

**Appendix 3: Area of Concern and Use Impairments of  
Lake Michigan**

### **Area of Concern**

Another component of the GLWQA is an agreement to develop remedial action plans (RAPs) for the 43 Areas of Concern identified by the International Joint Commission. The Sheboygan River encompasses the lower Sheboygan River downstream from the Sheboygan Falls Dam, including the entire harbor and nearshore waters of Lake Michigan. The Sheboygan River Area of Concern (AOC) serves as a settling area for pollutants transported from three watersheds- the Sheboygan River, Mullet River, and Onion River. Pollutants of concern in the Sheboygan AOC are:

- Suspended Solids
- Fecal Coliform Bacteria
- Phosphorus
- Nitrogen
- PCBs
- PAHs
- Heavy Metals

Other criteria contributing to designation as an Area of Concern are Beneficial Use Impairments. Eight of the Fourteen Beneficial Use Impairments (previously mentioned) have been identified for the Sheboygan Area of Concern. These Use Impairments are:

- **Degradation of Fish and Wildlife Populations:** The lower Sheboygan River currently supports a diverse fish population. Recent surveys show smallmouth bass are abundant in the Sheboygan River system. Populations of trout and salmon are dependent on stocking. However, bioaccumulating contaminants in the food chain and sedimentation are negatively affecting the fish populations and their forage base.

Populations of mink are well below what normally would be expected for the habitat available. Small mammal trapping in 1993 resulted in no mink found in the AOC. Occasional mink are seen in this area, however they are suspected to be transient individuals that probably are not breeding in the area.

- **Fish Tumors or Other Deformities:** Fish health assessments were conducted by WDNR on white suckers in the AOC in 1994. This research concluded that white suckers residing in the lower Sheboygan River were exposed to and absorbed significant amounts of PCBs and PAH, and exhibited biochemical, histological and hematological alterations, suggesting impaired fish condition.
- **Bird or Animal Deformities or Reproductive Problems:** Reproductive problems are suspected with mink because of their low population levels in relationship to available high quality habitat. A study that examined four species of birds collected along the Sheboygan River concluded that reproductive impairments were suspected because of the PCB tissue concentrations found.
- **Degradation of Benthos (organisms that live on or in the bottom of a body of water):** Benthic surveys on the Sheboygan River identified the AOC as having degraded

populations. The community shows low species diversity and is dominated by pollution tolerant species compared to reference conditions.

- **Restrictions on Dredging Activities:** Dredging in the lower Sheboygan River and Inner Harbor has not been conducted since 1969 because of contaminated sediment disposal concerns. The sediments are contaminated with high concentrations of PCBs, PAHs and heavy metals. Some deposits are considered heavy pollution according to U.S. EPA guidelines and WDNR draft sediment criteria.
- **Eutrophication [the process by which a body of water becomes enriched in dissolved nutrients (as phosphates) that stimulate the growth of aquatic plant life usually resulting in the depletion of dissolved oxygen] or Undesirable Algae:** Nutrient concentrations in the lower Sheboygan River and Harbor routinely exceed water quality criteria. Blooms of nuisance algae are often seen in summer months. The major cause of eutrophication is nonpoint source pollution from developing urban areas and upstream agricultural areas.
- **Degradation of Phytoplankton & Zooplankton Populations:** The species found in the AOC are indicative of disturbed conditions. The periphyton [organisms (as some algae) that live attached to underwater surfaces] community downstream of the Village of Kohler is highly productive. The community shifts toward greater tolerance of high nutrient conditions. Biomass and density in the AOC are the highest found in the Sheboygan River. High concentrations of nutrients from point and nonpoint sources are considered responsible.
- **Loss of Fish & Wildlife Habitat:** Although historic loss of habitat has occurred through development, the quality of wildlife habitat along the river is good considering its proximity to urban areas. Ongoing loss of instream habitat for fish and wildlife is occurring through sedimentation from streambank, farmland, and construction site erosion. Dams on the river also contribute to degraded habitat in several ways. They alter river flow, increase water temperature, cause the loss of important riffle areas, inhibit fish migration and cause sediment build up which buries much of the fish cover and invertebrate habitat.

The GLWQA required Remedial Action Plans (RAPs) for all Areas of Concern. The RAP process is conducted in three phases. Stage I identifies and assesses use impairments in the AOC, and identifies sources of stress from all sources, Stage II identifies proposed remedial action methods for implementation, and Stage III documents progress on implementation.

In 1994, the Wisconsin Department of Natural Resources with the assistance of other local stakeholders outlined activities targeted for implementation and progress toward development of a comprehensive strategy for restoring water quality, fisheries, recreational uses and other benefits of the Sheboygan River Basin. The 1994 RAP was published in October 1995 and distributed for review at 51 libraries statewide, including the Mead Public Library in Sheboygan and the Memorial Library in Sheboygan Falls. Three work groups (Water quality, Biota and

Information, and Education) were formed to recommend remedial actions for Stage Two RAP development.

The Sheboygan River and Harbor Stage One RAP was completed in 1989 following a two-year cooperative effort of Wisconsin Department of Natural Resources (WDNR), other agencies, researchers and citizens of the Sheboygan area. All of these groups worked together to identify management goals for the river and harbor for the year 2000 and specific management strategies to control existing sources of pollution, abate environmental contamination and restore beneficial uses. The RAP goals and objectives describe the "desired future state" of the Sheboygan River ecosystem. The Sheboygan County Water Quality Task Force served as the Citizens Advisory Committee (CAC) for Stage One development. The CAC included representatives from industry, government, fishing and conservation groups and others, and was instrumental in facilitating information exchange between environmental agencies and the public. An intergovernmental Technical Advisory Committee was utilized for review purposes.

To-date progress has been made in implementing the RAP and developing additional recommendations for restoring beneficial uses. Following a Remedial Investigation and Enhanced Screening, an emergency removal of PCB contaminated sediments in the upper portion of the Sheboygan River was completed in 1991. A total of 4,100 m<sup>3</sup> of PCB-contaminated sediments were removed. Sediment was deposited in two Confined Disposal Facilities (one temporary and the other an experimental Confined Disposal Facility at Tecumseh Products Company) and other selected deposits were armored in five areas near Rochester Park. The remaining sediments were to be dealt with in a later action. The US EPA has conducted a feasibility study for further cleanup options in the area.

In 1992, monitoring of soil and groundwater for total PAHs, cyanide, arsenic and nickel at the Coal Gasification Plant site began in spring of 1992. This site is located on the far-south side of the City of Sheboygan on the shores of Lake Michigan. Results of these investigations showed that the County had levels for these substances higher than state enforcement standards.

In 1991, a Remedial Investigation and Feasibility Study was completed at the Kohler Company landfill Superfund site. In 1992, a Record of Decision for landfill closure was issued. And, in 1996, a Record of Decision for groundwater was issued for the site.

These activities are contributing to successful achievement of alleviating the beneficial use impairments. However, to improve the quality of the Sheboygan River Basin ecosystem and achieve the "desired future state" will require a long-term commitment from all levels of government, as well as local interest groups and citizens. Successful implementation of the RAP will require the cooperation of all stakeholders and a willingness of the Basin's citizens to voluntarily change the way they conduct their everyday lives.

The WDNR and Sheboygan River Basin Partnership (SRBP) are working together to update the RAP. An inventory of projects completed within the basin is in progress. An analysis of the current situation, including any new information regarding the BUIs, is needed in order to determine what still needs to be done and to develop science-based delisting targets that can have wide community acceptance.

In 1994, a revised RAP was prepared by WDNR and other stakeholders which outlined activities targeted for implementation and progress toward development of a comprehensive strategy for restoring water quality, fisheries, recreational uses and other benefits of the Sheboygan River Basin. The 1994 RAP was published in October 1995 and distributed for review at 51 libraries statewide, including the Mead Public Library in Sheboygan and the Memorial Library in Sheboygan Falls. Three work groups (Water quality, Biota and Information and Education) were formed to recommend remedial actions for Stage Two RAP development.

A two-year cooperative effort of Wisconsin Department of Natural Resources (WDNR), other agencies, researchers and the citizens of the Sheboygan area resulted in the completion of a Sheboygan River and Harbor Stage One RAP in 1989. All of these groups worked together to identify management goals for the river and harbor for the year 2000 and specific management strategies to control existing sources of pollution, abate environmental contamination and restore beneficial uses. The RAP goals and objectives describe the "desired future state" of the Sheboygan River ecosystem. The Sheboygan County Water Quality Task Force served as the Citizens Advisory Committee (CAC) for Stage One development. The CAC included representatives from industry, government, fishing and conservation groups and others, and was instrumental in facilitating information exchange between environmental agencies and the public. An intergovernmental Technical Advisory Committee was utilized for review purposes.

The U.S. EPA has been tracking the progress of the AOC and significant milestones, achievements, and current projects are listed below.

### **Significant RAP Milestones**

**2006:** RAP Update in progress.

**1998:** Sheboygan River Basin Partnership (formerly Sheboygan Land and Waters Partners) formed.

**1995:** Sheboygan River Remedial Action Plan progress report with 29 Stage II recommendations completed.

**1989:** Sheboygan River Remedial Action Plan Stage I report completed.

### **Recent Progress and Achievements**

In 2006, Sheboygan County adopted an erosion control and stormwater management ordinance.

In 2005, WDNR and the Sheboygan County Land and Water Conservation Department worked with a local farmer to relocate a barnyard and grazing area along the banks of Otter Creek. Otter Creek is a tributary to the Sheboygan River and is listed as a 303d impaired waterway primarily due to bacteria contamination. Grant dollars for the state portion came from Wisconsin's Environmental Damages Compensation Fund. The county and the landowner also shared in the cost of the project.

In 2004, Pollution Risk Services (PRS) completed Phase I of the Sheboygan Superfund Site cleanup of the Upper River. All PCB hot spots on the upland portion of the riverbank at the former Tecumseh plant site have been remediated and a trench has been dug to intercept and test groundwater exiting the site.

The Sheboygan County Planning and Resources Department and Bay-Lake Regional Planning Commission completed the Sheboygan County Natural Areas and Critical Resources Plan in 2004. This plan provides general background information on the issues and opportunities related to agricultural, natural and cultural resources and proposes future programs and policies for the county to pursue. These programs and policies were developed through a thorough process involving the public and various stakeholders in the county.

The Sheboygan County Land and Water Conservation Department worked with WDNR and others on an update to the Sheboygan County Land and Water Resources Management Plan in 2004. This plan is required by the State of Wisconsin for the use of funds for the implementation of agricultural best management practices. The plan includes some joint strategies for implementing the state nonpoint pollution regulations and establishes priorities for agricultural runoff practices near impaired waters and outstanding or exceptional waters in the county.

In 2004, municipal WPDES stormwater permits were issued for the Village of Kohler, Town of Sheboygan, and Town of Wilson. All of these communities are taking actions to control urban runoff in accordance with their permits.

WDNR staff worked closely with the City of Sheboygan and their consultants on the redevelopment of the former C. Reiss Coal Peninsula on Lake Michigan and the Sheboygan River. Elements of the project, which was completed in 2004, included permitting for seawall reconstruction on the Sheboygan River, remedial action plan for site cleanup, site grading permit, review of Lake Michigan revetment plans and a dune re-creation project. The city installed engineered stormwater devices to treat runoff from the newly developed areas on the peninsula. The city received a grant through WDNR for a trail and fish cleaning station.

In 2004, WDNR staff completed two Onion River trout stream restoration projects. They also completed trout population surveys at six locations on the Onion River and its tributaries. Those surveys indicate that a newly instituted fishing regulation change on the Onion River has protected many fish from harvest. The hope is that more adult trout will be available to boost natural reproduction of trout in the system.

WDNR staff completed a small wetland restoration in the Onion River watershed in 2004.

A consent decree was signed by U.S. EPA, U.S. DOJ and Tecumseh Products Company in 2003. This agreement requires Tecumseh to clean up the upper portion of the Sheboygan River Superfund site including ground water at the Tecumseh facility, floodplain soil, and river sediment.

In 2003, WDNR staff conducted a stream monitoring workshop for the public that was concentrated on a small waterway named Willow Creek that is tributary to the Sheboygan River. The workshop included information on monitoring streams for habitat, water quality and biological community. This small stream supports a cool/cold water fishery including evidence of spawning by brook trout and Coho salmon from Lake Michigan. The watershed is located in an area that will likely experience rapid urban development within the next decade.

A drawdown of the Sheboygan Marsh occurred in 2002. Sheboygan County and WDNR worked together to collect data during the drawdown including high quality color air

photography before and after the drawdown. WDNR also worked with local conservation groups to establish a carp trap in the marsh.

The *Broughton Sheboygan Marsh Strategic Management Plan 2001* was completed in 2001 and approved by the Sheboygan County Resources Committee in February 2002. This plan outlines mutually agreed upon responsibilities between the different units of government responsible for resource management throughout the marsh. A broad public process with representatives from local and county government, non-profit organizations, the WDNR and citizens at large were responsible for completing the plan.

### **Current Projects and Outlook**

In 2006, Pollution Risk Services (PRS) will complete Phase II of the Sheboygan Superfund Site clean up of the Upper River, including the removal, dewatering, and disposal of 35,000 cubic yards of PCB-contaminated sediment and armored materials.

With support from the Great Lakes National Program Office (GLNPO), a research team led by the University of Illinois and the Northeast-Midwest Institute (NEMW) is collecting property transactions data and household information for a study of the economic benefits of remediation of the AOC. This study provides an opportunity to inform the public and galvanize community support for delisting the AOC.

The soil cleanup phase of the Camp Marina Manufactured Gas Plant site along the Sheboygan River in the City of Sheboygan was implemented in 2001. Wisconsin Public Service Corporation and their consultant, Natural Resources Technology, continue to work with WDNR to develop the plan for the river cleanup phase.

Since the removal of the Franklin Dam on the Sheboygan River in 2000, WDNR staff have been working with community members regarding the next dam downstream in Johnsonville. It was discovered that this dam did not have an established owner. Many local citizens are concerned about dam removal because they believe it prevents ice jams from forming downstream of their town.

The Sheboygan County Land and Water Conservation Department continues to implement their stream buffer program for water quality improvement. Since the project began in 2000, the Land and Water Conservation Department has contracted with 53 landowners and installed 95 acres of buffer strips that reduce the amount of sediment and agricultural runoff from entering streams.

The Sheboygan River Basin Partnership (SRBP) has embarked with WDNR on an information gathering effort for Willow Creek. Willow Creek is a small tributary to the Sheboygan River that has its confluence in the AOC. The creek receives annual runs of trout and salmon from Lake Michigan. Recent fish surveys discovered the presence of young brook trout and salmon, which seemed to indicate at least some amount of natural reproduction. The stream has some remnant habitat areas that appear suitable for spawning. It is about five miles long and a fairly significant amount of this small watershed will likely be developed in the next decade. It appears that stream improvements are possible in some of the degraded sections. SRBP recently applied for a grant from the U.S. Fish & Wildlife Service. In addition, the partnership has started an information and education effort and has been meeting with landowners and local municipal officials.