educational workshops and an audit program of these communities to help evaluate their implementation efforts.
- The Cuyahoga RAP is currently working on an inventory of land use ordinances/legislation to identify communities where additional assistance and education are needed to help them meet permit and habitat protection needs.
- The RAP continues to work with various other local initiatives to better connect economic advancements and environmental improvements.
- Additional progress in restoring beneficial uses within the AOC can only continue with the support of local community watershed groups dedicated to providing stewardship of their local tributary streams. The RAP and its partners continue to support groups that have formed in Euclid Creek, Doan Brook, West Creek, Mill Creek, Pond Brook, Big Creek, Yellow Creek, Tinkers Creek, Chippewa Creek, and Brandywine Creek. Many of these groups have completed watershed action plans for their tributary streams or will do so over the next several years.
- The Cuyahoga RAP and the Cuyahoga County Planning Commission received \$495,000 from the U.S. Army Corps of Engineers for the development and installation of demonstration habitat improvement projects in the navigation channel. This “Green Bulkhead” project will provide viable habitat that supports fish as they migrate upriver from Lake Erie and back. The project will also create potential economic opportunities in the production of structures and the installation and maintenance of habitat materials. Deployment of several demonstration projects is expected in 2008.
- The Cuyahoga RAP membership is looking at some possible reorganization to focus their efforts on specific delisting management areas. Ohio EPA is assisting in the development of a reporting format to aid in continuing to monitor and report additional progress in approaching/meeting delisting target in the years to come.

Black River RAP and Watershed Initiative, Ohio

www.epa.state.oh.us/dsw/rap/blk_home.html

www.epa.gov/glnpo/aoc/blackriver.html

www.noaca.org/blkrap.html

www.blackriverwatershed.org

History

The Black River RAP process began in 1991 with the establishment of the Black River Coordinating Committee (BRCC) by Ohio EPA. The group represents a diverse membership and plays a role in the development and implementation of the RAP.

Originally, the AOC included only the lower mainstem, due to many industrial operations and wastewater treatment plant discharges. Sediments had been contaminated with PAHs from a steel mill coking facility and there was a high incidence of fish tumors. Prior to the initiation of the RAP process, many of the discharges had been discontinued or remediated. Due to increasing pressure from nonpoint sources, the BRCC expanded the AOC boundaries to include the entire watershed, which is largely agricultural and rural. The PAH-contaminated sediments were removed in 1990 under an enforcement action.

The 1994 Stage 1 RAP identified 10 beneficial use impairments including: restrictions on fish and wildlife consumption; degradation of fish and wildlife populations; fish tumors or other deformities; degradation of benthos; restrictions on dredging; eutrophication; restrictions on drinking water consumption; beach closings; degradation of aesthetics; and loss of fish and wildlife habitat.

The RAP adopted a Riparian Corridor Resolution in 1996 that outlined the need for riparian corridor establishment and protection. A Strategic Long Range Plan was developed in 1997. The RAP received national attention with the construction of a fish habitat shelf along the lower river at the Black River Landing brownfield remediation site. Since its construction, a dramatic improvement has been seen in the local fish community structure. In partnership with the US Army Corps of Engineers under a WRDA 401 project, the RAP participated in the development of a French Creek watershed guide to assist landowners and elected officials in making decisions that better protect the environment and the creek. This project was the RAP's first product in its attempt to tackle nonpoint source issues by breaking the AOC down into sub-watersheds.

Since the remediation of the PAH-contaminated sediments, the incidence of tumors and other deformities in fish in the lower river has continued to decline. On Earth Day 2004, the tumor BUI status was changed from impaired to "in recovery." The contact advisory listed in 1983 was also rescinded that day. Benthic communities in the East Branch have improved dramatically. All areas now meet Ohio EPA warmwater habitat biological criteria for benthos, and some areas are approaching exceptional warmwater habitat criteria. This portion of the AOC is under considerable development pressure and in need of protection. The Black River RAP decided a formal delisting of the benthos impairment for the East Branch would be the best method to publicize the improvement and garner local support to protect the waterway. U.S. EPA approved the delisting for this BUI in 2005.

Improvements in wastewater treatment plant discharges along the East Branch also led to significant reduction in algal growth downstream from the Grafton wastewater treatment plant.

In the fall of 2004, the Black River RAP received the Lake Erie Award from the Ohio Lake Erie Commission for its outstanding contributions towards the restoration and protection of the waterways of Ohio's Great Lake.

Recognizing that land use and stream stewardship are better directed at the local level, the Black River RAP has been dedicating considerable effort toward the development of sub-watershed groups. The AOC has been divided into six sub-watersheds: the mainstem, French Creek, the West Branch, Plum Creek, the northern East Branch, and the Southern East Branch. Various studies and projects have been initiated in all these sub-watersheds.

In 2003, funded by a grant from U.S. EPA on behalf of the Lake Erie Binational Public Forum, the Lorain County Community Development Department was able to hire a local watershed coordinator. The primary role of the coordinator was to initiate development of a watershed plan on the West Branch, a tributary highly impacted by agricultural runoff. A local advisory board was established and draft watershed plan prepared. Several workshops have been held to provide instruction on the proper application of atrazine and options to reduce its use. Under subsequent grants from U.S. EPA and the Ohio Coastal Management Program, the local watershed coordinator's role expanded to also include French Creek, Plum Creek and northern East Branch tributaries.

Using simplistic testing for *E. coli*, monitoring has been initiated to determine the more polluted areas in the watershed and the sources. Efforts have also begun to get the members of the watershed groups involved in collecting water quality data from the streams.

Progress since the 2006 LaMP Report

The Black River RAP produced a DVD formatted video as an update to an earlier RAP video effort. The new DVD, titled *Rediscovering the Black River*, received considerable local television play both within and outside the AOC. In 2007, the RAP started production on a new video outreach effort focussing on the problems associated with home sewage treatment systems.

Use of "sediment sticks" by volunteer monitors was initiated to test the concentrations of suspended sediments (as a measure of turbidity) and to determine the areas contributing

the largest sediment loads. In association with the sediment stick monitoring, Ohio EPA conducted biological monitoring along the West Branch to calculate fish IBIs and test the correlation between turbidity and the quality of the fish community. The results of this study were somewhat less than anticipated as it appears that locally-occurring tannins affected the outcome of the sediment stick results by tainting the surface waters towards the end of the field study. This study is being examined by the local stakeholders and will likely be re-started once an understanding is gained between the effects of tannin levels and water clarity as measured by volunteers using sediment sticks.

Next Steps

- Working with the Lorain County Community Development Department watershed coordinator, the RAP is creating a watershed group for French Creek and continuing planning for the West Branch.
- A final TMDL will be submitted for review and approval in 2008. It will further define limits for identified contaminants of concern.
- The Black River RAP has adopted the Delisting Targets for Ohio Areas of Concern (Ohio EPA, 2005) and is reassessing BUIs for each subwatershed based on these targets.
- The Black River RAP and local stakeholders of the lower mainstem have been working with GLNPO to develop a master plan for re-development in the City of Lorain. The master plan will outline a future vision for the mainstem that connects the city's economic need for urban renewal and brownfield re-development with the needs for restoring and protecting the environmental health of the river system.
- The Black River AOC continues to experience impacts from sediment loads, bacteria and nutrients. Properly managing urban, suburban and rural land use practices throughout the AOC, including the enhancement and protection of the riparian corridors and wetlands, will improve the quality and productivity of the Black River. The Black River Watershed Initiative and the Black River RAP will continue to coordinate the organization and implementation of monitoring and remedial actions needed to restore the entire Black River watershed.

Maumee River RAP, Ohio

www.MaumeeRAP.org

www.PartnersForCleanStreams.org

History

The Maumee RAP process began in 1987, coincidentally as the IJC unveiled the 1987 version of the Great Lakes Water Quality Agreement at their biennial meeting in Toledo. The boundaries of the AOC include the mainstem of the Maumee River from RM 22.8 to Maumee Bay, Duck Creek, Otter Creek, Cedar Creek, Grassy Creek, Crane Creek, Swan Creek, and the Ottawa River. In 1992, the AOC was expanded to include Packer Creek, Turtle Creek, Rusha Creek and the Toussaint River, all east of the Maumee mainstem and direct tributaries to Lake Erie.

The Stage 1 Report was written by the diverse membership of the Water Quality Subcommittee of the Toledo Metropolitan Area Council of Governments (TMACOG), with oversight by Ohio EPA. The 1990 Stage 1 Report identified 10 beneficial use impairments, including: restrictions on fish and wildlife consumption; degraded fish and wildlife populations; fish tumors or other deformities; degradation of benthos; restrictions on dredging; restrictions on drinking water; eutrophication; beach closings; degradation of aesthetics; and loss of fish and wildlife habitat.

In 1991 upon completion of the Recommendations for Implementation Report, the Maumee RAP Public Advisory Committee (PAC) reorganized into the Maumee RAP Implementation Committee (MRIC). Under the guidance of TMACOG, this reorganization yielded a shift from planning to the implementation of projects, research, and community education programs to improve the area's waterways to fishable and swimmable conditions. MRIC made the formal decisions for the organization and oversaw the issue-based action groups (subcommittees).

In 1998 MRIC released a new Strategic Plan for the organization that utilized much of the same structure with a few minor differences including a few new action groups, a new logo, and a new simplified name for the organization, Maumee RAP Committee. The Strategic Plan classified action groups into three categories: issue, support or watershed. The new action groups created were the Public Outreach and Education Action Group and the Finance Action Group. The Maumee RAP Committee was still the formal decision-maker for the organization that resided under the umbrella of TMACOG.

A 10-year Activities and Accomplishments Report was completed in 2002 setting the stage for identifying next steps toward restoration. Much work has been done on the Ottawa River, the most contaminated part of the Maumee AOC. Remedial actions at the Dura, Stickney, Tyler and King Road landfills have reduced significant loads of PCBs to the Ottawa River. Soil and sediment remediation at the Texileather and Fraleigh Creek sites removed more than 57,000 lbs of PCBs from the river. Extensive additional work had been done to further characterize contaminated sediment levels and locations, assess environmental and human health risk, and prioritize river segments for clean up.

The Maumee RAP Committee continued a very active public outreach and education program. They held numerous education and training workshops covering such topics as: agricultural runoff and best management practices; urban storm water runoff; pollution prevention; and watershed planning. They were co-creators of an award-winning documentary about the Maumee River watershed entitled “Fate of a River: Revisited” that was broadcast on PBS in three states and continues to be shown to local groups.

In partnership with more than 15 communities and organizations, an intensive three-phase multi-media education campaign, entitled “Give Water a Hand,” was conducted from 2004-06. The residential, business, and stream signing campaigns were aimed at addressing some of the requirements for Phase 2 storm water regulations and to inform homeowners and business managers of the importance of water conservation, septic system maintenance, and storm water management.

Progress since the 2006 LaMP Report

The Maumee RAP undertook an intensive and ambitious effort to create the Maumee AOC Stage 2 Watershed Restoration Plan (Stage 2 Restoration Plan). This plan combines the IJC requirements of a Stage 2, U.S. EPA and Ohio requirements for a watershed action plan, attention to the nonpoint source management measures of the Ohio Coastal Management Plan, and consideration of TMDL and Natural Resource Damage investigations in the AOC. The plan underwent public review in November 2005 and a draft was submitted to Ohio EPA for review in early 2006.

In order to meet Ohio EPA’s requests for changes to the Stage 2 Restoration Plan, the Maumee RAP Committee needed to prioritize the projects identified in the plan. To do this the organization took a hard look at how it was structured and what it intended to accomplish. Ohio EPA helped the Maumee RAP Committee to do this with a grant to hire a contractor to lead the organization through a self-evaluation in late 2006.

In early 2007, the Maumee RAP Committee determined that their best path forward for efficiency, effectiveness, and sustainability would be to form their own non-profit 501(c)3 organization and to leave the umbrella of TMACOG. In March 2007, the Partners for Clean Streams (PCS) was officially created. The Maumee RAP Committee merged under the PCS organization to become the Maumee RAP Advisory Committee. The new organization will be responsible in the coming months for completing the Stage 2 Restoration Plan and will again submit it to Ohio EPA for approval.

Because of the draft Stage 2 Restoration Plan and the Maumee RAP’s decision to become “independent,” PCS/RAP were able to successfully apply to the Joyce Foundation and receive a grant for \$588,118 to conduct three projects in the Maumee AOC. These projects are:

1. *Ecological and Human Health Risk Assessment for Duck and Otter Creeks:*
Producing human health and ecological risk assessments for Duck and Otter Creeks could leverage significant funding from the Great Lakes Legacy Act and incidentally would support the Act by building the pipeline of actionable projects and demonstrating public demand for the funds available.

2. *Highland Park Dam Decommissioning and Riparian Enhancement Project for Swan Creek:* This low dam prevents fish from spawning, traps sediments, and degrades water quality, but cannot be removed. This project will demonstrate a new technology in dam mitigation that will not remove the dam, but will decrease its impact by building structures into the streambed to restore natural water movement, allow spawning fish to swim pass the dam, and create an overall more natural environment.
3. *Wetland and Riparian Inventory and Restoration Plans for Swan Creek and Ottawa River:* This project is to identify and prioritize up to 15 potential wetland and/or riparian mitigation sites in both the Swan Creek and Ottawa River watersheds. These lists will be used to capture mitigation or enforcement penalty funds that become available.

Next Steps

- Complete the Maumee AOC Stage 2 Watershed Restoration Plan under the direction of PCS. This plan provides a comprehensive list of actions needed to restore the Maumee AOC. Once this plan is approved by Ohio EPA/U.S. EPA/IJC, local organizations and agencies need to buy in to the plan that they helped to create and to implement the components applicable to their mission and authorities.
- Local organizations have expressed an interest in applying for Great Lakes Legacy Act (GLLA) funds once the Duck and Otter creek risk assessments have been completed. The Duck and Otter Creeks Partnership is already working with GLNPO to assure their needs are being met with the work that is being conducted.
- A Natural Resource Damage Assessment is being conducted in the lower Ottawa River. It is hoped that the remediation efforts will be able to utilize Great Lakes Legacy Act (GLLA) funding, and that the habitat inventory plans being developed by the Joyce Foundation grant will be considered as options for restoration implementation.
- Field data for much of the Maumee AOC has become dated. The Maumee RAP successfully petitioned Ohio EPA to accelerate the TMDL schedule for Swan Creek, Duck Creek and several smaller tributaries near the mouth of the Maumee River. The request was approved and field sampling was done in 2006. The direct Lake Erie tributaries in the eastern portion of the Maumee AOC are scheduled to be sampled in 2008. These two TMDL sampling efforts will allow the PCS and the RAP Advisory Committee to reassess the beneficial use impairments in these segments and help to prioritize remedial actions needed. A TMDL for the Toussaint River was completed in 2004. Following the development of the Lake Erie Tributary TMDL, the Ottawa River will be the only major watershed in the Maumee AOC that will have not have a TMDL developed.
- Dam removal and stream restoration is planned for the Secor Road dam near RM 11.5 in the middle reach of the Ottawa River. Following removal and restoration, contact and fish consumption advisories in the area will be reviewed to determine if they are still relevant.
- A larger watershed plan development project, Western Lake Erie Basin Partnership (WLEBP), continues for the entire Maumee River basin under a congressional line item request to the USACE and NRCS. Early efforts have been focused in the upper reaches of the Maumee Watershed (well outside of the AOC). However, Partners for Clean Streams expects to be involved once efforts begin in the lower reaches to connect their efforts with those of the WLEBP to work toward the goal of improving the ultimate discharge of the river to Maumee Bay and Lake Erie's western basin.

River Raisin RAP, Michigan

www.riverraisin.org

www.epa.gov/glnpo/aoc/rvraisin.html

www.riverraisin.org/raisin_projects/river_raisin_area_of_concern.html

History

Located in Monroe County, Michigan, the AOC includes the lower 2.6 miles of the River Raisin from the low head dam (#6) and extends a half mile out into Lake Erie. It also includes the nearshore zone of Lake Erie north and south of the river mouth. The River Raisin AOC has nine beneficial use impairments, including: fish and wildlife consumption advisories; degraded fish and wildlife populations; bird or animal deformities or reproductive problems; degraded benthos; dredging restrictions; eutrophication; beach closings; degradation of aesthetics; and loss of fish and wildlife habitat. The impairments are primarily due to historical discharges of oil and grease, heavy metals, and polychlorinated biphenyls (PCBs) from industrial facilities that have contaminated sediments in the river. In addition, industrial and municipal waste discharges and changes in water flow have historically caused problems with eutrophication and high levels of *E. coli*.

Progress since the 2006 LaMP Report

In August 2006, the River Raisin PAC was accepted as a standing sub-committee under the City of Monroe Commission on the Environment and Water Quality.

The City of Monroe was awarded a \$5,820 MDEQ PAC support grant in the spring of 2007 to conduct an *E. coli* investigation in the AOC and support three public outreach projects, including an invasive species management project, woody debris removal project, and a Boy Scout clean-up. The *E. coli* project will better define the presence/absence of bacterial contamination within the AOC and will be used by the PAC to formally assess the status of the Beach Closing BUI. The outreach projects will be used to raise the profile of restoration activities taking place in the AOC.

In 2005, a hydrologic study of the River Raisin watershed was conducted by the Hydrologic Studies Unit of the MDEQ. Using the Hydrologic Engineering Center's Hydrologic Modeling System, a hydrologic model was developed to better understand the watershed's hydrologic characteristics in an effort to provide a basis for storm water management to protect stream morphology, and to help determine the River Raisin watershed management plan's critical areas. The 2006 report is available on the River Raisin Watershed Council website.

The City of Monroe has recently received an U.S. EPA Five-Star Grant award of \$10,000 for a Shoreline Restoration Project at the mouth of the River Raisin. This grant combined with \$46,000 in matching funds and in-kind assistance, including \$39,000 from DTE Energy, will help restore approximately 500 feet of concrete-lined shoreline along the River Raisin near DTE Energy's Monroe Power Plant in the spring of 2008. The project will restore the shoreline to a more natural state, creating fish and migratory bird habitat and enhance fishing opportunities.

In August 2005, a \$142,345 Clean Michigan Initiative grant was awarded to the Monroe County Drain Commissioner's Office to implement Phase II of the U.S. EPA's storm water program. Work began in 2006 and is ongoing in the watershed. The four year project is expected to identify and eliminate illicit discharges, reduce pollution (e.g., sanitary wastewater and effluent from septic tanks) and improve water quality in Monroe County, including the city of Monroe.

Next Steps

- The River Raisin PAC is currently working with a U.S. EPA contractor to develop fish and wildlife restoration criteria for the River Raisin AOC. The project will be completed by the end of 2008.
- Based on the results of the *E. coli* investigation, the River Raisin PAC will be assessing the status of the Beach Closing BUI in 2008.

Rouge River Area of Concern

www.rougerive.com

www.therouge.org

History

The Rouge River watershed is an urban/suburban watershed of 48 communities that drains 466 square miles of southeastern Michigan and discharges into the Detroit River. It is the oldest, most heavily populated and industrialized area in southeast Michigan. The river has four main branches totaling 127 miles of waterways, includes 400 lakes and ponds, and provides recreational opportunities for more than 1.5 million people. The AOC includes the entire watershed.

The Rouge River AOC has nine beneficial use impairments. These include: restrictions on fish and wildlife consumption; degraded fish and wildlife populations; fish tumors or other deformities; degraded benthos; dredging restrictions; eutrophication; beach closings; degraded aesthetics; and loss of fish and wildlife habitat. The Rouge River suffers from typical urban watershed stressors including discharges from combined sewer overflows (CSOs), sanitary sewer overflows (SSOs), non-point sources, limited industrial discharges, contaminated sediments and high flow variability. These factors have resulted in public health advisories for fish consumption and water recreation, poor biotic communities, impoundment eutrophication, and damage to the stream channel morphology.

Progress since the 2006 LaMP Report

On August 29, 2006, the Rouge River Advisory Council (RRAC) held a meeting and voted to adopt the statewide delisting criteria outlined in the MDEQ's Guidance for Delisting Michigan's AOCs to evaluate the status of BUIs in the Rouge AOC.

In 2005, the Rouge River Watershed Local Management Assembly (the Assembly), which included 38 communities and three counties, worked to get passage of the Watershed Alliance legislation, Act No. 517. The legislation authorizes the organization to function as a legal inter-governmental entity capable of seeking grants and other sources of outside funding to implement watershed management plans. In 2006, the Assembly transitioned into the Alliance of Rouge Communities (ARC). As of August 2007, the ARC includes 40 communities, three counties and the Wayne County Airport Authority. In addition to the ARC's funding capacity, it provides an institutional mechanism to encourage watershed-wide cooperation and mutual support to meet water quality permit requirements and to restore beneficial uses of the river to the area residents. As a result, Rouge River watershed stakeholders continue to complete substantial remedial efforts, improving the overall water quality and ecosystem health in the AOC.

Friends of the Rouge (FOTR) organized and completed 55 Rouge Rescue clean-up sites in 39 communities, up from 23 communities in 2005. The number of Rouge Rescue volunteers almost doubled from 1,871 in 2005 to 3,145 in 2006. In 2007, 2,164 Rouge Rescue volunteers cleaned up 43 sites in 23 communities.

The FOTR also completed their U.S. EPA-GLNPO grant to develop a comprehensive GIS database of critical habitat areas. This database will be used as a tool to set measurable restoration and delisting goals for fish and wildlife habitat BUIs identified in the Rouge River AOC. Highlights of the project include the identification and mapping of almost 16,000 acres of wetland within the watershed. Each wetland is classified to the Class level using the Cowardin classification. FOTR also mapped all woodlands over 0.5-acre in size within the watershed. This effort resulted in the identification and mapping of over 36,000 acres of woodland within the watershed.

According to the 2006 Rouge River National Wet Weather Demonstration Project Progress Report, 21 watershed restoration projects were completed in 2006. All 10 Combined Sewer Overflow (CSO) retention/treatment basins planned under Phase 1 of the Rouge watershed CSO control program continued to operate during 2006 and continue to remove a significant source of untreated sewage overflow to the Rouge River. A total of 77 of the 83 Phase 1 CSO outfalls are now under control or have been eliminated by sewer separation. Of the 127 miles of the Rouge River, 89 of those miles are now free from the adverse impacts of

uncontrolled CSO discharges. In addition, watershed monitoring demonstrated that dissolved oxygen conditions continue to improve.

Next Steps

- The RRAC is currently working with a U.S. EPA contractor to develop fish and wildlife restoration criteria for the River Raisin AOC. The project will be completed by the end of 2008.

Detroit River RAP (Bi-national)

History

The Detroit River is a 51 km (32 m) connecting channel between Lake St. Clair and Lake Erie. The bi-national AOC includes the Detroit River and its watersheds, covering an area of over 2000 km². Over 75% of the total land area is in Michigan. The Canadian portion of the AOC is approximately 60,000 hectares and includes virtually all of the municipalities of Windsor and LaSalle, and parts of Amherstburg, Tecumseh, Kingsville and Essex. Some 100 communities rely on the river for drinking water with most of the population concentrated in the cities of Detroit, MI and Windsor, ON.

In the original Stage One RAP, only eight of the 14 BUIs were thought to be impacted. However, additional research has now demonstrated that 10 of the 14 BUIs are likely impaired, one is likely not impaired, and additional information is required about the remaining three. The impairments are a result of a number of factors, including historical industrial activity, agricultural practices, and urban development in the watershed. Major sources of impairment to the bi-national AOC are from CSOs, sanitary sewer overflows, municipal and industrial discharges, storm water runoff, and loss of habitat for fish and wildlife. Due to high volumes of water entering the river, upstream sources contribute considerable contaminant loads. The river is the single largest source of contaminants to Lake Erie.

Distinct RAP implementation frameworks have been developed for the Canadian/Ontario and U.S./Michigan sides of the AOC, under the guidance of the 1998 Four Agency Letter of Commitment signed by Environment Canada, U.S. EPA, Ontario Ministry of the Environment, and Michigan Department of Environmental Quality. The Detroit River RAP Team guides the U.S. implementation. The Detroit River Canadian Cleanup (DRCC) process guides Canadian implementation efforts. The DRCC is organized into: the Detroit River Canadian Steering Committee comprised of senior managers and representatives of other committees; the Detroit River Canadian Implementation Committee comprised of technical agency, municipal, industry, and academic representatives; the Detroit River Outreach Committee comprised of organizations supporting public involvement and education activities; and the Detroit River Canadian Public Advisory Council.

Jointly, the Detroit River RAP Team and the DRCC are working toward fostering actions that will improve the conditions of impaired beneficial uses.

U.S. (Michigan)

www.detroitriver.org

www.epa.gov/glnpo/aoc/detroit.html

History

Nine beneficial use impairments have been officially identified in the U.S. waters of the Detroit River. The known causes of impairments include urban and industrial development in the watershed, bacteria, PCBs, PAHs, metals, oil and grease. Combined sewer overflows (CSOs) and municipal and industrial discharges are major sources of contaminants within the AOC. Storm water runoff and tributaries in Michigan are also major sources of contaminants. Additional environmental concerns include exotic species, changes in the fish community structure, and reductions in wildlife populations.

In 2005, Friends of Detroit River (FDR) agreed to take the lead role as coordinator of the U.S. Detroit River Public Advisory Council. FDR has reconvened the Public Advisory Council (PAC) to engage the community in the restoration of the AOC.

In 2004 the Detroit River AOC was chosen as the first Great Lakes Legacy Act site for the dredging of Black Lagoon contaminated sediments. Removal of these sediments was a key remedial action identified in the 1996 RAP. The project, which dredged 115,600 cubic yards of contaminated sediments, was completed in September 2005.

Progress since the 2006 LaMP Report

In June, 2006, U.S. EPA settled a Clean Water Act violation case with Detroit Metropolitan Airport resulting from a 2001 spill to the Frank & Poet Drain, a tributary to the Detroit River, that resulted in a large fish kill. The Airport was fined \$100,000, with \$25,000 going to Friends of the Detroit River as a supplemental environmental project. In addition, the Airport was required to spend \$8.5 million to connect their wastewater lagoons to the Wyandotte, Michigan, municipal treatment system instead of directly into the Frank & Poet Drain.

On Aug. 11, 2006, Michigan Department of Environmental Quality (MDEQ) announced a settlement with BASF concerning the cleanup of contamination at the Federal Marine Terminal site in Riverview, MI. Since then, BASF has constructed a containment system around the entire property to contain wastes on-site and stop the flow of contaminated groundwater to the Detroit River. The company also removed approximately 32,000 yds³ of contaminated sediments located in the river adjacent to the property. BASF is conducting additional investigations to determine if contamination from the site has impacted adjacent upland areas. The total cost of the project is expected to be \$25 - \$30 million.

In September 2006, MDEQ and U.S. EPA-GLNPO initiated a Great Lakes Legacy Act Project to investigate contaminated sediments in the Trenton Channel adjacent to the cities of Riverview and Wyandotte. The project area covers about 2.5 miles of the western shoreline. The goal of the Riverview project is to develop and select the most appropriate option to remediate contaminated sediments within the boundaries of the site. Previous studies have demonstrated that portions of the Riverview site contain significant volumes of non-native sediment, contaminated with a variety of pollutants, including mercury and PCBs. The purpose of the Remedial Investigation is to evaluate the magnitude and extent of contamination throughout the entire project area, and identify potential risks to human health and the environment. Based upon this information, a Feasibility Study will be performed to establish remedial goals, identify and evaluate remedial options, and recommend a remedial alternative.

In November 2006, Michigan Sea Grant and USGS completed a four-year project to reintroduce sturgeon-spawning habitat to the Detroit River. This project was a coordinated federal, state, university, local, and NGO effort funded by National Oceanic and Atmospheric Administration (NOAA) and the Great Lakes Fisheries Trust. The results document conditions and fish use at three constructed sturgeon-spawning beds off of Belle Isle. Although after two years the effort failed to document use of the reef by spawning sturgeon, it did document increased reproduction of 12 species of native fish and two invasive species, and provided additional habitat for 8 other fish species including the State-endangered northern madtom. The results of the project also provided insight on the value of various substrates best suited for sturgeon spawning under Detroit River conditions.

In 2006, Canada and the US began a three-year project to build a lake sturgeon-spawning reef off Fighting Island in the Detroit River as part of a bi-national effort to restore the lake sturgeon population. The first phase of the project will be a pre-construction assessment funded with \$10,000 from Environment Canada and \$24,500 from US Fish and Wildlife Service. The second phase will focus on reef construction, and the third will consist of a post-construction assessment.

A soft shoreline habitat restoration project at Meyer-Ellias Park in Trenton, MI was completed in December 2006. The project was initiated in November 2005 in conjunction with the completion of the Black Lagoon sediment cleanup. Approximately 800 feet of shoreline were rehabilitated to reintroduce native plants and provide aquatic fish habitat.

Spring 2007 began the second year of a USGS effort to identify, quantify and characterize reproductive and larval fish habitat in the Detroit River. Some results of the project include the collection in 2005 of the first reproducing lake whitefish recovered from the River since

1916. Over the past two years, a small number of whitefish eggs and larvae have been raised at the USGS Great Lakes Science Center and released back into the Detroit River.

U.S. Fish and Wildlife Service (USFWS) completed the Preliminary Assessment/Site Investigation of Grassy Island in 2005. Grassy Island is located in the Detroit River and is a former confined disposal facility. It is currently part of USFWS's Detroit River Wildlife Refuge. In 2006, USFWS completed a bio-survey of the island and the surrounding aquatic environment. In 2007 USFWS finalized a human health risk assessment of the site and they are currently conducting an ecological risk assessment. The next step in the remedial process for Grassy Island is a \$2 million Remedial Investigation and Feasibility Study that will be initiated once USFWS can secure funding.

US Steel has been working to address complaints of oil sheens at their Detroit River river-basin catchments from their Ecorse, MI plant. In May 2006, they dredged 15,000 yd³ of oil-contaminated sediment from three large catchments in the River.

Next Steps

- BASF is expected to complete work at the Federal Marine Terminal site.
- Grassy Island RI/FS will begin when funding becomes available.
- US PAC to finalize delisting targets in 2008.
- Work is ongoing to develop a sampling framework for the St. Clair/Detroit Corridor for the Lake Erie year of intensive monitoring in 2009.
- Under an Interagency Agreement with U.S. EPA, the US Geologic Survey is examining past and present physical and biological characteristics of change in the St. Clair - Detroit River corridor. This project focuses on the impacts on habitat of historical physical changes in the corridor and the present dynamics of erosion and sedimentation, in combination with water velocity, to determine where fish spawning and nursery areas were, and where river processes are currently suitable for creation and maintenance of fish habitats. The results of this project will provide the scientific basis for identification and prioritization of fish spawning and nursery habitat restoration opportunities in the St. Clair River and Detroit River AOCs.

Canada (Ontario)

www.detroitriver.ca

History

The Detroit River Canadian Cleanup (DRCC) continues to be the local RAP coordinating body on the Canadian side. DRCC activities are supported by an Implementation Specialist (funded jointly by the federal and provincial governments) who organizes DRCC activities and serves as a point person for the Canadian RAP. Early in 2005, the DRCC developed a master five-year work plan, including activities of all committees. Activities are prioritized on an annual basis, which allows for the adaptation of the plan to changing needs and conditions. The DRCC has finalized delisting criteria for the Canadian portion of the Detroit River RAP, but there is still a need for bi-national criteria.

One of the key focuses of the DRCC recently has been on research and monitoring. In 2004, the DRCC was one of the conveners of the State of the Strait Conference, with a focus on "monitoring for sound management." The Great Lakes Institute for Environmental Research has continued its focus on the Detroit River with sediment sampling work over the past several years. The sampling includes areas all along the corridor, which allows for a big-picture view of sediment issues in the corridor ecosystem.

A DRCC Monitoring and Research Work Group was formed in 2004, and has developed a Monitoring Framework Plan for the river. The Plan sets ambitious goals for ongoing whole-river monitoring activities in the river and corridor. Part of the role of this Work Group is to track the status of the BUIs in the river. Utilizing funding from Environment Canada, the Essex Region Conservation Authority (ERCA) has completed surface water quality monitoring for conventional pollutants at 18 sites around the AOC.

Another major RAP focus is the improvement of fish and wildlife habitat. The Habitat Work Group has made a substantial start on developing a prioritized aquatic habitat management plan for the river. This plan is a positive addition to the ongoing RAP focus on terrestrial and riparian areas. Large-scale habitat restoration projects have been completed

in the watershed every year by the ERCA and the Essex County Stewardship Network and, increasingly, these projects are including wetland and fish habitat components. Other smaller-scale habitat restoration projects are undertaken by public watershed groups on a semi-annual basis, and include some large, ongoing projects such as the “cloverleaf” naturalization project in the Little River watershed. Aquatic habitat and shoreline softening projects have been completed at sites along the shoreline including Fort Malden, Caron Avenue Pumping Station and McKee Park.

Efforts to improve habitat for bald eagles have also been a focus of activity. An existing nesting site on Peche Island has been supported by the erection of platforms that are more stable than the existing nesting tree. The project also involves efforts to track eaglets once they leave the nest and efforts to raise public awareness about the need for quality habitat in the Detroit River watershed to support key sentinel species such as bald eagles.

Seventy-seven agricultural BMP projects, including the installation of buffer strips, rock chutes, tree plantings and septic system upgrades, have been completed through ERCA’s Nonpoint Source grant program, utilizing funding from Environment Canada.

A number of efforts have been made to reach out to the public to provide education about the RAP process, to involve them in the process, and to encourage them to seek commitment to the RAP from government officials. A number of public workshops have been held, including ones focused on research and habitat. A new display was purchased in 2004 to provide updated information, and a newsletter is published regularly. This newsletter is in addition to other publications focused on specific topics such as pesticides and household mercury. The DRCC also published a monthly electronic newsletter which is distributed to a wide audience to raise awareness about RAP activities as well as other environmental events.

A very successful Household Mercury Collection held in 2004 brought in over 220 pounds of mercury during a one-month period. That project was followed up by the publication and distribution of a fact sheet about fluorescent light bulbs and steps that businesses should take to dispose of them.

Progress since the 2006 LaMP Report

An update on the status of the BUIs was completed in June 2006.

A review of the Canadian delisting criteria, which were adopted in 2005, was initiated in spring 2007 to ensure criteria are measurable, realistic and achievable. An expert workshop was held in Windsor in December 2007, and the new criteria will be included in the Stage 2 report.

The development of a Stage 2 report for the Canadian side of the RAP was initiated in September 2007.

The priority habitat sites report was finalized in February 2007. The report highlights priority areas for habitat restoration on the Canadian side of the Detroit River.

The DRCC habitat work group, in partnership with the Town of Amherstburg, initiated a shoreline habitat restoration project at the mouth of the Canard River in August 2007.

A bi-national lake sturgeon spawning habitat project was initiated in 2006. The goal of the project is to construct a sturgeon spawning shoal in Canadian waters off the northeast corner of Fighting Island. The area is reported to be a historical spawning area for this species and sturgeon are known to frequent the area. To date, pre-construction monitoring has been undertaken and engineering designs for the spawning shoal have been developed.

The City of Windsor completed the expansion and upgrade of the Lou Romano sewage treatment plant in fall 2007. The official opening will take place in spring 2008.

Investigations into PCB contaminated sediments in Turkey Creek have been completed and a sediment remediation plan developed. Implementation of the plan is expected in the near future.

Over 120 acres (50 hectares) of the AOC watershed has been restored to upland forest and other habitat types. In addition, over 100 landowners have implemented agricultural beneficial management practices projects to improve surface water quality. These projects have been undertaken by ERCA, ECSN, and several friends of watersheds groups.

Since April 2005, 500 agricultural BMP projects have been completed through the Canada-Ontario Farm Stewardship and Greencover Programs implemented by OMAFRA,

Agriculture and Agri-Food Canada, Ontario Federation of Agriculture and Ontario Farm Environmental Coalition in the Essex Region watershed.

The Public Advisory Council prepared its first BUI report card on fish consumption advisories in July 2007.

A household hazardous waste collection was successfully conducted by the PAC/ Outreach Committee and the City of Windsor in 2006. In 2007, the DRCC Outreach Committee and the City of Windsor partnered on a pesticide education program entitled “Pull-Don’t Spray”. Six thousand hand-held weed pullers were distributed to residents at a number of sites along with information about alternatives to pesticides.

Peche Island Day has become a very popular annual event. Boats are donated to ferry people from Windsor to the island, giving many residents who would not normally have the opportunity to explore the natural environment of the island a chance to do so. A publication is in development on the history of ecology of the island, to educate residents about this protected natural area.

In addition, the various DRCC committees (Implementation, Outreach/PAC, Steering) and work groups (Monitoring and Research, Habitat) met on a regular basis. DRCC work plans are reviewed and updated annually. DRCC member organizations continued undertaking remedial actions within their own organizations, often seeking the endorsement or support of the DRCC for the projects. These ongoing projects include habitat restoration, nonpoint source pollution prevention, scientific research, and combined sewer overflow management.

Next Steps

Important future steps for the DRCC include:

- Completion of the revisions to the Canadian delisting criteria and the Canadian RAP Stage 2 report.
- Going forward, the primary focus of habitat rehabilitation efforts will be on the wetland areas of the Detroit River shoreline between Turkey Creek and the River Canard, as well as the shoreline and shallow shelves around the Canadian islands, with an ongoing emphasis on tributary and terrestrial habitat enhancement projects.
- Undertake construction of the Fighting Island lake sturgeon spawning shoal and complete post-construction monitoring to evaluate the success of the project.
- Completion of two large infrastructure projects (retention-treatment basins to eliminate 23 CSOs along the City of Windsor waterfront and the sewage treatment plant upgrade in the Town of Amherstburg). Make progress on other CSO reduction measures such as downspout disconnections.
- Completion of the remediation of the contaminated sediments in Turkey Creek and move forward on contaminant source track-down efforts in the Little River.
- Completion of the second PAC BUI report card focused on beach closings.
- The Outreach Committee will be working with the City of Windsor on a storm water education program to take place in spring 2008. The City is currently considering a proposal to make downspout disconnection mandatory in the municipality.
- Ongoing Canadian RAP activities include the implementation of the Monitoring and Research Plan, setting priorities for aquatic habitat restoration/protection, ongoing work with municipalities to protect habitat and reduce municipal loadings, and various outreach activities including Peche Island Day and community planting events.

Clinton River RAP, Michigan

www.crowc.org/rap/raphome.html

www.epa.gov/glnpo/aoc/clintriv.html

History

Located just north of Detroit and flowing 80 miles from its headwaters into Lake St. Clair near the city of Mount Clemens, the Clinton River drains 1,968 km² (760 square miles) of southeastern Michigan, including portions of Oakland and Macomb Counties and small areas of St. Clair and Lapeer Counties. The AOC includes the entire Clinton River

watershed, as well as a portion of Lake St. Clair immediately downstream of the mouth of the Clinton River.

There are eight beneficial use impairments in the Clinton River AOC, including: fish and wildlife consumption advisories; degraded fish and wildlife populations; degraded benthos; dredging restrictions; eutrophication; beach closings; degradation of aesthetics; and loss of fish and wildlife habitat.

Although historical industrial and municipal discharges were the primary causes of environmental degradation in the Clinton River, ongoing contamination problems are almost exclusively of nonpoint source origin. Land use in the watershed is predominantly commercial and residential, although agriculture is still common in the North Branch subwatershed. The main industries in the area are automotive-related. Storm water runoff, including the two municipal systems still experiencing combined sewer overflows, is the greatest source of water quality degradation.

Clinton River priorities include elimination of combined sewer overflows and separate sanitary overflows, nonpoint source pollution control, superfund waste site remediation, spill notification, habitat restoration, and elimination of illicit sewer connections and failing septic systems.

Progress since the 2006 LaMP Report

The Public Advisory Council (PAC) received a grant from the Great Lakes Commission to develop delisting criteria for six of the Clinton River AOC beneficial use impairments (BUIs). A technical committee of the PAC worked with consultants to develop locally-derived delisting criteria that are consistent with Michigan Department of Environmental Quality's (MDEQ) Guidance for Delisting Michigan's Great Lakes Areas of Concern. These criteria were submitted to the MDEQ in 2007 and are currently under review.

The PAC has recently been working with the MDEQ, the Michigan Natural Features Inventory and a private consultant to develop site-specific delisting criteria for degradation of fish and wildlife populations and loss of fish and wildlife habitat.

Seven subwatershed planning groups consisting of more than 50 communities and county agencies have formed since 2001, and are currently developing subwatershed management plans and Storm Water Pollution Prevention Initiatives as part of the requirements of the National Pollutant Discharge Elimination System (NPDES) Phase II storm water permit.

The GW Kuhn Combined Sewer Overflow Retention Treatment Facility was completed in 2006, expanding the capacity for treating storm water overflows.

The City of Warren has corrected numerous illicit sanitary connections that were discharging to Bear Creek.

The City of Madison Heights has corrected an illicit sanitary line from a commercial building to a storm drain, and has identified and corrected a break in a sanitary line that was overflowing into a storm drain.

Cleanup of the G&H Landfill was completed in 2006. This project included installation of a landfill cover, installation of a groundwater extraction and treatment system, and evacuation of contaminated soils outside the landfill cover to eliminate migration of PCBs.

The MDEQ is currently enforcing administrative consent orders for corrections to sanitary sewer overflows in Fraser, Centerline, Clinton Township, Hazel Park, Pontiac, and the City of Mt. Clemens.

The City of Rochester Hills passed an open space millage in 2006 to preserve natural areas, particularly along the Clinton River.

The City of Auburn Hills installed fish habitat structures along 1800 feet of the Clinton River in 2006.

There are currently 12 municipalities within the Clinton River AOC that have enacted wetland ordinances, including Addison Township, Oakland Township, City of Rochester Hills, Oxford Township, Orion Township, City of Auburn Hills, Independence Township, Waterford Township, West Bloomfield Township, White Lake Township, Bloomfield Township, and Orchard Lake Village.

Next Steps

- The MDEQ will review proposed delisting criteria submitted by the Clinton River Public Advisory Council.
- The Clinton River PAC will develop delisting criteria for degradation of fish and wildlife populations and loss of fish and wildlife habitat.
- Work is continuing on implementing NPDES Phase II storm water permits within the Clinton River basin.
- The Clinton River Watershed Council will continue to coordinate major public education and outreach events, including River Day and Clinton Clean-Up, in collaboration with many local governments and community organizations.

St. Clair River RAP (Binational)

www.friendsofstclair.ca/rap/

www.epa.gov/glnpo/aoc/st-clair.html

History

The St. Clair River flows southward about 40 miles (64 km), connecting the southern tip of Lake Huron to Lake St. Clair. The river is part of the boundary between the United States and Canada. The St. Clair River branches into several channels near its mouth at Lake St. Clair, creating a broad delta region. The AOC includes these important wetlands from St. Johns Marsh on the west (near Anchor Bay, Michigan) to the north shore of Mitchell's Bay in Ontario. Agriculture is the predominant land use within the river's watershed, but intensive industrial development has occurred in and near the cities of Port Huron and Sarnia.

The St. Clair River AOC has 10 beneficial use impairments (BUI): restrictions on fish consumption; fish tainting; bird and animal deformities; degraded benthos; restrictions on dredging; restrictions on drinking water consumption and taste and odor problems; beach closings; degradation of aesthetics; added cost to agriculture and industry; and loss of fish and wildlife habitat. The impairments are primarily due to poor agricultural practices and industrial development in and near the cities of Port Huron and Sarnia. The heaviest concentration of industry (including a large petrochemical complex) lies along the Ontario shore near Sarnia. Several communities along the St. Clair rely on the river as their primary source of drinking water. Industries, including petroleum refineries, chemical manufacturers, paper mills, salt producers and electric power plants, need high quality water for their operations as well. Ships carrying cargo between the upper and lower Great Lakes ply the St. Clair River.

St. Clair River RAP priorities include contaminated sediment remediation on the Canadian side of the river, elimination of combined sewer overflows and sanitary sewer overflows on both sides of the river, elimination of spills to the river from sources downstream of Sarnia, Ontario, and ensuring proper notification when spills do occur.

Progress since the 2006 LaMP Report

In 2007 the Binational Public Advisory Council (BPAC) formally adopted the Michigan Department of Environmental Quality's Delisting Guidance as the delisting targets for the beneficial use impairments on the U.S. side of the river. The BPAC will develop site-specific criteria for loss for fish and wildlife habitat using a process outlined in Michigan's Delisting Guidance. The acceptance of the Michigan criteria by the BPAC is only applicable on the US side and does not affect the Canadian delisting criteria.

In 2007 the U.S. Congress passed the Water Resources Development Act (WRDA) authorizing up to \$20 million to implement the St. Clair River/Lake St. Clair Comprehensive Management Plan prepared by the U.S. Army Corps of Engineers in 2005. Additional information about WRDA and the Management Plan follows in the section on Lake St. Clair.

The St. Clair River/Lake St. Clair Drinking Water Protection Network has been established to provide early detection of drinking water contamination from chemical spills and other threats to public health. Additional information about the Network follows in the section on Lake St. Clair.

Work continues on the combined sewer separation project in the City of Port Huron, MI. Overflows have been reduced by 80% to date. The project is expected to cost \$185 million and is scheduled for completion in 2013. When finished, the project will eliminate combined sewer discharges to the Black and St. Clair Rivers.

The International Joint Commission has initiated a five year, \$16 million study on Upper Great Lakes Water Levels. One of the issues being looked at with respect to these levels is what impact historical navigation dredging, riverbed mining and shoreline alteration on the St. Clair River near Port Huron, MI and Sarnia, ON have had on water levels within the upper Great Lakes, particularly Lakes Huron and Michigan.

Non-profit status has been restored for the U.S. Friends of the St. Clair River (FoSCR). The FoSCR must re-file for charitable organization status. It has already been incorporated as a non-profit organization. The Earth Voyager, a 60 ft Trimaran, has been gifted to FoSCR as a flagship to engage a large public audience in water quality education. The Earth Voyager arrived in Port Huron on July 17, 2007 and has generated a lot of publicity. The Trimaran is currently docked downtown and has been used regularly since its arrival to educate a wide cross-section of people (e.g., political officials, bank executives, general public, etc.) on the St. Clair River and the AOC program. The SCR BPAC is also working on developing an educational plan for the Earth Voyager and is interested in moving the Trimaran around the Great Lakes for uses in other AOCs.

Next Steps

- The St. Clair River BPAC is in the process of developing site-specific delisting criteria for loss of fish and wildlife habitat on the U.S. side of the river.
- Beneficial use impairments will be assessed for possible redesignation as unimpaired over the next year or so.
- Local officials are expected to pursue Congressional appropriation for funds authorized in the 2007 Water Resources Development Act to implement the recommendations of the St. Clair River/Lake St. Clair Comprehensive Management Plan.
- Work is ongoing to develop a sampling framework for the St. Clair - Detroit River Corridor (including the St. Clair River) for the Lake Erie year of intensive monitoring in 2009. Under an Interagency Agreement with U.S. EPA, the U.S. Geological Survey is examining past and present physical and biological characteristics of change in the corridor. This project focuses on the impacts on habitat of historical physical changes in the corridor and the present dynamics of erosion and sedimentation in combination with water velocity to determine where fish spawning and nursery areas were, and where river processes are currently suitable for creation and maintenance of fish habitats. The results of this project will provide the scientific basis for identification and prioritization of fish spawning and nursery habitat restoration opportunities in the St. Clair River and Detroit River AOCs.

Wheatley Harbour RAP, Ontario

www.on.ec.gc.ca/water/raps/wheatley/intro_e.html

History

Wheatley Harbour is a small, confined harbour on the north shore of Lake Erie. It is the busiest commercial fishing harbour in Ontario and the centre of the province's commercial fish processing industry, serves as an access point for Lake Erie sportfishing, and supports a commercial baitfish fishery. It was listed as an Area of Concern (AOC) in the 1970s because of dissolved oxygen depletion, elevated bacterial levels, nutrient enrichment, and PCB contamination of sediments. The AOC encompasses the harbour proper and the wetlands in lower Muddy Creek, a small tributary that flows into the AOC from the north.

A combined Stage 1/Stage 2 report was completed in 1998. The report highlighted five environmental concerns – contaminants in sediments, high phosphorus concentrations, poor water clarity, bacterial contamination, habitat loss – that result in the following five beneficial use impairments: restriction on fish consumption; restriction on dredging activities;

eutrophication or undesirable algae; loss of fish and wildlife habitat; and degradation of fish and wildlife populations (not solely attributed to factors in the AOC).

Progress reports updating the status of the AOC were completed in November 2002 and June 2004.

The Wheatley Harbour Implementation Team (WHIT) was formed January 2004, with representation from Environment Canada, Ontario Ministry of the Environment, Ontario Ministry of Natural Resources, Ontario Ministry of Agriculture and Food, Essex Region Conservation Authority, and the Essex County Stewardship Network and a comprehensive work plan for 2005-2007 was produced in June 2005. The work plan outlined all the activities to be pursued in order to complete all actions toward delisting of the AOC. A review of the RAP delisting criteria was initiated in fall 2004 and revised delisting criteria were finalized in September 2005.

A two-day State of Wheatley Harbour Workshop, held in April 2005, brought together federal and provincial government management, research and implementation staff to review the most current information on the environmental conditions of the AOC. The meeting provided a forum for discussion about information gaps and needs and future directions. Public outreach was re-initiated via a meeting with the Southwest Outdoors Club, a new, 200-member hunting and fishing club based out of Wheatley.

Progress since the 2006 LaMP Report

The following major activities have been undertaken in the Wheatley Harbour AOC since the 2006 LaMP update report:

- Fish community and snapping turtle population assessments were conducted in August 2006, following up on sampling that was done in 2001 and 2002.
- Brown bullhead were collected in spring 2006 to study tumour incidence in fish. Laboratory analysis of the samples was completed by summer 2007.
- Sediment cores were taken throughout the Muddy Creek wetland in fall 2006 and spring 2007 to further define the areas of sediment PCB contamination.
- The wetland hydrology and sediment transport study was completed in fall 2006.
- Benthic community sampling was conducted in spring 2007. PCB tissue burdens were analyzed in laboratory in summer 2007.
- A targeted Ecological Risk Assessment examining potential ecological risk of PCB contaminated sediments was completed in August 2007. The results indicate that PCB contaminated sediments in the Muddy Creek wetland do not pose an ecological risk to piscivorous wildlife.
- ERCA's federally funded nonpoint source remediation program continued to be active in the Muddy Creek watershed. Projects included septic system upgrades, tree plantings, buffer strips, and soil erosion protection projects. The goal is to continue to improve the quality of water entering the AOC (i.e., reduced nutrients, sediment and bacteria).
- Several habitat restoration projects were undertaken in the AOC-proper by the Essex Region Conservation Authority and the Essex County Stewardship Network.
- A meeting was held in November 2007 with the local community to share information on the status of the RAP and to communicate the intention of the WHIT to proceed with delisting of the AOC.

Next Steps

- Development of a RAP Stage 3 report recommending delisting of the AOC will be completed by March 2010.
- Remaining on-the-ground actions are to pursue several opportunities for habitat projects to improve the quality of the Muddy Creek wetland.

9.3 Watershed Projects

Erie and Cattaraugus County Watershed Projects, New York

www.law.buffalo.edu/cattaraugus

History

The Erie County Soil and Water Conservation District develops and implements a wide range of projects addressing habitat, streambank stabilization, erosion control, nutrient management, agricultural environmental management planning, non-point source, stewardship, and forest/community management. Other projects by environmental and governmental organizations address land use, urban sprawl, large animal farms, storm water, construction, conservation incentives, water quality, and public access.

New York Rivers United received a grant from U.S. EPA-GLNPO to develop the Cattaraugus Creek Watershed Project in Partnership with the University of Buffalo Law School Environmental Law Clinic. This project is a collaborative, science-based Watershed Protection Plan for the Cattaraugus Creek Watershed in accordance with the Vision and Objectives of the Lake Erie Lakewide Management Plan (LaMP). The goal is to develop a Strategy to provide scientific and technical tools to those who make decisions on local land use that may impact water quality.

Progress since the Lake Erie LaMP 2006

On October 3, 2006, the project team hosted a Watershed Summit Kickoff to commence public participation in the planning process for the Cattaraugus Creek Watershed project. The Kickoff was attended by close to 100 community members as well as representatives from various governmental regulatory agencies. Stakeholder representatives and experts presented information on the known condition of the watershed and provided for questions and answers.

A series of smaller focus groups designed to elicit further comments and concerns from the community members was held on October 24, 2006 and November 9, 2006 in Gowanda and Sardinia. Both the summit and the focus groups had substantial turnouts and provided opportunities for significant public input. The objectives of the Focus Groups were to (1) develop a common Vision for the watershed; (2) identify threats to the watershed; and (3) identify opportunities and constraints within the watershed.

A Watershed Resource Guide was prepared that includes the results of the focus group sessions, stakeholder contact list, and endorsements by Cattaraugus County Legislature, Congressman Tom Reynolds, and Congressman Brian Higgins.

Part II of this Watershed Resource Guide provides a “snapshot” of current conditions in the watershed, utilizing data collected by government agencies, academics and non-profits. The mapping resources and data may be important in future watershed planning. Some of the information relates to water quality, environmental conditions and activities that impact upon water quality. Other information, such as economic drivers and poverty, might influence the choice of watershed strategies. A complete analysis of baseline data needs should be completed at the start of strategy development.

Next Steps

- Cattaraugus County planning experts, with assistance from the UB Law School Environmental Law Clinic and NYRU, will prepare the draft Watershed Strategy Document based upon the suggestions and input from the Focus Groups. This strategy will describe multiple tools for protecting the watershed and water quality, including municipal assistance in planning and zoning developed by Cattaraugus County Department of Economic Development, Planning, and Tourism, best management practices for agricultural and forest landowners directed specifically for the resources in the Cattaraugus Creek watershed, and ideas for compatible economic development incentives.

Lake St. Clair Program (Bi-national)

Lake St. Clair, together with the St. Clair River and the Detroit River, provide the connecting channel between Lakes Huron and Erie and form part of the international boundary between Canada and the United States. Significant tributaries to Lake St. Clair include the Sydenham and Thames Rivers (Canadian) and the Clinton River (U.S.). The total drainage basin area exclusive of the St. Clair River drainage is 13,500 km² with 23% draining U.S. lands and 77% draining Canadian lands.

The need for a Lake St. Clair focus to coordinate and communicate the various on-going programs and to identify areas where work is needed was recognized by the four lead government agencies: Environment Canada, U.S. EPA, Ontario Ministry of Environment, and Michigan Department of Environmental Quality. In 2000 they approved a resolution to include Lake St. Clair under the Four Agency Letter of Commitment. Under this commitment, a framework for managing Lake St. Clair was completed, a bi-national monitoring committee (MUGLCC) established, and two bi-national monitoring activities inventories (MUGLCC 2000 and 2002) have been published.

The key elements that form the basis of the management framework are: a Bi-national Partnership Agreement (Four Agency Letter of Commitment); a Bi-national Management Committee (Four Agency Management Committee); a Bi-national Working Group; separate local U.S. and Canadian Watershed Coordinating Committees; and a Biennial State of Lake St. Clair Conference. Implementation actions in the U.S. are guided by the 2005 St. Clair River/Lake St. Clair Comprehensive Management Plan. Environment Canada is in the process of finalizing a Lake St. Clair Canadian Management Plan.

Key stressors that have been identified for the watershed include land use, commercial navigation, recreational navigation and invasive species. These sources have resulted in increased nutrients and chemicals in water and sediment; increased bacterial levels at beaches; fish consumption advisories; and changes in habitat, fish and wildlife populations, and biodiversity.

U.S.

Progress since the 2006 LaMP Report

In 2007 the U.S. Congress passed the Water Resources Development Act. This Act authorizes up to \$20 million to be spent on implementing the St. Clair River/Lake St. Clair Comprehensive Management Plan prepared by the U.S. Army Corps of Engineers in 2005. The Management Plan outlines 10 goals for environmental restoration actions needed for Lake St. Clair. These goals are:

- Pollution does not threaten public health and the health of the watershed;
- All biological communities and habitats are healthy, diverse, and self-sustaining;
- Water is safe for drinking;
- Water is safe for swimming;
- Fish and wildlife are safe to consume;
- Land use activities are sustainable and support a healthy watershed;
- Recreation and economic activities impacting the lake are sustainable and support a healthy watershed;
- Data and information are available to ensure informed management decisions;
- All entities responsible for natural resources and environmental protection within the watershed are working together in a collaborative manner to protect and enhance the watershed;
- The public is informed about environmental issues and engaged in activities to restore and protect the lake.

U.S. EPA-GLNPO awarded a grant for Lake St. Clair Program Capacity/Coordination to the Southeastern Michigan Council of Governments (SEMCOG). The two-year grant involves facilitating the U.S. Lake St. Clair Team to advance implementation of the Lake St. Clair Management Plan and strengthen the overall cleanup and restoration process. Work includes facilitation of meetings of the U.S. Lake St. Clair Team and its subcommittees,

developing a team approach to implementing the Lake St. Clair Management Plan and providing input into developing the upcoming Lake St. Clair Conference.

The St. Clair River/Lake St. Clair Drinking Water Protection Network has been established to provide early detection of drinking water contamination from chemical spills and other threats to public health. The Macomb/St. Clair Inter-County Watershed Management Advisory Group initiated this cooperative project between the U.S. EPA, Michigan Department of Environmental Quality (MDEQ), Macomb County, St. Clair County and the local water treatment plants. Pollutants in the water treatment plant intakes will be identified in real-time. Decision makers will be automatically notified about the presence and identity of water contaminants and will be able to ensure faster implementation of actions to protect the public from exposure to spills. Through a public website, the public can access data and see that their water is safe and clean.

In 2007 officials from Macomb County reconvened the Blue Ribbon Commission on Lake St. Clair. This panel was first formed in 1997 and developed nearly 100 recommendations to tackle pollution problems on Lake St. Clair. The new Commission has 36 members including top officials from Macomb, Oakland, St. Clair and Wayne Counties, and representation from Michigan's Office of the Great Lakes, the Canadian parliament, the Walpole Island First Nation of Native Americans, congressional aides, professors, environmental experts and members of the original commission. They plan to issue a final report by March of 2008.

Next Steps

- The Lake St. Clair Conference was held in March 2008 and the proceedings will be published.
- Local officials are expected to pursue Congressional appropriations for funds authorized in the 2007 Water Resources Development Act to implement the recommendations of the St. Clair River/Lake St. Clair Comprehensive Management Plan.
- Work is ongoing to develop a sampling framework for the St. Clair/Detroit Corridor (including Lake St. Clair) for the Lake Erie year of intensive monitoring in 2009.

Canada (Ontario)

www.scrca.on.ca/lakestclair.asp

Progress since the 2006 LaMP Report

The Lake St. Clair Canadian Watershed Council completed an extensive consultation process with local First Nations, stakeholders, and the general public in order to raise awareness of the Technical Report and discuss the proposed management recommendations for the Lake St. Clair Canadian Watershed Management Plan. A PowerPoint presentation and questionnaire formed the basis of the consultation and was available through the Internet (at Walpole Island First Nation's site and at the St. Clair Region Conservation Authority's site) and by presentations from Council members. Information was presented to over 300 stakeholders and general public, and to approximately 125 First Nation community members. Overall, there was not significant disagreement expressed by the participants and they supported the management recommendations as proposed.

The final draft Lake St. Clair Canadian Watershed Management Plan is complete and is currently going through the approval process of the Council's partner agencies. The release of the plan is expected by spring 2008.

Since April 2005, 900 agricultural BMP projects have been completed through the Canada-Ontario Farm Stewardship and Greencover Programs implemented by OMAFRA, Agriculture and Agri-Food Canada, Ontario Federation of Agriculture and Ontario Farm Environmental Coalition in the St. Clair Region watershed.

The Canada-Ontario Agreement (COA) Respecting the Great Lakes (2007-2010) contains several commitments that will support efforts to restore Lake St. Clair, including: continuing to reduce nutrient loadings from urban and rural sources; raising awareness of Lake St. Clair issues; reporting out on progress through SOLEC; and supporting the recovery of Lake St. Clair populations of lake sturgeon. Information in the Management Plan and the Implementation Strategy will be used to support negotiations for the next COA (beyond 2010).

Next Steps

- Publication of the Public and First Nations Consultation Report and the Lake St. Clair Canadian Watershed Management Plan.
- Begin developing the Lake St. Clair Canadian Watershed Implementation Strategy.
- Support ongoing projects (e.g. nonpoint source BMPs, complete a walleye study in the lower Thames River, and continue to develop a corridor-wide hydrology model).

Thames River Watershed, Ontario

www.thamesriver.on.ca

www.lowerthames-conservation.on.ca

History

The Thames River watershed is located in the agricultural heartland of southwestern Ontario. The river is 273 km long and drains a 5,825 km² watershed to Lake St. Clair. Flood control reservoirs in the upper portion of the Thames regulate the flow regime of the river. Water quality and aquatic habitat have been altered by land use activities in the watershed. Historical and current land use has resulted in high sediment and nutrient loadings, mainly from nonpoint sources, and habitat fragmentation and degradation. The Thames contributes the second largest nutrient loadings to Lake Erie, next to the Maumee River in Ohio. The Thames River watershed was identified as a target watershed to implement recommendations from the Lake Erie LaMP.

The Upper Thames River Conservation Authority (UTRCA) manages resources in the upper portions of the watershed including London and upstream areas. The Lower Thames Valley Conservation Authority (LTVCA) manages resources in the lower portion from downstream of London to Lake St. Clair. Established in 1947 and 1961, respectively, the UTRCA and LTVCA have well established watershed management programs. These include flood control, land use and environmental planning, environmental monitoring (surface water, groundwater, fisheries, and species at risk), forestry and agricultural conservation services, community education, and recreation.

Through the Clean Water Program, rural landowners receive technical assistance and financial incentives to implement best management practices to reduce rural pollution sources and enhance habitat. A total of 204 projects were completed in the UTRCA watershed in 2004/2005. An ecosystem-based recovery plan for aquatic species at risk in the Thames River watershed was developed. A partnership of agencies (federal, provincial, conservation authorities) and First Nations interested in ecosystem restoration within the Thames River Watershed created the Thames River Ecosystem Restoration Committee in 2003.

Revisions to the Conservation Authorities Act by the Province of Ontario have resulted in a new directive: Ontario Regulation 97/04 – Development, Interference with Wetlands and Alterations to Shorelines and Watercourses. The Generic Regulation will take the place of the Fill, Construction and Alteration to Waterways Regulation by regulating development on defined hazard lands, including: erosion hazard lands, flood hazard lands, watercourses, wetlands, and other areas of interference surrounding wetlands.

Progress since the 2006 LaMP Report

Progress has continued on a number of activities to restore and protect the Thames River since 2006. Some of these include:

- Through the Clean Water Program, 210 projects to implement best management practices to reduce rural water pollution sources and enhance habitat were completed in 2006/2007.
- Since April 2005, 2,170 agricultural BMP projects have been completed through the Canada-Ontario Farm Stewardship and Greencover Programs implemented by OMAFRA, Agriculture and Agri-Food Canada, Ontario Federation of Agriculture and Ontario Farm Environmental Coalition in the Thames River watershed.
- Community Education: Hands-on environmental education for 136, 400 students since 2004.

- Approximately 290,000 trees were planted for habitat improvement through plantings on private lands and as part of school and community plantings.
- Upper Thames River Watershed Report Cards for 2007 were completed. This includes individual report cards summarizing environmental conditions and an action plan for improvement for each of the 28 watersheds in the upper Thames River watershed.
- Nutrient Management Studies continue in partnership with the Ontario Ministry of the Environment on selected agricultural watersheds to monitor the impacts of nutrient management practices on water quality.
- Environmental Monitoring – on-going monitoring in the Thames watershed includes surface water chemistry and bacteria, stream flows, groundwater, fisheries, pesticides, benthic invertebrate monitoring, and species at risk.
- A study was completed on Fanshawe Reservoir and the North Thames watershed to address algal blooms on the reservoir and upstream nutrient sources.
- Environmentally Significant Area Management Plan Updates were completed for Sifton Bog, Ellice Swamp, and Westminster Ponds/Pond Mills outlining objectives and implementation actions for future protection.
- The Oxford County Natural Heritage Study was completed, identifying significant natural features and outlining conservation and policy needs for the County.
- The UTRCA Environmental Planning Policy Manual was completed.
- Phase 1 of the Thames Valley Corridor Study was completed, identifying lands for protection and addressing future development in the urban flood plain.
- A climate change conference was held in London to discuss the effects of climate change on local watershed management issues.
- Studies are ongoing with the Ontario Geological Survey to better define the water bearing zones and to complete a regional groundwater model for Southwestern Ontario.
- Work continues to inventory and assess the approximately 225 dams and barriers throughout the watershed and prioritize them for mitigation efforts. The Dingman Creek Weir, located in the City of London, was removed in September 2005 as a result of this work.

Next Steps

As financial resources become available, the development of an overall watershed plan for the Thames River will be developed. This plan is needed to target future implementation actions. Many relevant plans being developed are key components of a watershed plan. Some of those currently planned or underway include:

- Drinking Water Source Protection Plan – an extensive effort led by the Province of Ontario and facilitated on a watershed scale by Conservation Authorities to protect municipal drinking water sources;
- Ingersoll storm water management study;
- UTRCA property assessment project identifying the status of UTRCA land holdings and future priorities;
- Riparian meadow and historic wetland mapping projects;
- Implementation of targeted watershed projects as identified by the 2007 UTRCA watershed report cards;
- Thames River Fisheries Management Plan;
- A Heritage Landscape Guide to the Thames River watershed;
- Thames Valley Corridor Plan;
- Stewardship projects – continuing to implement rural non-point source projects and habitat projects is a priority.

Essex Region/Canadian Western Lake Erie Watersheds

www.erca.org

History

The Essex region is located in extreme southwest Ontario, and encompasses all or part of nine municipalities including Windsor, most of Essex County, and Pelee Island. The region is formerly a glacial lakebed, and is characterized by predominantly clay soils with a very flat topography. Prior to European settlement most of the region was covered in swamp forest, with extensive coastal marshes and some areas of prairie and alvar. European settlement has radically altered the landscape, and today just 7.5% of the region exists as natural area (2.5% wetland and 5% forest with very small remnants of prairie and alvar). Similarly, water quality has been degraded by human activities, and the region is a significant contributor of nutrients to the lower Great Lakes. Agricultural land uses (primarily cash crops with significant but localized greenhouse, fruit and vegetable production) cover 80% of the region, with urban and rural residential dominating the balance.

Due in part to its southernmost location in Canada, the region supports the highest diversity of flora and fauna in the country. It is in the heart of the Carolinian life zone and is also home to approximately 240 federally and provincially listed Species at Risk. The region is a very special place from a natural environment perspective, and also faces significant and unique resource management challenges. The Lake St. Clair-Detroit River western basin of Lake Erie corridor encompasses most of the region and has been identified as a priority area for LaMP activities.

The Essex Region Conservation Authority was established in 1973 to “manage natural resources in the region other than oil, gas, coal and minerals.” A diverse suite of programming has been developed by ERCA in relation to watershed conservation and restoration, hazard lands and flood management, outdoor recreation, and environmental education. Learn more at www.erca.org.

Progress since the 2006 LaMP Report

Since 2006, progress has continued on a number of activities to restore and protect the watershed draining to the western basin of Lake Erie. Some of these include:

- For each of the last two years, ERCA’s municipally appointed Board of Directors has approved the Clean Water~Green Spaces program that sees \$1.05 million of local levy directed to natural areas acquisition, water quality improvement and habitat restoration programs.
- Over 200 acres of prairie habitat in the Detroit River watershed has been acquired in partnership with the City of Windsor and others under Protection of Significant Natural Areas through Acquisition.
- Under the Water Quality Improvement Program, approximately 150 projects were completed through provision of incentive grants to private landowners. Projects included septic system upgrades, buffer strips, rock chutes and other soil erosion control structures, and abandoned wellhead decommissioning. This program relies on a strong federal-provincial-regional partnership.
- Since April 2005, 500 agricultural BMP projects have been completed through the Canada-Ontario Farm Stewardship and Greencover Programs implemented by OMAFRA, Agriculture and Agri-Food Canada, Ontario Federation of Agriculture and Ontario Farm Environmental Coalition in the Essex Region watershed.
- Habitat restoration – over 400,000 trees were sold to residents during the last two years throughout the region or planted at private sites with financial and technical assistance from ERCA. ERCA partnered with landowners to restore over 400 acres of forest and wetland habitat in the last two years. This program relies on a strong federal-provincial-regional partnership.
- Essex-Erie Aquatic Species at Risk Recovery Strategy – ERCA and other Lake Erie Conservation Authorities and Stewardship Networks partnered with the federal government to initiate a recovery strategy process focusing on fish species at risk.

- ERCA maintains 45 surface water quality monitoring stations and eight groundwater monitoring stations and monitors for various parameters, with emphasis on the conventional pollutants. Benthic invertebrate health is also monitored at these sites.
- Through a provincial partnership, background studies have been completed and a Source Protection Committee has been formed to prevent contamination of drinking water sources.

Next Steps

Continued expansion of ERCA's water quality enhancement and habitat protection and restoration programs are a high priority. This requires continued landowner engagement, sustained local and senior government funding, and continuing to work with municipalities to strengthen planning documents.

Kettle Creek Watershed Project, Ontario

www.kettlecreekconservation.on.ca

History

The Kettle Creek watershed is located in southwestern Ontario, bordering on the north central shore of Lake Erie. Kettle Creek is a short, deeply incised watercourse that drains 520 km² of intensively used agricultural and urbanized lands to Lake Erie at Port Stanley.

Within the watershed valley the bed of the stream is often more than 100 feet below the level of the surrounding lands. Approximately 80% of the watershed is in agricultural use; 15% is forested or marginal land; and 5% is urbanized. The primary agricultural land use is cash crop, and there is a moderate amount of specialty cropping. Livestock operations are declining in total number of animals, but the animals are concentrated in smaller areas. Most agricultural lands are systematically tile drained which, along with municipal drains, has reduced wetland features in the watershed landscape by 80% from historical records.

Shoreline erosion monitoring, development controls or prohibitions, flood proofing of new shoreline development, and shoreline protection activities combine along Kettle Creek's Lake Erie shoreline, which represents the fastest eroding shoreline in the Great Lakes (average of two metres recession per year over 100 years) and the largest lake-induced flood damage centre on the Canadian side of Lake Erie. The population of the watershed is approximately 65,000 people, with a forecast growth of 50% within the next 20 years. A large, as yet unsettled or developed portion of the City of London is located in the northern headwaters of the watershed.

As a result of the watershed's natural features and land uses, the following natural resource management issues are present:

- Flash flooding but otherwise low and decreasing surface water flows;
- Erosion and sedimentation of watercourses and Lake Erie;
- Deforestation and decreasing water and air quality;
- Habitat fragmentation and degradation;
- Hazard land management in both riverine and lakeshore environments.

Kettle Creek's outflow plume into Lake Erie has been identified as a source of sediments laden with nutrients, mercury, and PAHs, all measurable within Lake Erie 1 km south and 2 km east of the outlet. Both point and nonpoint sources within the watershed contribute to Kettle Creek's impact upon Lake Erie.

Progress since the 2006 LaMP Report

Progress has continued on a number of activities to restore and protect the Kettle Creek watershed since 2006. Some of these include:

- Reforestation: 200,000 trees planted in the watershed to buffer watercourses, create interior forest habitat, improve biodiversity, and reduce water and wind erosion and sedimentation.
- Wetland Creation: Three wetland projects totaling more than five acres completed on private properties within the watershed.

- Since April 2005, close to 100 BMP projects have been completed through the Canada-Ontario Farm Stewardship and Greencover Programs implemented by OMAFRA, Agriculture and Agri-Food Canada, Ontario Federation of Agriculture and Ontario Farm Environmental Coalition in the Kettle Creek watershed.
- Continuing on the successes of the partnership with the Lake Erie Binational Public Forum and U.S. EPA to develop a community-based watershed strategy for the Dodd Creek subwatershed, Kettle Creek Conservation Authority (KCCA) has developed an action-based strategy for the Upper Kettle Creek subwatershed. The Lower Kettle Creek strategy is scheduled for completion in early 2008.
- Hands-on environmental education involves more than 1,500 elementary and secondary school students.
- A comprehensive monitoring system (surface water and groundwater quality and quantity, benthos, fisheries, etc.) was designed and implementation is ongoing.
- Development of a Watershed Characterization Report and Water Quality Trends and Conditions Report for Source Water Protection.
- Over \$175,000 donated to KCCA as registered charity for environmental management and protection works.

Next Steps

- The development of a private land stewardship program for the Kettle Creek watershed to provide landowners with grants for environmental restoration projects.
- Coordination of the St. Thomas-Elgin Children's Water Festival. This festival, being held in May 2008, will teach over 2,000 local grade 3-5 students about the importance of water to their lives and communities. Water conservation and protection will be key messages.
- Development of a Watershed Report Card for the Kettle Creek watershed.
- Development of a Drinking Water Source Protection Plan – an extensive effort led by the Province of Ontario and facilitated on a watershed scale by Conservation Authorities to protect municipal drinking water sources.

Long Point and Long Point Bay (including Big Otter Creek, Big Creek, Lynn River, Nanticoke Creek, Sandusk Creek and Stoney Creek)

www.lprca.on.ca

History

The Long Point Region Conservation Authority (LPRCA) encompasses a regional watershed area with several third order watercourses draining directly to Lake Erie, both west and east of Long Point and Long Point Bay. Major watersheds include Big Otter in the west, and Big Creek, Lynn River, Nanticoke Creek, Sandusk Creek and Stoney Creek in the east. The regional watershed area consists of approximately 2782 km², and includes approximately 170 km of Lake Erie shoreline (including the Long Point sand spit). The watershed is largely dominated by two surficial geologic features, namely the Norfolk Sand Plain, sweeping down from the northeast through the central and western areas of the watershed, and the Haldimand Clay Plain, occupying the eastern third of the watershed, with occasional bedrock outcrops near the lakeshore and along the shoreline in the east.

The Long Point Region watershed has experienced a number of problems in recent years relating to the impairment of uses of Lake Erie. The Big Otter watershed continues to be a significant source of sediments entering the lake from the north shore, with associated nutrient loadings. Sedimentation and nutrient loadings have impaired fish habitat and wildlife habitats along the major watercourses, especially Big Creek and Lynn River. High bacteria levels in the mid-1990s have persisted on occasion in certain locations. Seasonal low water conditions (both surface water and groundwater) have been a significant problem in the past several years. Pathogen problems causing mortality in waterfowl populations along the lakeshore within Long Point Bay flared up seasonally in the early 2000s, but were not of significance in 2004 or 2005.

The LPRCA has had an active land and habitat restoration program in recent years. Approximately 400 acres of private and public land were replanted and restored from 2004 to 2006 through a cooperative restoration project with Ontario Power Generation and the Long Point World Biosphere Reserve Foundation. Approximately 60 acres of floodplain agricultural land along Big Creek were restored on two properties acquired by the LPRCA. An additional 79-acre parcel of floodplain and wetland area was acquired in 2005, along with 85 acres of upland forest and agricultural land that will be restored in 2006. A cooperative restoration action plan for the lower Big Creek watershed was developed in 2005 by a number of partners, including LPRCA.

Progress since the 2006 LaMP Report

In 2006 and 2007, the LPRCA planted approximately 160 acres of private land. Additionally, a 26 acre parcel of land along the Big Otter Creek was acquired. Two sub-watershed buffer projects were initiated (South Creek and Tributaries of the Hahn Marsh). Both projects were successful at buffering over 80% of the unbuffered tributaries. Since April 2005, 340 agricultural BMP projects have been completed through the Canada-Ontario Farm Stewardship and Greencover Programs implemented by OMAFRA, Agriculture and Agri-Food Canada, Ontario Federation of Agriculture and Ontario Farm Environmental Coalition in the Long Point Region watershed. LPRCA is presently working cooperatively with the Kettle Creek, Catfish Creek and Grand River Conservation Authorities on water supply source protection planning focusing on watershed characterization and risk assessment.

Next Steps

The LPRCA hopes to plant/restore between 80 and 100 acres annually, partnering in the buffering of four more sub-watersheds (Kent Creek, Spittler Creek, North Creek and Mud Creek).

Southern Grand River (Ontario) Ecosystem Rehabilitation Initiative

History

The Grand River is the largest tributary in the Canadian portion of the Lake Erie basin, draining an area of almost 7,000 km². Due to its size and the wide diversity of aquatic habitats it offers, the Grand River is critically important to the health of the Lake Erie ecosystem and to achieving the Lake Erie LaMP restoration goals in the eastern basin of Lake Erie. It has, therefore, been identified in the Lake Erie LaMP as a priority watershed for implementation.

The Grand River has been significantly impacted by urban and agricultural development (land use, water utilization, sewage disposal, recreation). About 78% of the watershed is farmed, and more than 875,000 people currently reside in the watershed. Approximately 70% of residents get their drinking water from groundwater or the river via 40 municipal water systems, and about 300,000 households are serviced by 25 municipal wastewater treatment plants that return treated effluent to the river. A series of seven dams and reservoirs, constructed and operated to ensure there is enough water in the river year round to deal with drinking water and effluent needs, have altered the natural water and sediment flow regimes. As a result, the lower portion of the Grand River is heavily stressed by nutrients, bacteria, and sediments originating upstream.

Within recent years, increased attention has been given to restoring water quality and ecosystem health within the Grand River watershed. Some of the main factors recognized as contributing to reduced water quality and ecosystem integrity through this reach include: 1) municipal wastewater treatment plants that add high annual nutrient loading rates to the river; 2) free ranging cattle that still have direct access to the main river and connecting tributaries; 3) the lack of buffer zones along the river and connecting tributaries; 4) sewage outflows, faulty septic systems, and untreated storm drainage; 5) altered shorelines and encroaching development; and 6) the presence of the dam.

The Southern Grand River Ecosystem Rehabilitation Initiative is a partnership of agencies with the common objective of restoring the aquatic ecosystem of the southern Grand River. The initiative commenced in August 2001 with a workshop entitled “Restoration of Healthy Ecosystem Function in the Lower Grand River,” which provided a forum for sharing current information on the status of the southern Grand River. A Working Group, with representation from Environment Canada, Grand River Conservation Authority, Ontario Ministry of the Environment, Ontario Ministry of Natural Resources, Six Nations First Nation, and Fisheries and Oceans Canada, was subsequently formed to coordinate research, monitoring, and implementation efforts in the southern Grand River. Projects undertaken included: assessment of the fish community of the lower Grand River and the nearshore areas of Lake Erie; monitoring of fish passage at the Dunnville Dam fishway; a walleye radio-telemetry study to investigate habitat use and fishway passage by migrating walleye; water quality and benthic community sampling; and an examination of the Grand River plume and its influence on the nearshore areas of the eastern basin of Lake Erie.

Progress since the 2006 LaMP Report

The results of significant research and monitoring of the southern Grand River between 2002 and 2006 have been compiled and released in a series of technical reports and papers by the investigators. On March 4-5, 2008 a scientific workshop was held at the Grand River Conservation Authority to bring together technical experts to review the results of the studies, discuss the state of the Southern Grand River, and begin to identify the key issues and priority actions required for its rehabilitation. The workshop proceedings will be presented and reviewed at upcoming First Nations and Stakeholder Workshops for comments. Findings from the workshops will be summarized and used to develop a management plan for the Southern Grand River, to be developed over 2008.

Recent publications include (but are not limited to):

Cooke, S. 2006. Water Quality in the Grand River: A summary of current conditions (2000-04) and long term trends. Grand River Conservation Authority, Cambridge, ON. 88p.

Chow-Fraser, P. 2002. Ecological status of the Dunnville Marsh, a coastal wetland of Lake Erie. Ecological Status Report, McMaster University, Department of Biology, Hamilton, ON.

Gilbert, J.M. and P.A. Ryan. 2005. A Status Report on the wetlands within the Southern Grand River between Cayuga and Dunnville. In press. Ontario Ministry of Natural Resources, Port Dover, ON.

Gilbert, J.M., and P.A., Ryan. 2007. Southern Grand River Wetland Report: ecological assessment of the wetlands within the southern Grand River between Cayuga and Dunnville. Ministry of Natural Resources internal report. Port Dover, ON. 38pp + appendixes

Lougheed, V.L. and P. Chow-Fraser. 2002. Development and use of a zooplankton index of wetland quality in the Laurentian Great Lakes Basin. *Ecological Applications* 12 (2): 474-486.

MacDougall, T.M., Wilson C. C., Richardson L. M., Lavender M. and P. A. Ryan. 2007. Walleye in the Grand River, Ontario: an Overview of Rehabilitation Efforts, Their Effectiveness, and Implications for Eastern Lake Erie Fisheries. *J. Great Lakes Res.* 33 (Supplement 1):103-117.

MacDougall, T.M., 2008. Aquatic Habitat, Environment and Fisheries of the Lower Reaches of the Grand River, Ontario, 2000-2005. Ontario Ministry of Natural Resources. 134p + Appendices.

Next Steps

A State of the Southern Grand River report is currently being prepared by the Southern Grand River Ecosystem Rehabilitation Working Group. The report will summarize the current status of the southern Grand River ecosystem, and identify the main issues facing the southern Grand River. A Southern Grand River Rehabilitation Plan will identify actions required to address issues identified in the State of the Southern Grand River report. This will be followed by the development of an Implementation Plan that will set priorities and guide on-the-ground restoration activities, and a Research and Monitoring Plan that will identify information needs and guide research and monitoring activities to support the implementation plan and to allow for the tracking of progress.