

Chapter 3: Rivers and Streams

Assessment Summary

Most of Wisconsin's waters already meet the standards for water quality established for them. We reported roughly 55,000 miles of state rivers and streams in water quality management plans for the state's 23 Geographic Management Units, including some intermittent streams. Of these, 24422.16 or about 44.5 percent, were assessed (Table 13). This report identifies that 57,698 stream miles or 100% of all stream miles are impaired for one or more uses due to the presence or potential presence of mercury in surface waters from atmospheric deposition. The table below also shows assessment results for river miles due to factors other than atmospheric deposition of mercury. We believe the number of threatened stream miles does not adequately reflect threatened waters because the criteria for "threatened" may not be uniformly applied. In older water quality management plans "threatened" was not reported. New guidance issued for plans, and the continuous process for assessment data updates should clear up this discrepancy.

Table 13. Fully Supporting, Threatened and Impaired Streams and Rivers

Degree of Use Support	Assessment Basis		Total Assessed
	Evaluated	Monitored	
Size Fully ALL assessed uses	6106.41	1882.50	7988.91
Size Fully ALL assessed uses but Threatened for at Least One	2898.90	1506.20	4405.10
Size Impaired for one or more uses	6217.60	5810.55	12028.15 57,698.00**
Size Not Attainable for any use and not included in items above	0	0	0
Total Assessed	15222.91	9199.25	24422.16

** All rivers, both perennial and intermittent, in the state are listed as not meeting potential uses due to the presence of a general fish consumption advisory for mercury for all Wisconsin Waters

Table 14. Individual Use Support, Streams and Rivers – National and State

Goals	Use	Size Assessed	Fully	Threatened	Partial	Not
Protect and Enhance Ecosystems	ALUS*	23129.51	7808.01	4270.40	9667.80	1383.30
Protect & Enhance Public health	Fish Consumption	3879.35	0	0	0	57,698**

* ALUS = Aquatic Life Use Support

** All rivers, both perennial and intermittent, in the state are listed as not meeting potential uses due to the presence of a general fish consumption advisory for mercury for all Wisconsin Waters

Where waters are only partially, or not meeting designated uses, we report the cause (Table 15) and source (Table 16) of the non-support. Water quality problems in the state are most often the result of land use activities with the exception of atmospheric deposition of mercury. The most prevalent water quality problems are the presence of mercury in surface waters, habitat alterations, siltation, excessive nutrients such as phosphorus and oxygen-demanding materials that use up oxygen as they decay, limiting the oxygen available to aquatic life. The *causes* of these water quality problems are atmospheric deposition, polluted runoff, especially from agricultural areas, and river modifications such as ditching and wetlands destruction. Wastewater discharges contribute moderate to minor impairments to Wisconsin's streams. A stream reach may be degraded by more than one source, causing more than one problem, the cumulative effect of which can be significant.

Table 15. Total Sizes of Streams and Rivers Impaired by Various Cause/Stressor Categories (Rivers and Streams Reported in Stream Miles)

Cause/Stressor	Size of waters by Contribution to Impairment
Unknown	41.00
Unknown Toxicity	14.00
Pesticides	244.25
Priority Organics	147.50
Nonpriority Organics	1.00
PCBs	299.90
Metals	
(includes Mercury)	57,698**
Unionized Ammonia	91.20
Chlorine	6.00
Nutrients	2717.95
Nitrogen	47.00
pH	45.10
Siltation (includes Sedimentation)	6458.15
Organic Enrichment/DO	1233.20
Salinity/TDS/Chlorides	8.50
Thermal Modifications	1888.55
Flow Alterations	1668.40
Other Habitat Alterations	8459.60
Pathogen Indicators	1208.25
Taste and Odor	53.00
Suspended solids	6.00
Noxious aquatic plants (macrophytes)	278.60
Algal Growth/Chlorophyll a	70.00
Turbidity	1567.60
Exotic species	90.00

** due to the presence of the general fish consumption advisory for mercury for all Wisconsin surface waters.

Table 16. Total Sizes of Streams and Rivers Impaired by Various Source Categories

Type of Waterbody: Rivers/Streams (reported in miles)

Source Category	Size of waters
Industrial Point Sources	1048.70
Municipal Point Sources	1537.55
Domestic Wastewater Lagoon	29.00
Agriculture	5620.90
Crop-related sources	3357.65
Non irrigated crop production	2168.40
Irrigated crop production	184.25
Grazing-related sources	3629.20
Pasture grazing, riparian and/or upland	2736.50
Pasture grazing, upland	579.60
Intensive Animal Feeding Operations	2212.35
CAFOs	95.20
Off farm animal holding/management area	142.40
Silviculture	76.30
Forest management	73.00
Logging road maintenance	3.30
Construction	470.60
Highway/Road/Bridge Construction	89.60
Land Development	243.40
Urban Runoff/Storm Sewers	921.10
Highway/Road/Bridge Runoff	113.90
Erosion and Sedimentation	19.80
Resource Extraction	140.10
Surface Mining	9.00
Subsurface Mining	22.50

Source Category	Size of waters
Mine Tailings	8.00
Land Disposal	111.40
Landfills	80.50
Septage Disposal	30.90
Hydromodification	4223.80
Channelization	675.75
Dredging	202.50
Dam Construction	78.60
Upstream Impoundment	26.55
Flow Regulation/ Modification	22.30
Habitat Modification (non-Hydro modification related)	3583.95
Removal of Riparian Vegetation	235.35
Bank or Shoreline Modification/ Destabilization	138.00
Drainage/Filling of Wetlands	48.80
Atmospheric Deposition	57,698**
Highway Maintenance and Runoff	17.90
Contaminated Sediments	118.80
Natural sources	1742.10
Waterfowl	4.00
Recreational activities	3.70
Groundwater Loadings	145.10
Source Unknown	82.50

** due to the presence of the general fish consumption advisory for mercury for all Wisconsin surface waters.

Water Quality Planning and Management

River Management

Rivers Team

For years DNR staff and management in multiple programs have worked together on issues central to river management. One aspect of this work involved a group informally called the FERC Team, as Federal Emergency Regulation Commission issues were the foremost issues of concern. In 1999, the WDNR formalized this working relationship by initiating the development of a Rivers Team with a full-time permanent Rivers Team Leader. While the Team Leader position is not yet filled, the Rivers Team has developed a Rivers Strategy, a Rivers Grant Program, and most recently grant program performance measures.

Rivers Strategy - Report Card

Since 1999, when the WDNR formally initiated a rivers strategy –*Going with the Flow: A rivers strategy to protect, preserve, and restore Wisconsin's flowing waters*, much has been done toward its development and implementation. The strategy is aimed at bringing a coordinated approach to the support of local river management while helping initiatives that protect and restore riverine ecosystem integrity and that balance legitimate river resource uses with environmental needs. Below is a list of strategy Goals and objectives and progress to date.

<http://www.dnr.state.wi.us/org/water/fhp/rivers/index.htm>

Goal I. Protect and restore riverine ecosystem integrity. Development around rivers systems and the use of rivers have significantly modified many rivers' physical and biological characteristics. Dams have been constructed and have converted free-flowing rivers into a series of impoundments. Systems have become fragmented. Land use practices have degraded water quality and increased the amount and altered the rate of sediment and nutrient flow in the systems. The integrity of the ecosystem (combination of the physical, biological, and chemical components) must be protected and restored to preserve the functional riverine system.

Goal II. Balance legitimate river resource uses with environmental needs. Decisions on multiple river uses like recreation, waste assimilation, power generation, water supply, irrigation, transportation, etc. must be made together to sustain both river continuity and socioeconomic benefits.

a) Establish a personal stake or sense of belonging with regards to the river. Encouraging the participation of user/citizen groups is critical to the success of a river program.

Progress: The state's River Grant Program has provided over \$150,000 during each grant cycle for the establishment and support of River Organizations. In addition, through a grant with the Rivers Alliance of Wisconsin, that nonprofit organization has hired two full-time river organization support staff to help achieve this goal.

b) Provide a consistent and comprehensive approach that assures the effective and equitable protection and management of Wisconsin's rivers systems. Historically river management has been inefficient because of the lack of coordination or inconsistencies in the designated management approach.

Progress: Issued guidance on multiple topics and established a statewide Rivers Team (see below)

c) Identify and protect critical river systems by managing rivers according to their unique potentials and needs. Rivers differ in size, surrounding land, environmental and economic potential, threats, and protection needs



Progress: Issued program guidance and improved data systems (see below)

d) Strive for a comprehensive management approach at the watershed level. If a rivers strategy is to be effective, working relationships with other agencies or groups must be formed to develop an integrated management plan that includes the entire basin or watershed and builds on existing efforts in river management. Education (integrate programs and people to recognize the connection between land uses and river system quality); Coordinated planning (who's doing what, where and when; what are the opportunities; partnership formation - GMU's, river advocacy groups). Take the next step (identify projects, take advantage of existing opportunities, grants, etc. What needs to be done to make a long-term difference?)

All plans are posted on the web at <http://www.dnr.state.wi.us/org/gmu/index.html>

Progress: During 2000-2002, Basins/GMUs initiated, and in many cases completed, integrated management plans in which partnership priorities were identified and ecologically-based goals and work tasks were specified. All of these plans identify river and river related issues as key focal areas for work in the coming years.

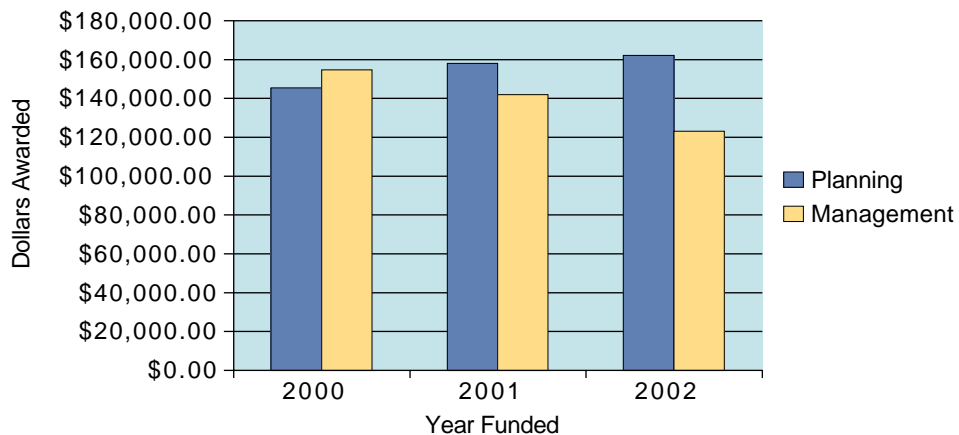
e) Effectively showcase the results and benefits of the varying components of a rivers management program. Develop realistic performance measures for a comprehensive, integrated rivers management program.

Progress: Issued press releases on important river projects, such as the Franklin Dam Removal, multiple dam removals on the Baraboo River, Prairie River and other key sites around the state. Developed an internet presence. Drafted performance measures for the Rivers Grant Program.

River Grant Program

The state's Rivers Grant Program supports community and nonprofit groups protect rivers by funding work that helps prevent water quality deterioration, restore fisheries habitat, and maintains natural beauty. This initiative is seen as fundamental to whole ecosystem protection as the density of residential development and recreational uses along rivers increases coincidentally with the exhaustion of available lake sites. Local units of government and nonprofit, qualified river management organizations are eligible to apply for these grants. In the 2 1/2 years since the program has been in implementation, \$308,912 has been awarded for 49 separate planning grant projects and \$419,599 has been awarded for 11 separate management or implementation projects. (See Figure 21).

Figure 21. River Grant Program Project Awards



River Planning Grants

River Planning Grants are designed to help with river organization development, to support information and education work and local, community-based assessments of water quality, fish and aquatic life, and finally to help conduct nonpoint source evaluations. The grant program provides a 75% state share maximum, up to \$10,000 per grant.

River Management Grants

River Management grants are designed to support purchase of land or easements, development of local ordinances for river protection, and restoration of in-stream or shoreland habitat. Again, this program provides a 75% state share maximum, up to \$50,000 per grant.

Performance Measures

Creating performance measures for the rivers grants program is the first step in an on-going effort to evaluate the effectiveness of all rivers programs. Ideally, performance measures would be ecosystem-based, focusing on numerical relationships between watershed activities and resulting riverine condition. Only recently has research been completed that describes such a relationship (See Science and Innovation in Water Management). Until this information can be formally incorporated into the state's water management structure, performance measures for the grant program will focus on procedural measurements. "Useful efforts" is the term used to describe functions deemed valuable in restoring or maintaining sound riverine ecosystems. The rivers grants program lists Useful Efforts in its roster of eligible work projects and in the criteria used in ranking applications. "Useful Efforts" performance measures for planning include: the number of planning grants, number of publications, or the number of planning groups formed. For management grants examples include number of acres purchased or easement acquired lands, number of nonpoint source practices established, or river restoration projects completed. More expansive criteria — for example, evidence that DNR has participated effectively in preparation of a mission, goals and strategy for a local rivers organization — are also being developed. For river management grants, performance can be measured by pre- and post-monitoring and evaluation of whether the grant achieved its stated goals.

Highlighted Planning Projects**Pine Creek Acquisition:**

The Wisconsin Farmland Conservancy obtained a \$50,000 river management grant to purchase approximately 84 acres on Pine Creek in Southeastern Pierce County. Pine Creek is a Class I brook trout stream, with trout densities approaching 3,000 brook trout per mile. This acquisition protects critical brook trout spawning, nursery and adult overwintering habitat on about 3/4 of mile on lower Pine Creek. In addition to protecting critical stream habitat the parcel also protects valuable bluffs and a large wetland complex near the Mississippi River. Local residents in the Pine Creek valley were very supportive of the Conservancy's efforts. Other landowners in the valley have donated conservation easements on several properties and the Conservancy is actively working with local landowners in the Valley for future conservation measures. This parcel will be open to the public for fishing, hunting, hiking and other nature based outdoor recreation.

Sugar Creek Acquisition:

The Mississippi River Valley Conservancy obtained a river management grant to purchase 35 acres on lower Sugar Creek in Western Crawford County. Sugar Creek is a Class II brook and brown trout stream. This acquisition protects .4 miles of stream frontage and adjacent wetlands along lower Sugar Creek. This parcel also links to an additional 77-acre bluffland that the Conservancy purchased through the stewardship program. This parcel also links to existing DNR easements upstream and over 5 miles of lower Sugar Creek have been protected through Department and the Conservancy efforts. This parcel will be open to public fishing, hunting, hiking and other nature based outdoor recreation.

Lower Chippewa River Basin Buffer Initiative

River Country RC+D obtained a \$50,000 river management grant to hire a buffer specialist to install CRP and CREP buffers in five counties in the lower Chippewa River Basin. This person is working with local county land conservation departments and NRCS office to install approximately 250 miles of CREP buffers on streams within the basin. This project also obtained matching

funding from a US Fish and Wildlife Foundation Grant and local donations from such groups as Pheasants forever and Trout Unlimited. Currently over 50 miles of buffers have been installed on streams within the basin and the project will continue over the next few years.

West Fork of the Kickapoo River Stream Restoration

The West Fork Sportsman Club obtained a \$31,000 river management grant to restore over 3,000 feet of the West Fork of the Kickapoo River in Vernon County. The West Fork of the Kickapoo River is known as one of the midwest finest trophy brown trout fisheries. This project also links to existing work that the West Fork Sportsman Club has conducted on other portions of the West Fork over the past decade. Overall over 5 miles of stream have been restored by the club over the past ten years. This project will be open to public fishing.

Kinnickinnic River Land Trust

The KRLT received a \$50,000 river management grant to purchase a conservation easement on the lower Kinnickinnic River. This development easement will protect one of the last remaining large farms on the lower Kinnickinnic River from development pressure. By preserving this parcel in an undeveloped condition, existing conditions on the lower Kinnickinnic River will be maintained. As part of this acquisition over .35 miles and over 250 acres of adjacent upland farmland, hardwoods and blufflands along the lower Kinnickinnic River will be protected as well as a host of rare and endangered plant and animal communities. This river portion of the conservation easement will be open to public fishing opportunities. By obtaining this parcel over 70% of the lower Kinnickinnic River has been protected through the Department, KRLT and local landowner efforts.

Dam Removals

Several dam removals throughout the state are in the planning stages or have recently occurred. The following examples from the state's South Central Region summarize some of the issues involved in Wisconsin dam removals.

Token Creek Watershed Project

The Token Creek Watershed, a 27-square mile subwatershed of the Yahara-Lake Mendota Watershed, located on Madison's northeast side, immediately adjacent to the City of Sun Prairie. This small watershed likely sustained a native brook trout fishery prior to European settlement, prior to the construction of a grist mill dam in the center of the watershed about a 150 years ago. Over the years the dam's original function as a grist mill changed to supporting recreation and aesthetic interests. In 1994, however, the dam failed, exposing magnificent springs that discharge over 4000 gallons per minute of cold water (50 d.f.) to Token Creek. Resource managers became aware of the creek's true potential as a cold water fishery – for at least 5 to 7 miles of its length. The Token Creek Coalition was formed from a several diverse groups with interest in the watershed and the river's restoration. The Dane County Natural Heritage Foundation, Trout Unlimited, the Token Creek Watershed Association, the River Alliance, the Town of Windsor, Dane County and the DNR worked under this umbrella organization to raise \$1,000,000 to purchase the dam and surrounding reservoir from the Token Creek Inland Lake District.

On December 11, 1998 the Department and the Town of Windsor completed acquisition of the dam and surrounding reservoir. This acquisition and subsequent dam removal enabled the restoration of 5-7 miles of brook trout stream in Eastern Dane County. Most of the water supply supporting this restoration emanates from a single spring source known locally as Culver Springs.

Continuing System Restoration

In addition to removal of the dam, this project has involved restoration of the channel and habitat, preservation of the springs, and reduction of polluted runoff to Token Creek. To help restore the larger river system, the Town of Windsor and DNR requested that the Corps of Engineers (COE) conduct an Ecosystem Restoration Project, which will result in restoration of the channel through the old millpond. With the addition of other habitat improvements below the dam, at least 7 miles of stream will be re-established as a brook trout fishery.

In addition DNR has been working with the UW Madison to develop hydrogeologic models to better understand the area's unusual springs and to ensure protection of critical recharge areas from development or placement of municipal wells.

Dane County and DNR have also been working with the City of Sun Prairie to encourage development that is more sensitive to the receiving cold water system. For example, new developments in this area utilize techniques that encourage stormwater infiltration rather than conventional retention ponds.

Token Creek has also been designated a "priority area" within the Yahara-Mendota Priority Watershed Project, which is designed to reduce sediment and nutrient inputs into Lake Mendota. Project leaders work with the agricultural industry to ensure that best management practices are installed throughout the watershed, but in particular, the Token Creek area.

In summary, the following are outcomes anticipated from the Token Creek Restoration Project:

- The Token Creek Spring complex, one of the most unusual in its quality and quantity in Southern Wisconsin will be restored to its original state.
- Token Creek, up and down stream of the dam, will be restored to enable the stream to be restocked with a native brook trout. Ultimately as much as 7 miles of stream will be converted from use as a warm water fishery to a class I native brook trout fishery.
- A 69-acre tract of wetland will be reestablished providing habitat for waterfowl, migratory songbirds and small mammals.
- Public access will be established to provide easy access to this 69-acre wetland preserve and trout stream.
- Water quality in Lake Mendota and other Yahara Lakes will benefit from increased baseflow and improved water quality in system.
- A new recreational resource will be established for use by all Dane County residents. Beneficial uses include trout fishing, bird watching, wildlife observation, educational enhancement opportunities for grade and high schools.
- The Token Creek area will experience increased use, benefiting local merchants.

Rockdale Dam Removal and Restoration of the Upstream Channel and Reservoir Bed

During 2001, the Rockdale Millpond Dam on Koshkonong Creek was removed and site restoration and habitat improvement began. The Koshkonong Creek Watershed, which lies east of Cottage Grove and south of the City of Sun Prairie, flows into Lake Koshkonong. The Rockdale Dam created a small shallow 72-acre impoundment in the center of the watershed. Heavy agricultural practices in the upper watershed resulted in sedimentation of the impoundment, reducing its depth to about 4 feet. Depths throughout the remaining reservoir were less than a foot, with slightly deeper water in the historic channel and a single deep hole in front of the dam. Approximately 10 residences, one tavern and the old mill building adjoin the pond, with the remaining shoreline located within Cam-Rock Park. This park is heavily used with several cross-country ski trails, a mountain bike trail, playgrounds, picnic sites and a day park with shelter.



Upstream of Rockdale Dam two days after complete dam removal.

In September 2001, the dam was breached exposing 72 acres of historic sedimentation. Work included removing the rest of the dam, site restoration, channel restoration, habitat improvement and bank stabilization. Dane County

hopes to incorporate the exposed millpond bed into its existing park. Much of the bed will be converted to prairie and wetland.

This project will result in enhanced water quality and biologic integrity of Koshkonong Creek by:

- Restoration of the riverine nature of this section of Koshkonong Creek.
- Elimination of the summertime thermal impacts caused by the shallow impoundment.
- Restoration of fish migration to upper portions of the creek.
- Elimination of carp spawning/rearing habitat.
- Restoration of two miles (the impoundment) of stream habitat.
- Restoration of fishery and potential spawning habitat along the stream itself in areas upstream of existing dam. This can be done with habitat work and by opening up silt-covered spring areas found in, or nearby, tributaries to the old millpond. The enhanced spring areas should provide brood water for wood duck, teal and mallards, as well as habitat for other amphibians and reptiles.
- Elimination of the shallow impoundment as nutrient source to downstream waters.

Enhancements to the adjacent Dane County owned Cam-Rock Park include:

- Restoration of approximately 47 acres of prairie, which will provide nesting habitat for waterfowl and grassland nesting bird species, as well as habitat or cover for a variety of mammals.
- Expansion of the existing trail systems.
- Improvements in the connectivity of the eastern and western portions of the county park, which are currently divided by the shallow impoundment.
- Restoration of spring complexes presently buried by sediments.
- Restoration of approximately 20 acres of wetlands.

Baraboo River Restoration

The Baraboo River flows approximately 120 miles from its headwaters near Hillsboro to its confluence with the Wisconsin River south of Portage. Its watershed encompasses 650 square miles and drops over 150 feet in elevation. The river drops forty-five feet as it flows through the City of Baraboo. This concentration of relatively steep gradient was recognized by early settlers for its potential to generate mechanical power and in 1837 they began constructing dams in this reach of the river, including:

- The former Linen Mill Dam. Removed in October, 2001 by the DNR, Sand County Foundation, River Alliance and the USFWS.
- The former Waterworks Dam. Removed in April, 1998 through partnerships between the City of Baraboo, DNR, the State Historical Society, the Circus World Museum and River Alliance.
- The former Oak Street Dam. Removed in 1999. Alliant Energy assisted with the removal of coal tar deposits discovered in the bed of the river. Partners included the City of Baraboo, DNR, River Alliance, Sauk County and the USFWS.
- The former LaValle Dam. Removed in 2001 through partnerships between the Sand County Foundation, the USFWS, NRCS, DNR, Sauk County, and the residents of LaValle.



Excavation work prior to the removal of the Linen Mill Dam, Baraboo River, October, 2001.



Before and after pictures of Linen Mill Dam removal on the Baraboo River.

Courtesy of Konstantine E. Margovsky.

These dams had a negative effect on the river ecosystems of the Baraboo and Wisconsin Rivers by restricting the movement of game and forage fish species from the Wisconsin River system into the upper reaches of the Baraboo River. In addition, the dams on the Baraboo River blocked valuable spawning and nursery areas for fish migrating from the Wisconsin River. This habitat fragmentation transformed the

rapids from a fast-moving stream with healthy fish populations to a series of sluggish impoundments. These millponds deteriorated substantially as a result of sediment loading, poor water quality, and degraded aquatic habitat.

In response to the river's importance as a fishery, the degraded quality of the millponds and the deterioration of the dams, many agencies, non-profit groups and citizens removed the dams on the Baraboo River, and are working to restore and enhance aquatic and riparian habitat and wetlands. The Baraboo River Restoration Project is focused on several main goals:

- Allow fish to assume historic spawning migrations.
- Restore in-stream habitat to course gravel deposits on bars and spits with cobble and boulder riffle and pools to enable fish to use the area for feeding, spawning and rearing, and as permanent habitat.
- Restore and enhance riparian habitat.
- Transport sediment in the former millponds downstream or remove mechanically.
- Restore steep gradient reach of the river to restore riffle areas and improve aeration for increased dissolved oxygen in the water column.

Today, all of the dams have been removed and partners are monitoring the system to examine the impact the removal of the dams has had on the fishery in the water and the water quality (Morton, 2000-2001).

Deerskin River Dam

The Deerskin River Dam, also known as the McDermott or Jones Dam, was an earthen dam constructed across the Deerskin River in the Town of Washington, Vilas County. At the turn of the century, the dam was used to float and sluice logs to lumber mills located downstream. When the logging era ended, the dam became a permanent structure, creating the Deerskin Flowage, an impoundment approximately 2.1 miles long and 110 acres in surface area. The dam was built for recreational purposes by the Eagle River Conservation Club in 1948, and it was authorized in 1949 by the Public Service Commission (PSC) under Order #2-WP-767. Due to concerns over the degradation of the trout fishery, the PSC granted a petition (Order #2-WP-1115) to lower the level of the flowage, resulting in a surface area of approximately 49 acres.

The Eagle River Conservation Club disbanded in the early 1970's, leaving the dam without an owner. The dam was inspected in 1985, and the Department sent recommendations for repairs of the dam to the Town of Washington. Following the statutory 10-year inspection cycle, the dam was inspected again on May 2, 1996. By that time the dam had deteriorated to the extent that a draw down and reconstruction was required to bring the dam up to safe standards. A public hearing was held on the evening of May 2, 1996 to inform the public of its deficiencies and owner-less status. On May 8, 1996, the Department sent a compliance schedule for establishing ownership and completing a reconstruction project to Vilas County and property owners on the flowage. All deadlines on this compliance schedule passed with no action being taken.

Although no parties expressed interest in taking ownership of the dam, there was significant local opposition to its removal. To address public concerns, the Natural Resources Board directed Department staff to prepare an analysis of removal and reconstruction alternatives. The report, titled Deerskin Dam – Alternatives Analysis was mailed to interested parties on October 15, 1999, and a second public hearing was held on November 15, 1999. A new compliance schedule was established with a March 31, 2000 deadline for finding an owner and submitting an application for reconstruction.

Spot inspections were performed by Department staff on June 23, 1999, April 20, 2000, and May 25, 2001. With the exception of a brushing project, no work took place to correct the dam's deficiencies, and its condition continued to gradually deteriorate.

The March 31, 2000 deadline passed with no action performed by proponents of dam reconstruction. On April 13, 2000 the Department issued Order 2-WP-767A to remove the Deerskin Dam. During May and June 2000, property owners on both sides of the dam denied access across their land for the Department to remove the dam. On August 24, 2000 the Department of Justice filed Case 00 CV 108 against four private property owners and Vilas County to gain access to the dam. This action resulted in signed access agreements from all parties, and all cases were dismissed by March 13, 2001.

During February 2001 the Vilas County Forestry Committee and the Wisconsin Association of Lakes expressed interest in finding an owner and reconstructing the dam. Due to lack of funds and the inability to find an interested owner, this effort reached no conclusion.

The Department contracted Lunda Construction Company to remove the dam. Drawdown and removal took place from June 5 through June 7, 2001. The earthen embankments and corrugated steel culverts were removed using two backhoes and a small Positrack bulldozer. After removal of the dam the riverbanks were stabilized by seeding and the placement of erosion mat and silt fencing. By agreement with the EPA, Lunda removed the dam at no expense to taxpayers.

Aerial spot checks of the former flowage area were performed in August and October 2001. The Deerskin River had already started to find a new channel and the flowage area was well underway in the process of vegetating its former bed.

Removal of the Deerskin Dam resulted in the elimination of an abandoned dam that had deteriorated to an unsafe condition. The Deerskin River above the former flowage is classified as an Outstanding Resource Water and a Class I trout stream. Removal of the dam is expected to result in approximately 2.1 miles of the flowage and an additional 3.5 miles below the dam being reclaimed as a cold water ecosystem. Initial action by the Department will consist of allowing the river to heal itself and monitor water temperature, water quality, sediment transport and fish populations. The need to provide additional fisheries habitat will be evaluated based on the monitoring efforts and how well the river naturally responds.



Thursday morning 6/7/01. Following drawdown, breaching, and channel relocation on the first two days, the contractor is preparing to widen the new channel to match the natural river width.



This shot of the former dam location was taken on an 8/17/01 flyover. It depicts revegetation of the flowage bed in progress.



This is an aerial photo taken on 10/5/01. It shows the former flowage taken from the upper end looking in a downstream (toward the dam) direction.

Big River Management

Mississippi River

Interstate Coordination

The Upper Mississippi River (UMR) is a resource of major importance to Wisconsin. Forming the boundary between Minnesota, Iowa and Wisconsin – and sharing management responsibilities for this Upper Mississippi segment with these states — WDNR participates in numerous multi-state planning, monitoring, and restoration projects involving this major resource, including the Environmental Management Program (EMP), navigation studies, environmental pool plans, the Upper Mississippi River Conservation Committee (UMRCC), channel maintenance plans, water level management and other activities.

During 2000-02, Wisconsin participated on the Upper Mississippi River Basin Water Quality Task Force, coordinated by the Upper Mississippi River Basin Association (UMBRA). This task force, comprised of senior level water administrators in states adjacent to the Upper Mississippi River Basin (Minnesota, Wisconsin, Illinois, Iowa and Missouri), met regularly to discuss and move forward an agenda for addressing multi-state issues requiring interstate coordination on this mutual waterbody. Issues such as water quality concerns related to hypoxia in the Gulf of Mexico, water quality standards, monitoring protocols and plans, assessment procedures, impaired waters listing 303(d), development of total maximum daily loads, etc. have been discussed. Recently the Task Force formally endorsed hiring (using federal 104(b)(3) funds) an interstate liaison to help describe differences and similarities between states on these various issues.

UMR Water Quality Assessment

Wisconsin participated in the development of a Water Quality Assessment of the UMR through its role as a member of the UMRCC Water Quality Technical Section. The study revealed that nonpoint source inputs from tributaries, discharges from major point source inputs, and river flows influence water quality conditions.

In Pool 2 nonpoint source pollution from the Minnesota River and wastewater discharges from the Twin Cities Metropolitan Area have strongly affected river quality in the past. Point source pollution abatement activities in the 1980s have resulted in improved water quality below the Twin Cities. Water quality changes also take place in the lower UMR where large agricultural watersheds, including the Missouri River, contribute to high nutrient or suspended solid concentrations.

The report documents that fish tissue PCB concentrations have decreased river-wide from the early 1980s to the 1990s and that compared to fish samples collected nationally, mercury concentrations in channel catfish filets from the UMR were slightly greater than the national average. Median mercury concentrations in Walleye fillet were noticeably lower than the national average and appear to be declining. The decreasing trend is consistent with reduced inputs based on sediment coring studies of Lake Pepin (UMRCC Water Quality Technical Section, Water Quality Assessment Report, March 2002).

Report Recommendations

- The Water Quality Technical Section should update the assessment and associated databases at 5-year intervals
- State, Federal and local agencies need to continue to coordinate their monitoring efforts to more effectively monitor the entire length of the Upper Mississippi River.
- Statistical trend analysis of water quality data collected at specific sampling locations should be performed at select stations throughout the UMR where long term (>20 years) data are available.
- Monitoring agencies should be encouraged to include flow data from an appropriate gaging site to their water quality databases for the Mississippi River or tributaries
- UMR States and Federal agencies should coordinate consistent sampling and analysis of contaminant concentrations in fish from the river at 5-year intervals

Environmental Management Program

Long Term Resource Monitoring

In 2002 the Long Term Resource Monitoring Field Stations at Lake City, MN (MNDNR-Pool 4) and Onalaska, Wisconsin (WDNR, Pool 8), completed routine fish, invertebrate, vegetation, and water quality monitoring with some exceptions. Night electroshocking, seining, and all tandem net sets were eliminated from 2002 sampling due to data analysis results indicating some redundancies among these gears and others kept. Stratified random monitoring for submersed vegetation was added in Pools 5 and 7 in 2002. Water quality sampling was stopped as of October 1, 2002 due to funding shortages. Efforts are currently underway to restructure the current Long Term Resource Monitoring program for 2003 and out years to accommodate severe (40%) federal funding reductions anticipated. No routine monitoring is planned for the 2003 sampling season, and only very limited pilot projects are being considered, contingent on receipt of funds. This has been a good program providing needed information and we are concerned about the funding shortages, severe reductions and the disruption of long term datasets that will result.

Habitat Rehabilitation and Enhancement Projects

The state of Wisconsin has sponsored or co-sponsored 21 Environmental Management Program Habitat Rehabilitation and Enhancement Projects (HREPs) since 1986. These projects are planned by an interagency team made up of representatives from the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service and the neighboring state DNRs of Minnesota or Iowa, depending on project location. The Wisconsin DNR, as part of the interagency team, has also been involved in the planning of 19 projects in Iowa or Minnesota waters since 1986. FY 01-02 accomplishments included participation in the planning of 8 HREPs (5 co-sponsored by Wisconsin) and start of construction for the Pool 11 Islands, Sunfish Lake, and Ambrough Slough Stages 1-3. Together, these 2 projects will directly improve over 1,500 acres of habitat in the Mississippi River floodplain.

Environmental Pool Plans

Wisconsin participated with other State and Federal agencies and the public in a recent planning effort to develop common habitat goals and objectives to guide the development of future habitat restoration on the UMR Pools 1-10 (Twin Cities to Guttenburg, IA). A similar planning effort is underway for pools 11 to 26. An important aspect of this work was to develop a desired future state of the UMR pools accounting for current knowledge of the River's ecosystem, experience with habitat projects, observations of river managers, biologist and the public. An important aspect of the pool plans was to identify future habitat and conditions necessary to reverse negative trends in habitat quality and to progress towards a more sustainable ecosystem. Pool plans will be modified as more information is gained about the UMR ecosystem, response of future habitat projects and technical advances in habitat needs assessment.

Mississippi River Water Level Management

A two-year water level reduction demonstration was held in Pool 8 of the Upper Mississippi River during the summers of 2001 and 2002. Through this demonstration hundreds of acres of additional aquatic vegetation have been produced to provide valuable fish and wildlife habitat. The next phase of this restoration technique will be examined for how long the results linger after reflooding, how often should it be repeated, and where and how should it be implemented next.

Upper Mississippi River - Illinois Waterway System Navigation Study

The Wisconsin DNR has participated in the Corps of Engineers Navigation study since 1991. As a result of a congressional inquiry the study has been refocused to include an equal emphasis on commercial navigation and the ecosystem integrity of the Upper Mississippi River. An Interim Report was released July 31, 2002 that charts the course for the partnering agencies to work on through the Feasibility Phase which is slated to be complete by December 2004.

Army Corps of Engineers Boatyard—Mississippi River

This site was located on the Mississippi River at Fountain City, and consisted of PCB contamination that resulted from the use of PCB-laden waste oils that were used as a dust-suppressing agent.

Concentrations of PCBs ranged from 5 mg/kg in river sediments to 65 mg/kg in land soils adjacent to the river. The spatial extent of soil and sediment contamination was less than 1 acre. Remediation, which took place in March 1999, involved the removal of the riverbank sediments and bed sediment with subsequent landfilling of the removed materials. Bed sediment was removed from a small area of the Fountain City Bay, adjacent to the site of soil contamination. WDNR and the Army Corps of Engineers each spent two years on the remediation of this site. Subsequent post-remediation monitoring in 2000 has indicated that the clean up goals were achieved. As a result of this remediation work, WDNR has submitted a petition to EPA to ask that this site be removed from the Wisconsin Section 303d list.

Wisconsin River

The Wisconsin River, the longest river in the state, supports diverse aquatic and terrestrial ecosystems as well as variety of human activities. The river begins at Lac Vieux Desert, a lake in Vilas County that lies on the border of Wisconsin and the Upper Peninsula of Michigan. The river is about 430 miles long and collects water from 12,280 square miles of land. As a result of glaciation, the river traverses a variety of different geologic and topographic settings. While the river has been modified by human activities over the last 150 years, its natural resource values continue to support abundant wildlife. Much of the river has been dammed for power production and flood control. Cities and industries have long discharged wastes into the river and by the 1950s the middle and upper parts of the river were severely polluted. Beginning in the early 1970s, massive water treatment programs were initiated to improve river water quality.

The Wisconsin River Basin is subdivided into three separate focal areas or "sub-basins" for management purposes, beginning with the Headwaters Basin, moving to the Central Wisconsin Basin, and ending with the Lower Wisconsin Basin. Below are summaries of Wisconsin River condition from Integrated Plans for these respective areas.

Headwaters Basin

The Wisconsin River is the largest waterway in the Headwaters Basin. It originates at Lac Vieux Desert (river mile 420.1), which lies in both the Upper Peninsula of Michigan and Vilas County in Wisconsin, and flows south through Vilas, Oneida and Lincoln counties to Merrill Dam (River Mile 286.7), approximately four miles south of Merrill. This portion of the river (133 miles) contains 7 hydroelectric generation plans, four paper mills, three municipal wastewater treatment plans, and two storage reservoirs. Most of the mainstem is classified as a balanced warm water fishery and aquatic life community. A very diverse game and nongame fishery exists. The greater redhorse and pirate perch, which are on Wisconsin's watch species list, are found in the northern subbasin. A small portion of the mainstem above the confluence with Portage Creek contains a remnant brook trout population reproducing in this portion of the river.

Fish in this headwaters portion of the river appear relatively free of harmful levels of toxic constituents. Northern pike taken from the river at Lake Alice in Lincoln County are on the Health Advisory for mercury concentrations greater than .5 ppm. Walleye from Rainbow Flowage are also on the advisory for mercury (See Chapter 7 for more information about health advisories).

Central Wisconsin Basin

The central portion of the Wisconsin River main stem starts at Merrill Dam (River Mile. 286.7) and flows south to Castle Rock Dam (River mile 159.7). The Wisconsin River stretches for 127.0 miles within the Central Wisconsin River Basin and has fifteen impoundments that generate hydroelectricity. The river receives effluent from ten municipal wastewater treatment plants (WWTPs) and fourteen industrial wastewater treatment facilities, eight of which are paper mills. A comprehensive management plan for this portion of the river was completed in 1996.

The central portion of the Wisconsin River is classified as supporting a balanced warm water fishery and aquatic life community (WWSF), with a diverse game and non-game fishery. Of the 127.0 miles of the Wisconsin River only a small portion supports its potential biological use due to excess nutrient loading from point and nonpoint sources; urban runoff; fecal coliform bacteria exceeding the state standard; elevated levels of heavy metals and organic chemicals in sediments; and bioaccumulation of organic contaminants in fish tissue.

The DNR has collected ambient data on the Wisconsin River in this portion of the basin at six locations, which include the Wausau Dam, Lake DuBay Dam, Stevens Point Dam, Biron Flowage Dam, Nekoosa Dam and Petenwell Dam. These six stations, sampled and maintained by DNR, including collection and analysis of dissolved oxygen, pH, BOD₅, suspended solids, total phosphorous, ammonia, total Kjeldahl nitrogen, nitrate-nitrogen, calcium, conductivity, chloride, hardness, chlorophyll, magnesium, and fecal coliform bacteria. A review of this data indicates that the Wisconsin River is currently meeting water quality standards for all parameters with the exception of fecal coliform bacteria. Violations of the standard have occurred at all six stations, but most of them have occurred at Biron, Nekoosa and Wausau locations.

Toxins are a concern in this portion of the Wisconsin River, in particular pentachlorophenol (PCP), used in the wood industry as a wood preservative. Known spill sites exist adjacent to the Wisconsin River between Merrill and Rothschild. The chemical has been detected in the sediments below and above the Rothschild Dam (Weyerhaeuser) and may be discharged to the river below Merrill, and on the Rib River above Lake Wausau. More detailed sediment sampling needs to be conducted between Merrill and Wausau to show the distribution and extent of PCP contamination. Polychlorinated biphenyls (PCBs) have also been detected in sediments below the Wausau Dam. PCBs are also found in fish from Biron Flowage to Castle Rock Flowage. Dioxin (paper mill by-product) has been detected in fish from the Petenwell and Castle Rock Flowage. These chemicals may also exist within the sediments but further testing is necessary to confirm this.

Another concern in this segment of the Wisconsin River, as well as the whole river system, is nutrient loading. Many of the main stem reservoirs, especially the Petenwell and Castle Rock, suffer from severe algae, dense growths of aquatic plants and increased siltation or sedimentation due to excess available phosphorus. In many cases this impact on water quality prohibits recreational uses in these impoundments. Currently, WWTPs are required to remove phosphorus from effluent; their contribution to the overall phosphorus in the river is insignificant during low flows. In any event, research is needed to identify the source of the phosphorus that is affecting the river. A study is currently being conducted to document whether the annual load of phosphorus entering the river comes from point sources or other sources such as nonpoint source runoff. This information is needed to determine the necessity of phosphorus removal by WWTPs.

Fish from the Central Wisconsin River area have been analyzed for microcontaminants at 15 sample locations:

- Wisconsin River below Merrill Dam
- Wisconsin River at Brokaw
- Wisconsin River at Wausau Dam Lake
- Wisconsin River at Lake Wausau
- Wisconsin River at Rothschild
- Wisconsin River at Mosinee Flowage
- Wisconsin River at Lake DuBay
- Wisconsin River below Stevens Point Flowage
- Biron Flowage
- Wisconsin River below Biron Dam
- Port Edwards Flowage
- Nekoosa Flowage
- Wisconsin River below Nekoosa Dam
- Petenwell Flowage
- Castle Rock Flowage

Some of these locations contain fish on the state fish health advisory. Monitoring should continue to track trends. Whole fish sampling is being conducted for PCBs, Mercury, PCP, dioxin and furan — which are often associated with PCP as microcontaminants. In addition, the DNR is conducting follow-up sampling for dioxin and furans below Rothschild. Walleye are on the state fish health advisory for mercury from the Nekoosa Dam to the Castle Rock Dam, including the Castle Rock and Petenwell Flowage. Carp and white bass from the Petenwell Flowage and carp from Castle Rock Flowage are on the advisory for dioxin. Periodic sampling is conducted to analyze possible trends.

This section of the Wisconsin River receives effluent discharges from ten municipal and fourteen industrial WWTP facilities. Due to the number of dischargers on the river from Hwy WW in Brokaw to the inlet of Lake DuBay, this portion of the river has a wasteload allocation to ensure water quality standards are maintained at times of low flow and high temperatures in the river.

Based upon the information provided both the Petenwell and Castle Rock flowages are impaired due to:

- High density carp populations.
- Undesirable bluegreen algal blooms, some toxic algae.
- Phosphorus loading from both point and nonpoint sources, causing eutrophication.
- Dioxin, Mercury and PCB contaminated fish and sediments.
- Restrictions on fish and wildlife consumption.
- Degradation of desirable phytoplankton, zooplankton, bottom-dwelling organisms (benthos), and fish and wildlife communities because of poor water quality and lack of established rooted aquatic plants.
- Degraded aesthetics.
- Human interference.

Because both Petenwell and Castle Rock flowages have the potential to be outstanding resources from both a fishery and recreational viewpoint, a comprehensive management plan should be developed to recommend remedial measures to resolve these problems.

Lower Wisconsin Basin

The section of the river known as the Lower Wisconsin River crosses over several 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. Overall, the Lower Wisconsin portion of the river extends about 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 operating 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. Below the Prairie du Sac dam the river is free flowing for 92 miles.

The Lower Wisconsin 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 impact so this industry included frequent fish kills, unpalatable fish flesh, and massive populations of bacteria, fungi and protozoans. Although Lake Wisconsin and the Lower Wisconsin mainstem are partially buffered from the impacts of the pulp and paper mill industry by the series of impoundments (which impede the flow of contaminated sediment to downstream areas), this segment of the river is nevertheless affected by pulp and paper mills.

Overall, the Lower Wisconsin River is classified as a diverse warm water sport fishery and anglers enjoy the opportunity to catch a variety of different sport fish on the river. 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 river and its backwaters support up to 95 native fish species; of these species, 19 are threatened or endangered. Several of these fish species are specific hosts for the glochidial stage of a number of rare, threatened and endangered freshwater mussels. This stretch of the river is also home to a variety of unusual and rare species insects and threatened and endangered amphibians and reptiles.

In addition to its abundant and diverse aquatic resources, the lower reach of the river has also been recognized for its aesthetics and potential for recreation. The US Park Service and US Forest Service nominated this stretch for inclusion in the National Wild and Scenic Rivers Program. The riverway is a unique natural and scenic area with abundant resources including a variety of habitat types, historical and archaeological sites, abundant wildlife and good quality fisheries. In recognition of its relatively undeveloped state, the Wisconsin Legislature created the Lower Wisconsin State Riverway in 1989; this designation 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.

Contaminated Sediment Management

The Department's Contaminated Sediment Program seeks to identify surface water communities that are contaminated by polluted sediments and manage those sediments in a manner that allows surface water quality standards to be maintained consistently. When sites are identified, and the environmental and health risks are assessed, an integrated effort by scientists and engineers in the Department allows for the remediation of contaminated sediments. These efforts result in the enhancement of water quality in Wisconsin's surface waters.

Contaminated Sediments at Former MGPs

A Manufactured Coal Gas Technical Team consisting of regional site project managers and water program staff within the Department review and coordinate technical issues involved in the investigation and remediation of former MGP sites. These plants have been identified as responsible for the contamination of surface water, sediments, and/or groundwater. Historically, MGPs utilized coal as a feedstock that was processed and ultimately resulted in waste products including coal tar, tar sludges and oil sludges. The primary pollutants of concern at MGP sites include VOCs (Volatile Organic Carbons), PAHs (Polycyclic Aromatic Hydrocarbons) and metals. The plants typically operated in confined areas, and utilized the nearest convenient outlet for waste disposal, which was often a nearby surface water. Once the toxic waste products enter the environment, they are not able to degrade naturally, and do not disappear without the help of human remediation (www.hatheway.net). For this reason, the contamination caused by MGPs is of great environmental concern, and the Department is actively pursuing remediation of these sites.

MGP Site Cleanups Completed

Baraboo MGP Site

Two acres of surface water and groundwater of the Baraboo River are contaminated with pollutants from activities that took place at the city of Baraboo MGP site in Sauk County. Alliant Energy was responsible for the contamination, which WDNR has known about since 1998. The Department and Alliant Energy each spent a year working on the remediation of the contaminated sediments, which was accomplished through mechanical dredging and landfilling. About 4,400 cubic yards of sediment were removed. As a precautionary measure, a silt curtain and sheet pile cutoff wall were utilized to discourage the contamination from spreading to other areas. All remediation, including reconstruction and revegetation of the stream bank was completed in Fall 2000. In addition to remediation efforts, the recent removal of several dams on the Baraboo River have lead to further restoration of the river corridor by improving aquatic and terrestrial habitat.

MGP Cleanups Pending

Lincoln Woods MGP site

Contamination at the Lincoln Woods MGP site in Merrill was caused by the city of Merrill MGP, however Lincoln Woods Window Manufacturer has since acquired the property and has assumed responsibility for the contamination. The contamination was detected in 1996, and the Department has been working on cleaning up the site for the past four years. Lincoln Woods has been involved in cleanup for about 6 months. A one-acre area, including both surface water and groundwater, was affected by the contamination. Remediation efforts have involved dredging to remove the contaminated sediments. During the dredging process the river was drawn down to minimize river contamination by the groundwater. Initial remediation efforts have failed to meet the cleanup goals of the project. Due to lack of funds and other difficulties, contaminant removal in the river has been postponed as further options are being explored.

Manitowoc MGP

Surface water and groundwater contamination at the Manitowoc MGP - located in Manitowoc County - was identified in 1988. It has been determined that Wisconsin Fuel & Light is responsible for the contamination, which included VOCs, PAHs and metals. The Department has spent two months on remediation of this site, and Wisconsin Fuel & Light has spent six months. The City of

Manitowoc has also been involved in the cleanup process. An initial experimental remediation attempt, involving in situ stabilization of the bottom sediments, was unsuccessful. Silt curtains were utilized during remediation to contain the sediment. No further remediation is planned at this time.

Oshkosh MGP

The Oshkosh MGP site is located in Winnebago County, and has contaminated five acres of sediments in Lake Winnebago. The Department has known about this contamination, caused by a Wisconsin Public Service Corporation plant, for about 12 years. Contamination at this site involves both surface water sediments and groundwater. To date, the contamination that is present on land (versus the sediments of surface water) has been treated. This was accomplished by trenching below the area of contamination, and encapsulating the contaminated groundwater and soil. During this process, water tight sheet piling was implemented along the shoreline to keep any contaminated groundwater from entering the river's surface water. The Department has spent three months working on remediation, and Wisconsin Public Service Corporation has spent a year on the cleanup at this site. With the groundwater contamination remediated, the Department is now focusing its efforts on exploring ways to clean up the surface water sediment contamination.

Campmarina MGP

The Campmarina property in Sheboygan has contaminated soil, groundwater, and surface waters. Wisconsin Public Service Corporation's former manufactured gas processing plant operated more than 40 years ago on both Campmarina and an adjacent site to the south known as the Center Avenue Right-of-Way. Soil and groundwater cleanup activities were implemented in 2001 at Campmarina. The contamination in the Sheboygan River will be addressed in a separate remediation phase

MGP Sites Under Investigation

Appleton MGP

This site in Appleton in Outagamie County is currently under investigation. Sediment contamination by VOCs, PAHs, and metals, which affected an area of less than one acre, was discovered in 1993. To date, the Department and Wisconsin Energy have each spent about one month investigating the contamination.

Ashland Coal Gas

The Excel Corporation caused the contamination of ten acres of surface water and ground water at Ashland Coal Gas site located in Ashland County. Contamination was first detected by the Department ten years ago, and both the Department and the Excel Corporation have conducted three years of investigation. Extremely high levels of coal gas waste were found in Ashland Harbor of Lake Superior. The U.S. EPA Superfund program is now involved, and will be conducting an additional risk assessment.

Chippewa Falls — Duncan Creek

A MGP site in Chippewa County, believed to have contaminated Duncan Creek in Chippewa Falls, is in need of investigation. Preliminary exploration by WDNR is underway.

Fox River IL Burlington MGP

Investigation is needed at this former MGP in the City of Burlington, Racine County.

Green Bay MGP

Wisconsin Public Service Corporation is the responsible party for a former MGP in the City of Green Bay, Brown County. The existence of a two-acre area of surface water and groundwater contamination by PAHs, VOCs, and metals has been known about since 1993. The Department has spent about two weeks in preliminary investigation and Wisconsin Public Service Corporation has spent four months.

La Crosse MGP

The City of La Crosse MGP site in La Crosse County is situated along the Black River. Contamination was detected two years ago, and the responsible party is unknown at this time. The Department is conducting preliminary investigations at this site.

Marinette MGP

A former MGP site is located in Marinette County, in the City of Marinette. The coal gas wastes from this former plant contaminated ten acres of surface water with PAHs, VOCs, and metals. The Department first found out about this contamination ten years ago, and is currently in the preliminary stages of requiring additional assessment.

Milwaukee Third Ward MGP

A portion of the contamination in the Milwaukee River at Milwaukee Harbor is attributable to the Wisconsin Gas Company. Initial investigations are underway to determine future action.

Ripon MGP

Sediment and groundwater contamination at the City of Ripon MGP, located in Fond du Lac County, was caused by activities of Alliant Energy. The Department was made aware of this contamination in 1994.

Stevens Point MGP

The City of Stevens Point MGP site is located near the Wisconsin River in Portage County. The plant was operated by Wisconsin Public Service, and caused the contamination of groundwater and surface water. Groundwater remediation has already occurred, and investigations of sediment contamination continue.

Two Rivers MGP

Wisconsin Public Service Corporation is responsible for the contamination at Two Rivers, in Manitowoc County. The Department is working to determine whether additional assessment is necessary.

Wausau MGP

The contamination at the Wausau MGP site in Marathon County is due to activities of Wisconsin Fuel and Light. The contamination was discovered in 1999, and very little information is known regarding the extent of contamination. Further investigation is necessary to establish future actions.

Remediations Completed

Army Corps of Engineers Boatyard—Mississippi River

This site was located on the Mississippi River at Fountain City, and consisted of PCB contamination that resulted from the use of PCB-laden waste oils that were used as a dust-suppressing agent. Concentrations of PCBs ranged from 5 mg/kg in river sediments to 65 mg/kg in land soils adjacent to the river. The spatial extent of soil and sediment contamination was less than 1 acre. Remediation, which took place in March 1999, involved the removal of the riverbank sediments and bed sediment with subsequent landfilling of the removed materials. Bed sediment was removed from a small area of the Fountain City Bay, adjacent to the site of soil contamination. WDNR and the Army Corps of Engineers each spent two years on the remediation of this site. Subsequent post-remediation monitoring in 2000 has indicated that the clean up goals were achieved. As a result of this remediation work, WDNR has submitted a petition to EPA to ask that this site be removed from the Wisconsin Section 303d list.

Gruber's Grove Bay

Gruber's Grove Bay is located on Lake Wisconsin, and is adjacent to the former Badger Army Ammunition Plant. This 20-acre site is near the City of Baraboo in Sauk County. Sampling in the Bay conducted in 1999 by WDNR and the Army indicated elevated levels of Mercury, Lead, Copper, Chromium and Nickel. The contaminated sediments were the result discharges associated with the production of ammunition at the former plant. Seventy-five thousand (75,000) cubic yards of mercury contaminated sediments on site were hydraulically dredged and landfilled, at a total cost of \$6 million. During dredging operations, the use of a silt curtain was implemented to contain contaminants in the bay. In addition to work done by the Department and the Department of Army, there was also involvement by U.S. EPA, University of Wisconsin Extension, and local citizen volunteer groups. Remediation efforts at this site were completed in November 2001.

Wausau Steel Corporation / Rib River Oxbow

Wausau Steel Corporation performed battery reclamation at a site adjacent to the Big Rib River near Wausau in Marathon County. Runoff from the battery recycling operation reached a cutoff oxbow of the Rib River, and contaminated surface water sediments with Lead and Zinc. It was determined through a feasibility study that “capping” was the appropriate remediation for this four-acre site. This was accomplished in 1997 by placing geo-textile fabric and sand on top of the ice cover, and letting it settle over the sediments as the ice melted. Cobble “islands” were also placed on the cap to provide habitat for aquatic life. The approximate cost of remediation was \$400,000. Monitoring conducted after capping the site indicated that beneficial aquatic habitat has developed in the capped area, and that healthy aquatic life is becoming established.

Cleanup pending



Hayton Mill Pond

Contamination at Hayton Mill Pond in Calumet County, near the Village of New Holstein, was first identified by the Department in the early 1990s. Tecumseh Products, an engine manufacturer, caused the contamination by PCBs at the site. The pollution affected twenty miles of surface water. Of particular concern at this site is the presence of KILLSNAKE Wildlife Area immediately downstream of the millpond. The Department and Tecumseh Products have been working on the development and implementation of cleanup efforts since 1999. Clean up has begun on site in the Fall of 2001, with the sediments of greatest contamination the first to be removed and landfilled. To date, these efforts total about \$1 million. To track the success of remediation, chemical and biological monitoring were conducted prior to remediation, and

will continue through the completion of the clean up process. Remediation efforts are being conducted by the Department in conjunction with the City of New Holstein, Calumet County, EPA, and United States Geological Survey (USGS). Additional investigation to determine the appropriate remediation method for the contamination at this site is necessary.

Kewaunee Marsh

The Kewaunee Marsh, located in Kewaunee County, is the site of contamination due to a Central Wisconsin Railroad car spill in the 1940's. This spill caused arsenic contamination of surface water and groundwater in a three-acre area of the marsh. The Department, along with Wisconsin Central Railroad, has spent two years investigating and cleaning up the site. As an interim remedy to reduce human and waterfowl exposure, a geo-textile liner and several feet of wood chips were used to cap the contaminated wetland. The perimeter of the contaminated area was also securely fenced to eliminate public access, and to safeguard human health. Biological and chemical monitoring was conducted prior to the remediation, and is currently being conducted to ensure that the movement of the contaminated ground water plume doesn't further pollute the river. To date, remediation costs have totaled approximately \$400,000. Groundwater monitoring investigations are underway to determine the necessity of future remediation.

Lower Fox River

The Lower Fox River in Outagamie County and Brown County is heavily polluted with PCBs as the result of the historical operations of seven local paper and pulp mills. The sediment contamination stretches for 39 river miles of the Fox River, and has affected several communities in the Fox River Valley, including Appleton, Green Bay, Neenah, and Menasha. Contamination was detected in the mid 1970's, and has been a subject of investigation by the U.S. EPA, the Department and local paper manufacturers for more than 20 years. Two deposits of PCBs in the river (Deposits 56/57 in Green Bay, and Deposit N in Appleton) were remediated in 1998-99. Additional cleanup of the river is being planned with proposed remediation plans currently under public review. The proposed cost of the clean up of the Lower Fox River is estimated at \$238 million.

Many other agencies/organizations, including the U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, Menominee Indian Tribe, and Oneida Indian Tribe have collaborated with the WDNR and local responsible industries to assist in remediation efforts.

Ansul Corp / Menominee River

The Menominee River in Marinette is the location of 20 acres of arsenic contamination caused by Ansul Corporation, a chemical manufacturer of flame retardant materials. On-site storage of wastes resulted in the contamination of groundwater, as well as sediments in the Eighth Street boat slip, the ship turning basin, the Menominee River and Green Bay. The contaminated sediment at the boat slip was removed, and the slip was sealed off. During removal of material from the boat slip, silt curtains and sheet piling were used to isolate contaminated groundwater and prevent it from polluting other areas. Additional investigations of the turning basin are needed to determine a future course of action. Also involved in the remediation efforts were U.S. Environmental Protection Agency and the U.S. Fish and Wildlife Service.

Murphy Oil Refinery / Newton Creek

Murphy Oil Refinery, located in Superior, is responsible for the contamination of one river mile of Newton Creek, a tributary to Lake Superior. Contamination of sediments by oil and grease and PAHs was discovered nearly 20 years ago, has affected the surface water at this site. Over the past five years, the Department, Murphy Oil, and the City of Superior have cleaned up a two acre impoundment at the headwaters of Newton Creek, and are investigating and planning an approach to remove remaining contaminants from downstream waters. Additional investigations are presently underway.

Sheboygan River

The Sheboygan River Area of Concern includes the Sheboygan Harbor and 14 miles of the river up to the Sheboygan Falls Dam. The Sheboygan River, a tributary to Lake Michigan, was designated as a Superfund Site by U.S. EPA in 1985 because of PCB contaminated sediments. Tecumseh Products Company, Thomas Industries and Kohler Company have been identified as potentially responsible parties.

In May 2000, the Record of Decision for the Sheboygan River Superfund project was signed. About 4,300 cubic yards of contaminated sediment that had been previously dredged from the stretch of the Sheboygan River that runs from the area known as the "Upper River" and placed in steel storage facilities on the Tecumseh Products Company's Sheboygan Falls property, was shipped off site in September 2001.

The implementation phase of this project will usher in the long-awaited sediment remediation of the Sheboygan River. WDNR staff is working with fellow trustees from U.S. Fish and Wildlife and National Oceanic and Atmospheric Administration (NOAA) to determine the Natural Resources Damage Assessment for the restoration phase of the Sheboygan River Superfund Site.

Under a legal agreement signed earlier this year between the U.S. Environmental Protection Agency (U.S. EPA) and Tecumseh, polychlorinated biphenyl (PCB)-contaminated sediment was loaded onto trucks lined with heavy plastic and hauled to the company's New Holstein plant. From there, it was loaded into railcars and shipped to a licensed landfill in Tulsa, OK. This sediment was disposed of in Tulsa because it contained over 50 parts per million (ppm) PCBs and a landfill in Wisconsin was not available. The tanks were demolished after being decontaminated. After sections of the tank were removed, they were transported to a local recycling facility.

U.S. EPA has been communicating with Tecumseh officials for the past year hoping to reach an agreement that would commit the company to the cleanup of the upper river, which extends from the Tecumseh facility in Sheboygan Falls to Walderhaus Dam. Once the consent decree is lodged in federal court, the Department of Justice will begin a 30-day comment period by posting an announcement in the Federal Register. After the Department of Justice responds to the comments, it will ask that a judge enter the consent decree in federal court to finalize the agreement. Characterization and design of the cleanup components could proceed in 2002 with cleanup activities beginning soon after.

Under Investigation

Koppers Industries, Inc. / Crawford Creek

Koppers Industries, Inc. is a chemical manufacturing plant located on Crawford Creek in the City of Superior. Crawford Creek is tributary of the Nemadji River which flows into Superior Bay. The facility treated wood with pentachlorophenol and creosote and discharged waste into the creek that resulted in contamination of the sediment, as well as the overflow areas along a drainage ditch from the facility. Koppers Industries is under the Resource Conservation and Recovery Act (RCRA) program and has undertaken corrective measures related to the soil and groundwater contamination at the site. An investigation of the degree of contamination is being conducted by a consultant for Koppers Industries. Depending on the results of the investigation, the Department will take appropriate measures appropriate to moving forward on the remediation process.

Mercury Marine / Cedar Creek

Mercury Marine, an outboard motor engine manufacturer in Ozaukee County, is responsible for PCB contamination of approximately 20 miles of Cedar Creek and Ruck Pond in the cities of Cedarburg and Thiensville. The contamination was discovered 15 years ago, and the Department has been working with Mercury Marine for three years on remediation and further investigation of the site. The U.S. EPA and the City of Cedarburg were also involved in clean-up efforts at this site. Contaminated sediments removed from Ruck Pond were dredged and landfilled in 1998. Prior to this remediation effort, Cedar Creek was drawn down and diverted around Ruck Pond to allow for more effective removal of sediments. Pre- and post-remediation monitoring was conducted on Ruck Pond. Investigations are ongoing to determine the appropriate method of remediation for the remaining contaminated sediments of the creek. To date, \$7 million have been spent on remediation efforts.

Moss-American

Moss-American (now the responsibility of Kerr-McKee Corporation) was a chemical manufacturing industry that treated wood by a creosoting process from 1921 to the mid-1970s. Wood products were treated with a mixture of fuel oil and coal-based creosote. Moss American, which was located on the Little Menomonee River in Milwaukee, caused the contamination of sediments, groundwater, and surface water of a two-mile section of the river. The U.S. EPA has designated Moss-American as a Superfund site, and has taken the lead on coordinating the clean-up investigation at this site. To date, the U.S. EPA, WDNR and Kerr-McKee, have each spent five years working with the EPA on this project. Currently, the EPA is waiting for the submission of a proposed remediation plan by the Kerr-McKee Corporation, at which time decisions regarding further actions will be made.

Rhinelanders Landfill

An abandoned landfill in the City of Rhinelanders in Oneida County is the source of pollution of surface water and groundwater pollution by ammonia and, perhaps also metals. The site is near Slaughterhouse Creek and Pelican River and the identified pollutants have degraded these nearby resources. The contamination was first discovered in 1996, and the Department, as well as the City of Rhinelanders, has spent about three years investigating the site. Preliminary monitoring has focused on changes in water quality, as well as the performance of toxicity identification studies. Further investigations will identify the degree of contamination and allow for the determination of subsequent action.

Integrated Resource Management

Integrated planning, described in Part II of this report, involves identifying ecosystem status, ecological issues and concerns, and priority work areas for DNR and partner groups. The following summarize just a few of the many (18) integrated plans developed from 2000 through 2002. The Upper Chippewa, Superior, and Sugar Pecatonica are not completed.

Lower Fox River Basin

The Lower Fox River Basin Integrated Management Plan provides background information on the basin, identifies threats to basin resources, and details actions to improve the health of ecosystems in the basin. The ultimate goal of the plan is to improve resources through coordinated work planning and issue prioritization.

The physical features and geology of the basin influence the types of issues and problems that occur. The Fox River and the lower part of Green Bay are the major surface water resources; other major surface water features serve as the basis for dividing the basin into watersheds. Watersheds include the East River; Apple and Ashwaubenon Creeks; Plum and Kankapot Creeks; Fox River/Appleton; Duck Creek; and Little Lake Butte des Morts.

The topography, surface water drainage, and drinking water availability are dictated by local geology, which consists of glacial deposits underlain by a series of eastward-dipping sedimentary bedrock units. The sedimentary bedrock consists of carbonates (dolomite and limestone), shale, and sandstone.

The basin supports a variety of unique and delicate ecosystems, including open land, woodlands, wetlands, riverine, and lacustrine ecosystems. Open lands and woodlands ecosystems provide habitat for wildlife, recreational opportunities for area residents, and areas for groundwater recharge. The wetlands ecosystems support a variety of unique plant and animal species and protect water quality by buffering surface water runoff to rivers and streams. The riverine and lacustrine ecosystems provide habitat for wildlife, commercial fisheries, and recreational opportunities. The Niagara Escarpment is an especially unique ecosystem located within the basin.

Past and current industrial activities, agricultural practices, and residential and commercial development threaten these ecosystems. The primary challenges identified for the basin include:

- Habitat loss, deterioration, and fragmentation;
- Nonpoint source pollution of surface waters;
- Deteriorating groundwater quality and diminishing groundwater quantity;
- Heavy recreational use of some resources, such as lakes and shorelines;
- Contaminated sediments;
- Inadequate program support and enforcement; and,
- Lack of education [on how to protect and manage area resources]

The main priorities identified to address the issues above include:

- Increase and protect critical habitats and habitat integrity;
- Sustain a diverse, balanced and healthy ecosystem;
- Improve surface water and groundwater quality and identify water conservation opportunities;
- Establish a self-sustaining, balanced, and diversified edible fish community;
- Manage resources for multiple users;
- Strengthen program support and enforcement initiatives; and
- Improve educational programs.

Existing programs and regulations are currently addressing some of the issues identified for the basin. WDNR staff are working to improve and protect basin resources through Wellhead Protection Planning, the Wisconsin Storm Water Management Permit program, the Priority Watershed Program, and Impaired and Outstanding Waters and Wetlands regulations. These programs and regulations provide a framework within which future actions may be conducted.

Lakeshore Basin

The Lakeshore Basin, a water-rich area sprinkled with an assortment of inland lakes, major rivers and small streams, is bounded by Green Bay and Lake Michigan. The Basin completely encompasses the counties of Door, Kewaunee and Manitowoc and parts of Brown and Calumet Counties. The area was sculpted by glaciers and is dominated by the Niagara limestone formation, which underlies most of the Basin, but projects above ground as the Niagara Escarpment, visible throughout much of Door County. Tourism, manufacturing and agriculture dominate the economy. The Basin's blend of picturesque open land and abundant water combined with seemingly limitless recreational opportunities are increasingly in demand. However, the close proximity of this area to large urban centers is putting enormous stress on natural resources. The challenge for all of us is to satisfy people's needs without destroying the abundant but fragile natural resources that make the Basin so attractive to so many people.

Natural Resource Concerns

Several techniques were used to determine the priority natural resource concerns in the Basin from the perspective of not only Department staff, but more importantly, the public. People are especially concerned about the loss of aquatic habitat and open land to certain types of development, pollution threats to surface waters, and the contamination of drinking and groundwater. A variety of issues related to the above major concerns, along with tactics for addressing them, provided a focus for Department staff work plans for the next two years and beyond. Many of the tactics are specific to Basin problems but also relate to the *Department's Fisheries, Wildlife, and Habitat Management Plan for Wisconsin (2001 – 2007)*. Those issues are organized into broad categories of Aquatic Resources, Drinking and Groundwater Resources, and Terrestrial Resources.

Aquatic Resources

Fish management issues are a major topic in the report since Basin waters support both a tremendously popular and diverse sport fishery and a large commercial fishery. Issues discussed include stocking expectations, exotic versus native species, fishing tournaments, declining fishing opportunities, inadequate boating access, and contaminants. Projects are planned or ongoing to better meet stocking needs, provide more and improved boat access, and better understand changes in fish populations in inland and outlying waters.

The topic of habitat — threats to it and loss of it — is a priority public concern not only on inland waters but also outlying waters, especially along the Door County shore. Specific issues discussed include loss of fish spawning areas, shoreline development and fragmentation, and lack of shoreline buffers. Projects are planned to better determine impacts from nearshore habitat loss and areas in need of special protection.

The discussion of threats and existing impacts to surface water quality, another high priority concern, includes the issues of storm water runoff, agricultural practices, loss of forested and wetland vegetation, and quarries. All watersheds in the Basin are highly susceptible to nonpoint source pollution and controlling it is a major workload for Department staff that will only grow in the future.

Drinking and Ground Water Resources

Threats to drinking and ground water are a major concern to people in this Basin since most people depend on well water. The dominant issue is the contamination or potential for it from incompatible land uses on thin soils. Other issues discussed include deteriorating wells and the precarious balance between withdrawal and recharge of ground water. An ongoing study in Door County of bacterial contamination of ground water will continue and provide valuable health information to current and future well owners.

Terrestrial Resources

Historically most of the watersheds in the Lakeshore Basin were dominated by forested and wetland vegetation. Loss of forested and wetland vegetation has resulted in impaired watershed hydrology. These impairments include poor infiltration rates and an excessive percentage of the

percent precipitation and snow melt running off causing non-point source pollution and overwhelming existing stream channels and aquatic habitat. With a majority of the Basin's land use being in farmland the best opportunities exist for forest and wetland vegetation restoration on marginal farmland areas as a part of a solid farmland land use plan which encourages responsible stewardship. Sixty eight percent of the land in the basin is farmland. Today, many of the small farmers are finding it harder to make a living and face the need to either expand operations to survive or sell the land. Vacant farmland is being converted to rural home development, divided into smaller parcels for private recreation or potentially converted to tree planting, grassland or wetland restoration. Unfortunately most of the land is being converted to smaller parcels for private use or development. This trend greatly reduces recreational uses on lands that once were open to hunting or fishing opportunities. It also means a potential increase in silt and nutrient-laden runoff from further declines in forest lands and wetlands. In the next two years our workplans will continue to address the issues identified in this report.

- An average of 75 management plans per year will be written through the managed forest law for sound forestry practices on privately owned forest property.
- Approximately 200 acres of grassland habitat will be developed and 70 acres of wetlands will be restored throughout the basin. Most of these projects are dependent on continuation of state and federal incentive programs.
- A new position will be added to the Northeast Region to coordinate the Gypsy Moth control efforts.
- With the new smart growth legislation, more staff will be devoting time to assist local units of government develop land use plans that recognize the benefits of and protect our water, forest, wetland and farmland habitat.
- Trail and infrastructure improvements to our State Parks and Forests will enhance the recreational opportunities on those properties.

Future Challenge

The challenge for the future will be to meet the demand for access to our rivers, lakes and forests while protecting the natural character of these valuable resources. In some instances it may be necessary to go beyond protection efforts and identify the restoration efforts needed to restore proper ecosystem function and health. The Land Legacy Study identifies the critical habitats that both the department and the public would like to preserve for the future. However, public land acquisition is not and should not be the primary avenue for resource management and protection. We believe that public awareness of resource conditions, issues and threats, and active public involvement in creative solutions to address these issues is the best way to attain sustainable resource management. It is through encouraging individual action, public involvement, and strong partnerships that we believe resource quality will be maintained for future generations.

Upper Green Bay Basin

The Upper Green Bay Basin includes waters draining to Green Bay between the city of Green Bay and the Wisconsin-Michigan border. Major river systems include the Menominee, Oconto, and Peshtigo rivers in the north and the Pensaukee, Suamico and Little Suamico rivers further south. The Upper Green Bay GMU is a subset of the larger Green Bay hydrologic basin and includes all or portions of 16 watersheds entirely or partially within the Upper Green Bay Basin.

The basin's northern areas are largely forested. Agricultural uses are quite distinct in the southern portion of the basin. Marinette County is approximately 75% forested, while Oconto County is about 60% forested. Public lands make up a very large percentage of the land base in the Upper Green Bay Basin. In addition to federal and county land, the state now owns the Governor Tommy G. Thompson Centennial State Park. There are three main rivers within the basin — the Menominee River, the Peshtigo River and the Oconto River. Northern Oconto County contains a large concentration of lakes. Marinette County also has a large number of lakes, but is primarily noted for its miles of trout streams. Together there are 820 lakes in the basin covering almost 25,000 acres, and approximately 950 miles of trout streams, 650 miles of which are considered Class 1, or naturally reproducing trout streams.

The Upper Green Bay Basin includes the Northeast Hills, Northeast Sands, Northeast Plains and Northern Lake Michigan Coastal ecological landscapes. Most of the basin's outstanding and exceptional resource waters are located in the Northeast Sands and Northeast Hills areas. The Northeast Hills has hilly topography with silt loam soils, and extensive northern hardwood forests with little development. The Northeast Plains is an area with gently rolling to flat topography with sandy soil, a mixture of agriculture, and mixed hardwood forests and wetlands. The Northeast Sands includes gently rolling topography with sandy soils, primarily oak and pine forests. The Northern Lake Michigan Coastal ecoregion includes land and water influenced by Lake Michigan, with gently rolling to flat topography with clay and loam soils. The area is dominated by agriculture to the south and mixed hardwood forest in the north.

Basin Objectives

Below is a list of Upper Green Bay Basin Objectives, designed to provide direction for Department and Partner Team projects over the next six years.

- Target the west shore of Green Bay as a high priority for habitat protection. Complete feasibility analysis and planning process for the Western Shore of Green Bay Coastal Zone Habitat Restoration Area.
- Implement the fifty year acquisition/protection study recommendations identified as "Land Legacy projects" by and for the Upper Green Bay Basin.
- Increase emphasis on Water Regulation and Zoning efforts.
- Increase participation on regional Land Use Team, develop expertise in "Smart Growth" program, and work more closely with municipalities to promote wise land use and zoning.
- Review, revise and implement a Comprehensive Upper Green Bay Basin Fisheries Management Plan. This plan will include the following component plans.
- A revised Oconto River Fisheries Management Plan. Use this plan to implement and direct fisheries activities on the Oconto River system.
- A revised Menominee River Fisheries Management Plan. Use this plan to implement and direct fisheries activities on the Menominee River system.
- Incorporate the Lake Michigan Comprehensive Fisheries Management Plan.
- Develop and implement a Peshtigo River Fisheries Management Plan.
- Complete Master Planning process for Governor Tommy G. Thompson Centennial State Park. Implement master plan as resources become available.
- Increase emphasis on educational initiatives through routine activities and special projects, e.g. work with UW Extension, sportsmans groups, schools, the Citizens Natural Resource Academy, and other stakeholder groups.
- Continue to implement sound forestry practices on public and private lands to ensure a sustainable yield of forest products, a sound timber recovery, a variety of recreational opportunities, protection of waterways and optimum habitat for a variety of wildlife species.

Wolf River Basin

The water-rich Wolf Basin covers a large area, draining over 3600 square miles and portions of eleven counties in the northeast portion of the state. The basin is primarily located in the Northeast Hills and Northeast Plains Ecological Landscapes with small portions in the Central Sand Hills, Southeast Glacial Plains, and North Central Forest. The variable topography of the Northeast Hills are covered with extensive hardwood forests, while the Northeast Plains are characterized by gently rolling to flat topography with sandy soils and primarily oak and pine forests. Also present are hemlock, northern white cedar swamp, and hardwood conifer swamp. Numerous wetlands exist, particularly those associated with the Wolf River floodplain. Agricultural activities are more prevalent in the southern portion of the basin, while development along lakes and riverways is occurring throughout the basin.

Various stretches of the Wolf River, the basin's largest water resource, are considered outstanding or exceptional resource waters (ORW/ERW). This waterbody drains to the Winnebago Lake System and the rapidly growing Fox Valley area. Numerous lakes and impoundments, many of which are human-made from low-head dams on streams, serve as focal points for fishery and wildlife habitat as well as recreation.

Challenges

The scenic beauty of the Wolf Basin and its proximity to rapidly developing areas such as Green Bay and the Fox Valley make enhance its susceptibility to habitat loss and pollution from urban runoff. Likewise, the basin's agricultural sector results in runoff of excess nutrients and sediment. Additional challenges to ecosystem managers include the introduction of exotic species such as garlic mustard, purple loosestrife, gypsy moths, zebra mussels, and others that disrupt the delicate balance of both uplands and lowlands. Shawano Lake is an excellent example of an unbalanced ecosystem, with annual bird die-offs related to the presence of an exotic trematode or flatworm.

Priorities

The partnership team has identified four main priorities or issues of concern along with a series of recommendations:

- Water Pollution
- Loss of Shoreline Habitat
- Hunting, Fishing, Trapping and Recreational Uses
- Need for an Inventory of Basin Resources

The DNR Wolf Basin Team shares these concerns and has identified its own top priorities as well:

- Preservation and protection of wetlands
- Preventing the introduction and reducing the spread of invasive exotic species
- Pressures from development
- Land use and 'Smart Growth'



Modifications in farming practices can have a tremendous positive impact on the quality of surface water resources.