

LOWER WISCONSIN RIVER MAIN STEM

The Wisconsin River begins at Lac Vieux Desert, a lake in Vilas County that lies on the border of Wisconsin and the Upper Peninsula in Michigan. The river is approximately 430 miles long and collects water from 12,280 square miles. As a result of glaciation across the state, the river traverses a variety of different geologic and topographic settings. The section of the river known as the Lower Wisconsin River crosses over several of these different geologic settings. From the Castle Rock Flowage, the river flows through the flat Central Sand Plain that is thought to be a legacy of Glacial Lake Wisconsin. Downstream from Wisconsin Dells, the river flows through glacial drift until it enters the Driftless Area and eventually flows into the Mississippi River ([Map 1, Chapter Three](#)).

Overall, the Lower Wisconsin River portion of the Wisconsin River extends approximately 165 miles from the Castle Rock Flowage dam downstream to its confluence with the Mississippi River near Prairie du Chien. There are two major hydropower dams operate on the Lower Wisconsin, one at Wisconsin Dells and one at Prairie Du Sac. The Wisconsin Dells dam creates Kilbourn Flowage. The dam at Prairie Du Sac creates Lake Wisconsin. The operating permit for the Prairie Du Sac dam is regulated by the Federal Energy Regulatory Commission (FERC). Below the Prairie du Sac dam the river is free flowing for 92 miles.

The Lower Wisconsin River has been and continues to be an important economic resource throughout the state. The river's power and energy have been harnessed for use in a variety of different industries including the papermaking industry. This industry in particular has a long history of contributing pollution to the river. The impacts of this industry included frequent fish kills, unpalatable fish flesh, and massive populations of bacteria, fungi, and protozoans.

Although a combination of distance from the industrial waste sources and upstream impoundments that functioned as settling basins partially spared Lake Wisconsin and the Lower Wisconsin River from the impacts of the pulp and paper mill industry, this segment of the river has been impacted by the papermaking industry. Today, fish consumption advisories are in effect for walleye (mercury) and lake sturgeon (PCB's).

Overall, the Lower Wisconsin River is classified as a diverse warm water sport fishery (WWSF) and anglers enjoy the opportunity to catch a variety of different sport fish on the

Lower Wisconsin River At A Glance

Drainage Area: 4,940 sq. miles

Total Stream Miles: 165 miles

Major Public Land:

- ◆ Units of the Lower Wisconsin State Riverway
- ◆ Tower Hill, Rocky Arbor, and Wyalusing State Parks
- ◆ Wildlife areas and other recreation areas adjacent to river

Concerns and Issues:

- ◆ Nonpoint source pollution
- ◆ Impoundments
- ◆ Atrazine
- ◆ Fish consumption advisories for PCB's and mercury
- ◆ Badger Army Ammunition Plant contamination
- ◆ Development
- ◆ Groundwater concerns

Initiatives and Projects:

- ◆ Lower Wisconsin State Riverway Board
- ◆ Land acquisition
- ◆ Lower Wisconsin River Fisheries Plan
- ◆ USGS monitoring
- ◆ Lower Wisconsin State Riverway

river. The river used to support commercial fishing in parts of the river until frequent fish kills, unpalatable fish, and bacteria acted to severely limit fishing opportunities.

Today, the 92-mile stretch of river from Prairie du Sac to the Mississippi River supports a rich diversity of fish, mussels, herptiles and aquatic insects and fish species accounts indicate that the Wisconsin River and its backwaters support up to 95 native fish species. Of these 95 species, nineteen are state threatened or endangered species and several are specific hosts for the glochidial stage of a number of rare, threatened and endangered freshwater mussels (Appendix E). The Lower Wisconsin River is also home for a variety of unusual and rare insects and threatened or endangered amphibians and reptiles (Appendix E). There are eight species of mayflies (Ephemeroptera) and four species of beetles (Coleoptera) that are found almost exclusively in the river. In addition, during a Wisconsin River aquatic insect survey, a couple of rare dragonfly species were also found. The river is also home for eight species that represent primitive or ancient "living fossil" forms (Table 1).

Table 1: "Living Fossil" Species in the Lower Wisconsin Fishery

<i>"Living Fossils"</i>	<i>"Living Fossils"</i>
◆ Silver lamprey (<i>Ichthyomyzon unicuspis</i>)	◆ Paddlefish (<i>Polyodon spathula</i>)
◆ Chestnut lamprey (<i>Ichthyomyzon castaneus</i>)	◆ Lake sturgeon (<i>Acipenser fulvescens</i>)
◆ Shortnose gar (<i>Lepisosteus platostomus</i>)	◆ Longnose gar (<i>Lepisosteus osseus</i>)
◆ Shovelnose sturgeon (<i>Scaphirhynchus platyrhynchus</i>)	◆ Bowfin (<i>Amia calva</i>)

Paddlefish (*Polyodon spathula*), a state threatened species, are found in the Lower Wisconsin River below the Prairie du Sac dam. These fish first appeared in the fossil record 300 to 400 million years ago and were once common in the large rivers of the Mississippi River System. As a result of overharvest and modification of the rivers by dams, their populations have declined. The paddlefish found in the Wisconsin River has only one other known species in its family, the Chinese paddlefish (*Psephurus gladius*), found in the Yangtze River in China. Paddlefish live in large riverine systems, are highly mobile, can reach up to five feet or more in length, average 60 pounds and may live in excess of 50 years.

Lake Sturgeon (*Acipenser fulvescens*) are an ancient species, or "living fossil," found in the Lower Wisconsin River. These fish are bony plated bottom feeders and are typically 3 to 5 feet in length and can reach up to 80 pounds, though some fish have been found to be up to 7 feet and 200 pounds. The fish mature between the ages of 15 and 20 and spawn every four to six years throughout their lifespan of between 50 to 100 years. Due to their slow reproductive cycle, Lake Sturgeon are especially vulnerable to overfishing. In addition, they are sensitive to pollution and dams that block spawning areas impact their populations. As a result, the Lake Sturgeon has been designated as a state species of concern.

For more information on Paddlefish and Lake Sturgeon:
<http://www.seagrant.wisc.edu/greatlakesfish/framefish.html>
<http://www.rook.org/earl/bwca/nature/fish/acipenser.html>

The Wisconsin River flows through the southern part of the Driftless Area where there are few natural lakes and wetlands compared to other areas of the state. One of the unique

features of the Wisconsin River Valley, however, is that the river cycles have created over 12,000 acres of wetlands, oxbows and sloughs. These habitats function as an important transition zone between riparian and riverine habitats. In addition, these areas are critical habitat for reproducing gamefish, forage fish and other types of species. These areas also support a variety of plant communities that are significantly different from those found in the main channel. Several water control structures have been constructed on these shallow water areas. Although improving habitat for waterfowl, these structures can cause problems in downstream shallow water areas, such as Long Lake at Lone Rock and Jones Slough near Blue River.

The Wisconsin River has also been recognized for its aesthetics and potential for recreation. The river has been designated as an exceptional resource water. In addition, the U.S. Park Service and U.S. Forest Service nominated it for inclusion in the national Wild and Scenic Rivers program. The Lower Wisconsin riverway is a very unique natural and scenic area with abundant resources including a variety of habitat types, historical and archaeological sites, abundant wildlife and good quality fisheries. The riverway is relatively free of development along the banks or on the overlooking bluffs. In recognition of this great resource, the Wisconsin Legislature created the Lower Wisconsin State Riverway (LWSR) in 1989, which includes a 92.3-mile free-flowing stretch of the river from the Prairie du Sac dam down to the river's confluence with the Mississippi River. The riverway project covers 79,275 acres, of which the state already owns 43,740 acres with easements on another 2,800 acres. These publicly owned lands provide opportunities for hunting, wildlife viewing, hiking, biking, horseback riding, skiing, and snowmobiling. In addition to providing diverse recreational opportunities, these lands help to preserve large blocks of upland and lowland habitat for wildlife.

The Lower Wisconsin River's historical significance, good quality aquatic and wildlife resources, beautiful scenery and abundant recreational opportunities make the river a special resource. Unfortunately, there are a variety of issues that threaten to diminish the river's aquatic, recreational and aesthetic values.

- ◆ Elevated levels of PCB's and mercury have been found in some game fish samples taken from parts of the Lower Wisconsin River. Gamefish caught in the Lower Wisconsin River typically fall under the general mercury consumption advisory although some special advisories for PCB's do exist for carp and Lake Sturgeon in Lake Wisconsin and below the Prairie du Sac dam.
- ◆ The hydropower dam at Prairie du Sac operates as a "run-of-the-river" dam. It will release large volumes of water with little or no warning causing water levels on the river downstream of the dam to quickly rise. These changes in water level can have a negative effect on water quality and fisheries habitat due to increased bottom scouring, bank erosion and the flushing of spawning areas. Dissolved oxygen depletion has also been noted in the river below the dam. These problems are being addressed through the FERC relicensing process now underway for the Prairie du Sac dam. Wisconsin Power & Light, owner of the Prairie Du Sac dam, has put together a "comprehensive water quality plan.
- ◆ Impoundments on the river are a threat to the overall movement of aquatic resources. These impoundments all act to warm and slow down the water. In addition, these impoundments trap sediments and prevent the river from flushing its river channel. This

can cause pollution to accumulate in these impounded areas, including the impact to aquatic resources.

- ◆ Nonpoint source water pollution is also a problem on the Lower Wisconsin River. Since the basin is primarily agricultural, the largest source of nonpoint source pollution is from agricultural sources. These problems include sedimentation, high bacteria as a result of barnyard runoff, poor manure storage and spreading practices and cattle access to streams. Other sources of nonpoint source pollution are the result of development activities in the drainage basin of the river. Highway construction and urban stormwater runoff have the potential to contribute to nonpoint source pollution problems.
- ◆ Point source discharges to the Wisconsin River are less of a water quality concern than they once were. Four municipalities discharge treated wastewater directly to the Lower Wisconsin River: Wisconsin Dells-Lake Delton, Portage, Spring Green and Boscobel. There are also four industrial discharges that discharge treated wastewater to the river: Chula Vista Resort, Crocketts Resort, U.S. Badger Army Ammunition Plant, and Alliant/Wisconsin Power and Light. Other municipal and industrial facilities near the river either discharge treated wastewater to groundwater or to tributaries to the river. The reach of the Wisconsin River from the Prairie du Sac dam to its confluence with the Mississippi River has been recommended for exceptional resource water (ERW) status under NR 102 and NR 207, Wis. Adm. Codes, which would lead to stricter regulation of new or increased wastewater discharges to the river.
- ◆ Elevated levels of pesticides, most notably atrazine, have been found in some groundwater wells on the sand plains adjacent to the river. In addition, contaminated groundwater at, and in the vicinity of, the Badger Army Ammunition Plant (BAAP) appears to be migrating toward the river.
- ◆ Development along the river is also a threat to wildlife habitat and to sensitive plant and animal species. The Lower Wisconsin River Basin is in close proximity to over four million people within a four-hour drive of the riverway. Increased use and development of the area may have significant effects on the quality and the status of these resources.

As a result of its local and national importance, and the historical and current threats to the river, there are several active projects focused on improving and preserving the river and its resources. The Lower Wisconsin State Riverway Board was created to help protect and manage the vast resources of the area. The Board is an independent state agency and was created to help protect the valley's beauty and natural character. The main function of the board is to preserve the aesthetic quality of the river valley without prohibiting development.

For more information on the Lower Wisconsin State Riverway:
<http://lwr.state.wi.us/static/>

The following are the water resource related goals of the riverway project that can hopefully be achieved through the continued partnering of the Board, the DNR, local citizens, environmental groups, municipalities, politicians, and the state:

- ◆ Protect, maintain and enhance the generally natural and undeveloped scenic beauty of the river corridor.
- ◆ Maintain the fishery and fishing opportunities in the riverway.
- ◆ Maintain and enhance wildlife populations, hunting opportunities and associated habitats.

The riverway project may also abate water quality and habitat problems in the Wisconsin River through added restrictions on forestry and excessive development. Wetlands adjacent to the river may be protected as they come under public ownership. Riverway staff have a number of water resources concerns which may or do have an effect on public usage including:

- ◆ Water level fluctuations due to the operation of the hydropower dam at Prairie du Sac.
- ◆ Nonpoint sources of water pollution, both in and outside of the riverway project boundary.
- ◆ Potential for toxic substances to enter or already be in the water column and sediment.
- ◆ Point source discharges to the river.

In addition, a fisheries plan, developed by the Wisconsin DNR, addresses management issues for the aquatic resources in the portion of the river from the Kilbourn Dam, at the Wisconsin Dells, to the Mississippi River. The following are the main objectives of the plan:

- Restore natural fish migration and movement patterns within the Lower Wisconsin River system.
- Establish natural flow patterns within the Lower Wisconsin River system.
- Minimize fish mortality from turbine entrainment/impingement at the Prairie du Sac and Kilbourn dams.
- Maintain and enhance habitat quality.
- Enhance and maintain water quality standards in the Lower Wisconsin River system.
- Continue annual fisheries surveys to monitor game and nongame fish populations.
- Monitor population levels of threatened and endangered indigenous species within the Lower Wisconsin River system.
- Monitor the advancement and impacts of unwanted non-indigenous fauna and flora into the river.
- Maintain and enhance multi-use recreational opportunities.

This fisheries plan will hopefully help to prioritize management objectives and actions on the river to help improve the water quality and aquatic habitat.

The U.S. Geological Survey (USGS) has monitoring stations at the Kilbourn Dam and a monitoring station at Muscoda. These sites are also part of a Long Term Trend Monitoring project. The data collected from both of these efforts is used to analyze trends and general water quality conditions of the Wisconsin River.

Additionally, the Wisconsin Stewardship Program enhances wildlife and recreational opportunities along the river. The program provides \$2 million each year for property acquisition for recreation, wildlife, and fishery management in the Lower Wisconsin State Riverway.

RECOMMENDATIONS

(Note: Recommendations specific to Lake Wisconsin can be found in the Lake Wisconsin Watershed Narrative, LW19.)

- ◆ Ensure better limits and/or controls of water release are included in FERC relicensing of the Prairie du Sac hydropower dam to minimize potential adverse impacts on water quality, habitat, and recreational use of the river.
- ◆ Increase monitoring at Muscoda by securing additional funding for USGS to expand monitoring at this site.
- ◆ Conduct sediment core sampling for toxic substances in two to four backwater areas of the Wisconsin River below Prairie du Sac dam that appear to have good waterfowl brood rearing or staging habitat.
- ◆ Wisconsin Power and Light, as part of their FERC relicensing, should monitor water temperature and dissolved oxygen levels at both the dam intake and discharge points and find ways to increase dissolved oxygen content during times of low oxygen.
- ◆ Early morning dissolved oxygen readings should be taken.
- ◆ Continue to monitor walleye and smallmouth bass for the presence of toxins in the reach of the river from the Kilbourn Dam at Wisconsin Dells to the Prairie du Sac dam.
- ◆ Conduct sediment monitoring in the reach of the river from the Kilbourn Dam at Wisconsin Dells to Lake Wisconsin to determine if toxic substances reside in river bottom sediments.
- ◆ Monitor catfish, walleye, sturgeon and carp for the presence of PCBs, mercury and pesticides in the Lower Wisconsin River below the Prairie du Sac dam and at Boscobel.
- ◆ Work with federal agencies to prepare a plan for mercury removal or containment in Gruber's Grove Bay.
- ◆ Develop and conduct environmental education and outreach programs to teach people living along the Lower Wisconsin River about groundwater and drinking water.
- ◆ Examine the feasibility of constructing a fish passage around the Prairie du Sac dam as a part of the FERC re-licensing process.
- ◆ Conduct frequent surveys to inventory species present in the system. These inventories should be used to keep track of the location and density of species of particular concern.
- ◆ Identify the areas that contribute the largest volume of nonpoint source pollution and work to reduce these sources through the employment of a nonpoint source reduction program

such as the Targeted Runoff Management Program, (TRM), or the Urban Nonpoint Pollution program.

- ◆ Conduct monthly water chemistry sampling at the Wisconsin Dells dam to determine the current status of phosphorus loading to Lake Wisconsin.
- ◆ Upgrade the Lower Wisconsin River from the Prairie du Sac dam to the Mississippi River to Exceptional Resource Water (ERW).
- ◆ Continue to identify, protect and restore critical areas for wildlife habitat along the river.
- ◆ Track the status of rare, threatened and endangered species in the Lower Wisconsin River.
- ◆ Protect the area adjacent to Woodman due to its value as habitat for rare insects.
- ◆ Minimize the impact of impounded wetland discharges into downstream sloughs.
- ◆ Continue to monitor sloughs as a part of the “Shallow Lakes Initiative” sampling effort for oxbows and lakes in the river’s floodplain.

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