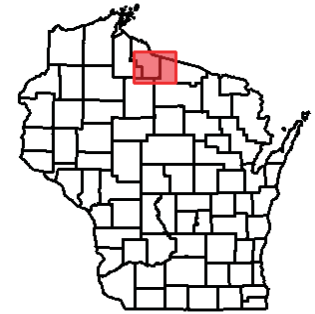
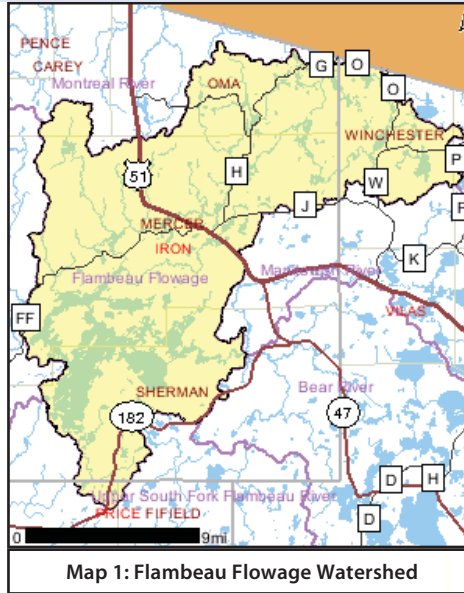


2014 Water Quality Management Plan Update

Upper Chippewa Basin, Wisconsin

May 2015

The Flambeau Flowage Watershed is located primarily in Iron County with smaller sections in northwest Vilas County and northern Price County. It has an area of 247 square miles. The Turtle-Flambeau Flowage is the largest waterbody at 12,942 acres. There are numerous other lakes. The Turtle River passes through many of the lakes and is the largest stream. The lower end of the Manitowish River is also present. The watershed is minimally developed, with 99% of its area consisting of forest, wetland, and open water.



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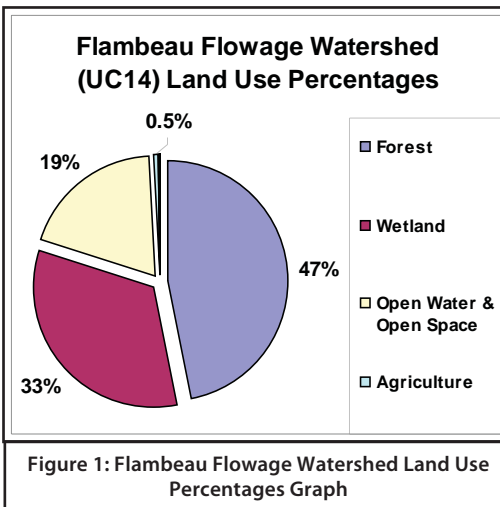
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Watershed Details

Population and Land Use

Table 1: Flambeau Flowage Watershed Land Use

Land Use	Acres	Percent of Area
Forest	74,158.45	46.88%
Wetland	52,456.72	33.16%
Open Water & Open Space	30,232.58	19.11%
Agriculture	788.61	0.50%
Grassland	265.09	0.17%
Suburban	252.42	0.16%
Urban	43.59	0.03%
Barren	0.00	0.00%
Total Acres in Watershed	158,197.46	



About half (47%) of the total area in the Flambeau flowage watershed is covered by forests, and another third is wetlands. The third most common land use is open water, which accounts for almost one-fifth of the total area. Agriculture only accounts for

one-half of a percent of the watershed's total area, and grasslands and suburban environments each cover less than one-fifth of one percent. Urban landscapes are scarcer still in the Flambeau Flowage Watershed, amounting to only three-hundredths of one percent of the total area.

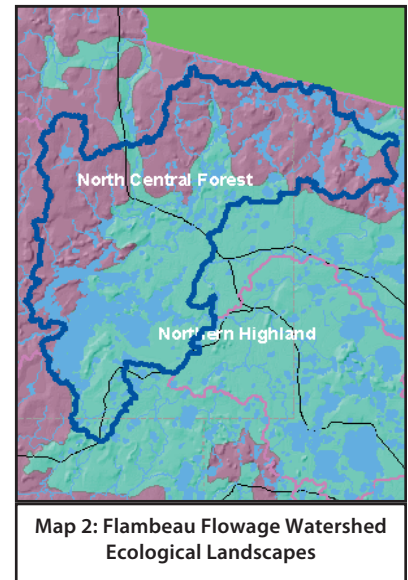
Hydrology

The dominate influences on the hydrology of the Flambeau Flowage Watershed are the ecological landscape and the numerous large dams within the watershed. The watershed is located in northern Wisconsin and sits within the Northern Highlands and North Central Forest ecological landscapes. Both landscapes are characterized by pitted glacial outwash plains of sandy soils with numerous kettle lakes and forested wetlands. The combination of the cool northern climate, sandy soils, and numerous lakes and wetlands have prevented the widespread development of agriculture within the watershed and consequently much of the land use remains forest, wetlands or lakes. The land use and soil types within the watershed creates ideal conditions for rain fall and snow melt to infiltrate into the alluvial aquifer that has formed within the glacial outwash. This shallow alluvial aquifer is confined by the underlying layer of impermeable Precambrian bedrock and consequently groundwater reaches the surface where the layer of glacial alluvium is thin or pitted; making the alluvial aquifer the primary source of water in many of the kettle lakes and wetlands in the watershed.

The rich forests of the watershed attracted the attention of the timber industry around the turn of twentieth century, but the slow flowing, intermittent streams that drained the lakes and wetlands within the region did not supply the hydropower necessary to operate mills or float logs downstream. To support the timber industry several large dams were built within the watershed to create the necessary hydraulic gradient to generate hydropower. The rise in water levels behind the dams transformed the numerous small lakes and adjacent wetlands into large lakes with regulated outflows. While the consequences of these dams on the hydrology and aquatic ecosystem of this watershed is difficult to quantify, they have altered the way water, nutrients, pollutants, and the biota move through the watershed.

Ecological Landscapes

The Flambeau Flowage Watershed is located in two ecological landscapes: the North Central Forest and the Northern Highland. The North Central Forest Ecological Landscape occupies much of the northern third of Wisconsin. Its landforms are characterized by end and ground moraines with some pitted outwash and bedrock controlled areas. Kettle depressions and steep ridges are found in the northern portion. Two prominent areas in this ecological landscape are the Penokee-Gogebic Iron Range in the north extending into Michigan and Timm's Hill, the highest point in Wisconsin (1,951 feet), in the south. Soils consist of sandy loam, sand, and silts. The vegetation is mainly forest, with many wetlands and some agriculture, though the growing season is not as favorable as it is in southern Wisconsin. Lake Superior greatly influences the northern portion of the ecological landscape, especially during the winter season, producing greater snowfall than in most areas in Wisconsin. The historic vegetation was primarily hemlock-hardwood forest dominated by hemlock, sugar maple, and yellow birch. There were some smaller areas of white and red pine forest scattered throughout the ecological landscape, and individual white pines trees were a component of the hemlock-hardwood forest. Harvesting hemlock to support the tanneries was common at the turn of the century, and the species soon became a minor component of forests due to over-harvesting and lack of regeneration. Currently, forests cover approximately 80% of this ecological landscape. The northern hardwood forest is dominant, made up of sugar maple, basswood, and red maple, and also including some scattered hemlock and white pine pockets within stands. The aspen-birch forest type group is also relatively abundant, followed by spruce-fir. A variety of wetland community types also are present, both forested and non-forested.



The Northern Highlands Ecological Landscape is located in northern central Wisconsin. It is known for its pitted outwash plains and kettle lakes mixed with extensive forests and large peatlands. Its landforms are characterized mainly

by pitted outwash but also contain some coarse-textured moraines. Soils are acidic and relatively unproductive due to low moisture-holding capacity and lack of organic matter. Historically, this was Wisconsin's greatest pinery. White and red pine forests largely dominated the vegetation, with some smaller pockets of jack pine. On the more mesic soils, hemlock-hardwood forests were common. Aspen-birch forests occurred in openings formed by disturbance events such as wind or fire. Current forest vegetation is primarily aspen, with some white, red, and jack pine in both natural and plantation form. Northern hardwood forests, though reduced in extent, still occur on the more mesic soils. Low-land conifer occupies the many peatlands that are scattered throughout the Northern Highlands Ecological Landscape.

Historical Note

The Flambeau Flowage Watershed includes the Turtle-Flambeau Flowage, which was created in 1926 when the Chippewa and Flambeau Improvement Company built a dam on the Flambeau River downstream from its confluence with the Turtle River. The dam flooded 16 natural lakes and formed an impoundment of approximately 14,000 acres. The flowage was constructed as a reservoir to augment river flows and sustain hydroelectric plants operated downstream by electric utilities and paper mills. The dam also provided flood protection and created a unique recreational resource.

Many early resorts located around the 16 lakes were flooded and forced to move; some chose higher ground, others left the area. As compensation for property lost when the flowage was built, property owners were offered money or adjacent land. Most chose a cash settlement and the shoreline today remains sparsely developed.

Over the years, these resorts have had many visitors, some of them notorious. John Dillinger frequented the area. Al Capone, the Chicago gangster, fished the flowage many times, especially in the years after his release from prison. Charlie Comiskey, founder of the White Sox baseball team, used Jerome's Hunting and Fishing Club on Trude Lake as a place for rest and relaxation for himself and his team.

In 1990, the Stewardship Fund allowed the state to acquire 22,343 acres from the Chippewa and Flambeau Improvement Company, including lands submerged by the flowage (about 95% of the shoreline and adjacent lands). With additional acquisitions, state ownership now comprises approximately 27,000 acres including over 300 miles of shoreline and 195 islands. The flowage is managed by the Department of Natural Resources using a master plan developed with citizen advice. Management practices aim to perpetuate the natural character of the shoreline, preserve its scenic qualities, and protect its plant and animal communities. The flowage has the highest number of bald eagle, osprey, and common loon breeding pairs in Wisconsin.

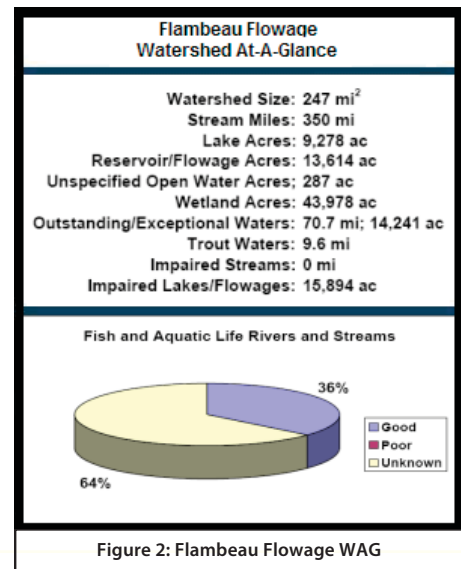
Watershed Condition

Overall Condition

Cathrine Lake, Cedar Lake, Hewitt Lake, Owl Lake, Trude Lake, and Turtle-Flambeau Flowage have been singled out as Outstanding Resource Waters. Segments of Manitowish River and Pardee Creek contribute another 21 miles of Exceptional Resource Waters. Many lakes within the watershed are impaired by high mercury levels, including: Birch Lake, Long Lake, North Bass Lake, Owl Lake, Rock Lake, North and South Turtle Lake, Trude Lake, and Turtle-Flambeau Flowage. The first three miles of Pardee Creek from its mouth is considered a Class I trout water. Drinkwine Creek and Dollar Creek contain another six and a half miles of Class III trout water near their mouths.

River and Stream Condition

According to the WDNR's Register of Waterbodies (ROW) database, there are over 349 miles of streams and rivers in the Flambeau Flowage Water-



shed; 191 miles of these waters have been entered into the WDNR's assessment database. Of these 191 miles, over one-third (36%) are meeting Fish and Aquatic Life uses and are specified as in "good" condition. The condition of the remaining stream miles is not known or documented.

Additional uses for which the waters are evaluated include Fish Consumption, General Uses, Public Health and Welfare, and Recreation. As Table 2 shows, these uses have not been directly assessed for the watershed. However, a general fish consumption advisory for potential presence of mercury is in place for all waters of the state.

Table 2: Designated Use Support Summary for Flambeau Flowage Watershed Rivers and Streams (all values in miles)

Use	Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption			191.21	191.21
Fish and Aquatic Life	69.53		121.68	191.21
General			191.21	191.21
Public Health and Welfare			191.21	191.21
Recreation			191.21	191.21

Bear River

The Bear River begins at the dam on the western tip of Flambeau Lake and flows northwest until it joins with the Manitowish to form the section of the Flambeau River that flows into the Turtle-Flambeau Flowage. Fisheries Management data indicates that the river is a warm water sports fishery, and recent monitoring by the Lac du Flambeau Band (1992) and USGS (1991) indicates no problems with water quality.

Dollar Creek & Drinkwine Creek

Both creeks, which are part of the Lake of the Falls system, are listed as Class III trout streams, but are not stocked. It is unknown if the streams contain trout now. Beaver dams are a problem for sustaining trout in these streams.

Flambeau River

The Flambeau River has about 18 river miles downstream of the Turtle-Flambeau Flowage, and four contiguous hydro-power projects are in operation. From upstream to downstream the projects are Upper Hydro, Lower Hydro, Pixley Hydro, and Crowley Hydro. All four projects may undergo relicensing in 1996 by the Federal Energy Regulatory Commission. The four flowages formed by the dams are operated as "run-of-river," which means they are maintained within a narrow range and water is discharged at the same rate as it enters the impoundment. Below the Crowley Flowage, the river is a popular canoe route. In the Flambeau River State Forest, the Flambeau River shoreline is protected by a one-quarter mile buffer strip along both sides of the river. Sulfite storage lagoons exist along the shoreline of the Flambeau River just upstream of Park Falls (upstream of Pixley Flowage). Beneath the lagoons contaminated groundwater discharges to the river. This contaminant discharge has resulted in water quality impairments, habitat damage, destruction of shoreline vegetation, odors, and degraded aesthetic values (Larson, Nancy and Lisa Kosmond (Helmuth). 1996. Upper Chippewa River Basin Water Quality Management Plan. PUBL-WR-345-96-REV. Wisconsin Department of Natural Resources, Madison, WI).

Little Turtle River

The Little Turtle River flows out of the Grand Portage, Martha, and Mercer lakes system and into the Turtle-Flambeau Flowage. The Mercer Wastewater Treatment Plant discharges to the Little Turtle at the outlet of Mercer Lake. Dye studies have shown that effluent flows back into Mercer Lake (WRM). Abundant algal growth occurs in the lake near the discharge. Floating clumps of algae at nuisance levels are common throughout the lake during summer months. In addition to nutrient inputs from the treatment plant, failing septic systems and lawn fertilizers could also be contributing nutrients to the system. The Little Turtle River supports a warm water sport fish community and experiences runs of northern pike. It may have had sturgeon runs before the dam forming the Little Turtle Flowage was built

Long Lake Creek

Long Lake Creek has the potential to support warm water sport fish, but the normal migration is blocked by beaver dams.

Manitowish River

The Manitowish River supports a warm water sport fishery. It was approved by the Natural Resources Board in January 1993 to be classified as Exceptional Resource Water under NR 102. Index of Biotic Integrity sampling conducted in 1991 indicated excellent water quality. Two threatened species of fish were recorded during the survey. These observations included both adult and young-of-year pugnose shiner and greater redhorse. The lake sturgeon population in the river is badly depleted. A real danger exists of losing this valuable fishery if steps are not taken to identify the causes of declining reproduction and recruitment. There is speculation that rusty crayfish may be having an impact on egg survival, but we have no documentation for this. An area along the Manitowish River near Benson Lake is known to be experiencing erosion. A Sturgeon Project Area has been established between Rest Lake Dam and Benson Lake, and a study has been proposed to assess habitat, environmental conditions, and to collect data on sturgeon and other fish species. The study's objective is to gather the necessary data to develop a plan to rehabilitate the sturgeon population. This project also has implications to the treaty fishery, and for Federal Energy Regulatory Commission (FERC) re-licensing relative to operation of the Rest Lake Dam.

Virgin Creek

There is a small walleye run out of Long Lake into Virgin Creek.

Lake Health

The WDNR's ROW database shows that there are over 9,277 acres of lakes and ponds in the Flambeau Flowage Watershed. There are also over 13,613 acres of reservoirs and flowages (12,942 acres from the Turtle Flambeau Flowage alone) and another 287 acres of unspecified open water in the watershed. A total of 10,259 lake acres has been entered into the state's assessment database. Of these 10,259 acres, about 85% are indicated as supporting Fish and Aquatic Life uses. The remaining lake acres within the watershed have not been assessed for Fish and Aquatic Life use support. A couple hundred lake acres within the Flambeau Flowage Watershed have also been assessed and found to support their Recreation use designations. However, over eighteen hundred acres in the watershed are indicating as not supporting Fish Consumption uses. A total of 12,943 acres of impoundments has also been entered into the assessment database and 100% are indicated as supporting Fish and Aquatic Life uses. No impoundments have been assessed for any other use category, though.

Table 3: Designated Use Support Summary for Flambeau Flowage Watershed Lakes (all values in acres)

Use	Supporting	Fully Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption			1,812	8,446.85	10,258.85
Fish and Aquatic Life	6,533.62	2,181		1,544.23	10,258.85
General				10,258.85	10,258.85
Public Health and Welfare				10,258.85	10,258.85
Recreation	206			10,052.85	10,258.85

The Flambeau Flowage Watershed is rich with lake resources. The following lakes are all over one hundred acres in size (in order of descending surface area): Trude Lake, Birch Lake, South Turtle Lake, Fisher Lake, Long Lake, North Turtle Lake, Spider Lake, Lake of the Falls, Moose Lake, No Mans Lake, Pike Lake, Pardee Lake, Echo Lake, North Bass Lake, Cedar Lake, Mercer Lake, Boot Lake, Wilson Lake, Rainbow Lake, Grand Portage Lake, Martha Lake, Catherine Lake, Owl Lake, and Rice Lake.

Wetland Health

Wetland Status:

The Flambeau Flowage Watershed is located primarily in Iron County, but includes part of the northwest corner of Vilas County and edges south to Price County. An estimated quarter (25%) of the current land use in the watershed is wetlands. Currently, about 93% of the original wetlands in the watershed are estimated to exist. Of these wetlands, the majority include forested wetlands (71%), scrub (25%), and emergent wetlands (3%), which include marshes and wet

meadows (See Figures 3 & 4).

Wetland Condition:

Little is known about the condition of the remaining wetlands but estimates of reed canary grass infestations, an opportunistic aquatic invasive wetland plant, into different wetland types has been estimated based on satellite imagery. This information shows that reed canary grass dominates less than one tenth of a percent of the remaining wetlands. Reed canary grass domination inhibits successful establishment of native wetland species.

Wetland Restorability:

Of the 2,885 acres of estimated lost wetlands in the watershed, only approximately 13% are considered potentially restorable based on modeled data, including soil types, land use, and land cover (Chris Smith, DNR, 2009).



Forested Wetlands (Photo Courtesy of WDNR)

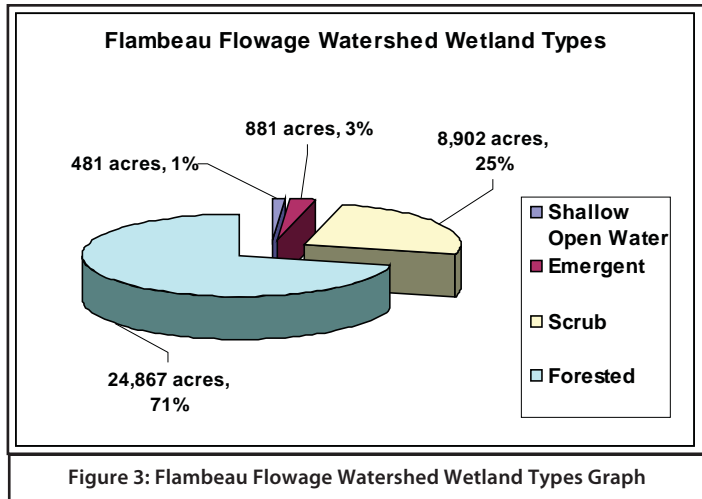


Figure 3: Flambeau Flowage Watershed Wetland Types Graph

Groundwater

The following groundwater information is for Iron County (from Protecting Wisconsin’s Groundwater through Comprehensive Planning website, <http://wi.water.usgs.gov/gwcomp/>), which roughly approximates to the Flambeau Flowage Watershed.

Mercer is the only municipal water system in the Flambeau Flowage Watershed to implement a wellhead protection plan. No animal waste management ordinances have been developed for the three counties into which the Flambeau Flowage Watershed extends: Iron, Vilas, and Price counties.

From 1979 to 2005, total water use in Iron County has increased from about 400,000 gallons per day to about 970,000 gallons per day. The increase in total water use over this period is due primarily to increases in irrigation and public use and losses. The proportion of county water use supplied by groundwater has been consistently 100% for the period 1979 to 2000, and decreased sharply to 56% in 2005 due to a spike in irrigation use, which relied primarily on surface water sources, after 2000.

Private Wells

All 67 private well samples collected in Iron County from 1990 through 2006 met the health-based drinking water limit for nitrate-nitrogen. Land use affects nitrate concentrations in groundwater. An analysis of over 35,000 Wisconsin drinking water samples found that drinking water from private wells was three times more likely to be unsafe to drink due to high nitrate in agricultural areas than in forested areas. High nitrate levels were also more common in sandy areas where the soil is more permeable. In Wisconsin’s groundwater, 80% of nitrate inputs originate from manure spreading, agricultural fertilizers, and legume cropping systems.

A 2002 study estimated that 18% of private drinking water wells in the region of Wisconsin that includes Iron County

contained a detectable level of an herbicide or herbicide metabolite. Pesticides occur in groundwater more commonly in agricultural regions, but can occur anywhere pesticides are stored or applied. There are no atrazine prohibition areas in the Flambeau Flowage Watershed. The one private well sample collected in Iron County for arsenic met the health standard.

Potential Sources of Contamination

There are no concentrated animal feeding operations (CAFOs) in the Flambeau Flowage Watershed; nor are there any licensed landfills or Superfund sites within the watershed.

WDNR’s Remediation and Redevelopment (RR) Program oversees the investigation and cleanup of environmental contamination and the redevelopment of contaminated properties. The RR Program provides information about contaminated properties and other activities related to the investigation and cleanup of contaminated soil or groundwater in Wisconsin through its Bureau for Remediation and Redevelopment Tracking System (BRRTS) database (WDNR 2010e).

The database shows that there are six sites in the Flambeau Flowage Watershed that are specified as “open”, meaning “contamination has affected soil, groundwater, or more and the environmental investigation and cleanup need to begin or are underway.” These sites include four Leaking Underground Storage Tank (LUST) sites and two Environmental Repair (ERP) sites. A summary of these sites is included in the table below.

Table 4: Open-status Bureau for Remediation and Redevelopment Tracking System (BRRTS) sites in the Flambeau Flowage Watershed

WDNR BRRTS #	Site Name, Location	Start Date	Activity Type	Remediation Activities	Waste Activities	Substance
326556303	Mercer Town Parking Garage (Former), Manitowish Waters	11/05/2010	LUST	1	0	Gasoline (Petroleum)
226549354	Mercer - PCE Detected, Manitowish Waters	03/14/2007	ERP	1	0	Perchloroethylene (VOC)
326241594	Draeger Amoco/Mercer 76, Manitowish Waters	08/25/1999	LUST	1	0	Petroleum - Unknown Type (Transferred to Commerce)
226000059	Mercer Landfill #3030, Mercer	08/10/1993	ERP	1	0	Unspecified (Transferred to Solid Waste Program)
364000703	Private Property, Winchester	12/17/1991	LUST	1	0	Unspecified
326000180	Frontier Inn, Sherman	05/07/1990	LUST	1	0	Gasoline (Petroleum) (Transferred to Commerce)

The Petroleum Environmental Cleanup Fund Award (PECFA) program was created in response to enactment of federal regulations requiring release prevention from underground storage tanks and cleanup of existing contamination from those tanks. PECFA is a reimbursement program returning a portion of incurred remedial cleanup costs to owners of eligible petroleum product systems, including home heating oil systems. As of May 31, 2007, \$4,997,735 has been reimbursed by the PECFA fund to clean up 38 petroleum-contaminated sites in Iron County. This equates to \$769 per county resident, which is greater than the statewide average of \$264 per resident.

Point and Nonpoint Pollution

Lakes and streams in the Flambeau Flowage Watershed have not been ranked for nonpoint source pollution (NPS). Groundwater in the watershed has been ranked as low for NPS, which the watershed as a whole ranks as well.

Waters of Note

Trout Waters

Class I trout streams are high quality trout waters that have sufficient natural reproduction to sustain populations of wild trout, at or near carry capacity. Consequently, streams in this category require no stocking of hatchery trout. These streams or stream sections are often small and may contain small or slow-growing trout, especially in the headwaters. Class II trout streams may have some natural reproduction, but not enough to utilize available food and space. Therefore, stocking is required to maintain a desirable sport fishery. These streams have good survival and carryover of adult trout, often producing some fish larger than average size. Class III trout waters are marginal trout habitat with no natural reproduction occurring. They require annual stocking of trout to provide trout fishing. Generally, there is no carryover of trout from one year to the next (<http://dnr.wi.gov/fish/species/trout/streamclassification.html>).

The first three miles of Pardee Creek from its mouth is considered a Class I trout water. Drinkwine Creek and Dollar Creek contain another six and a half miles of Class III trout water near their mouths.

Table 5: Flambeau Flowage Watershed Trout Waters

WADRS ID	Official Waterbody Name	WBIC	Start Mile	End Mile	Trout Class	Trout ID	Counties	Watersheds
14994	Pardee Creek	2307400	0	3.11	CLASS I	1253	Iron	UC14
14970	Dollar Creek	2299500	0	4.73	CLASS III	3210	Iron	UC14
14965	Drinkwine Creek	2298700	0	1.77	CLASS III	3209	Iron	UC14

Outstanding and Exceptional Resource Waters

Wisconsin has designated many of the state's highest quality waters as Outstanding Resource Waters (ORWs) or Exceptional Resource Waters (ERWs). Waters designated as ORW or ERW are surface waters which provide outstanding recreational opportunities, support valuable fisheries and wildlife habitat, have good water quality, and are not significantly impacted by human activities. ORW and ERW status identifies waters that the State of Wisconsin has determined warrant additional protection from the effects of pollution. These designations are intended to meet federal Clean Water Act obligations requiring Wisconsin to adopt an "antidegradation" policy that is designed to prevent any lowering of water quality, especially in those waters having significant ecological or cultural value.

Outstanding Resource Waters (ORWs) typically do not have any point sources discharging pollutants directly to the water (for instance, no industrial sources or municipal sewage treatment plants), though they may receive runoff from nonpoint sources. New discharges may be permitted only if their effluent quality is equal to or better than the background water quality of that waterway at all times. No increases of pollutant levels are allowed. If a waterbody has existing point sources at the time of designation, it is more likely to be designated as an Exceptional Resource Water (ERW). Like ORWs, dischargers to ERW waters are required to maintain background water quality levels; however, exceptions can be made for certain situations when an increase of pollutant loading to an ERW is warranted because human health would otherwise be compromised (<http://dnr.wi.gov/org/water/wm/wqs/orwerw/>).

Cathrine Lake, Cedar Lake, Hewitt Lake, Owl Lake, Trude Lake, and Turtle-Flambeau Flowage have been singled out as Outstanding Resource Waters. Segments of Manitowish River and Pardee Creek contribute another 21 miles of Exceptional Resource Waters.

Table 6: Flambeau Flowage Watershed Outstanding and Exceptional Resource Waters

WADRS ID	Official Waterbody Name	WBIC	ORW/ERW	ORW/ERW ID	Start Mile	End Mile	Code Reference	Counties	Watersheds
15003	Catherine Lake	2309100	ORW	622	null	null	102.10(1m)9	Iron	UC14
15007	Cedar Lake	2309700	ORW	623	null	null	102.10(1m)9	Iron	UC14
15033	Hewitt Lake	2763300	ORW	848	null	null	102.10(1m)9	Iron	UC14
14996	Owl Lake	2307600	ORW	621	null	null	102.10(1m)9	Iron	UC14
14946	Trude Lake	2295200	ORW	619	null	null	102.10(1m)9	Iron	UC14
14944	Turtle-Flambeau Flowage	2294900	ORW	618	null	null	102.10(1m)9	Iron	UC13, UC14
1492110	Flambeau River	2225000	ORW	2642	71.84	121.84	102.10(1)(f)8	Ashland, Iron, Price, Sawyer	UC11, UC13, UC14
15152	Manitowish River	2324400	ERW	624	0	17.56	102.11(1)(d)15, 102.11(1)(d)38	Iron, Vilas	UC14, UC16
14994	Pardee Creek	2307400	ERW	620	0	3.11	102.11(1)(a)	Iron	UC14

Impaired Waters

Many lakes within the watershed are impaired by high mercury levels, including: Birch Lake, Long Lake, North Bass Lake, Owl Lake, Rock Lake, North and South Turtle Lake, Trude Lake, and Turtle-Flambeau Flowage.

Table 7: Flambeau Flowage Watershed Impaired Waters

Waterbody Name	WBIC	County	Pollutant	Impairment	303 Status	Priority
Bass Lake, North	1868900	Iron	Mercury	Contaminated Fish Tissue	303(d) Listed	Low
Birch Lake	2311100	Vilas	Mercury	Contaminated Fish Tissue	303(d) Listed	Low
Long Lake	2303500	Iron	Mercury	Contaminated Fish Tissue	303(d) Listed	Low
Owl Lake	2307600	Iron	Mercury	Contaminated Fish Tissue	303(d) Listed	Low
Rock Lake	2311700	Vilas	Mercury	Contaminated Fish Tissue	303(d) Listed	Low
Trude Lake	2295200	Iron	Mercury	Contaminated Fish Tissue	303(d) Listed	Low
Turtle Lake, North	2310400	Vilas	Mercury	Contaminated Fish Tissue	303(d) Listed	Low
Turtle Lake, South	2310200	Vilas	Mercury	Contaminated Fish Tissue	303(d) Listed	Low
Turtle-Flambeau Flowage	2294900	Iron	Mercury	Contaminated Fish Tissue	303(d) Listed	Low

Fish Consumption

Wisconsin’s fish consumption advisory is based on the work of public health, water quality, and fisheries experts from

eight Great Lakes states. Based on the best available scientific evidence, these scientists determined how much fish is safe to eat over a lifetime based on the amount of contaminants found in the fish and how those contaminants affect human health. Advisories are based on concentrations of the following contaminants along with angler habits, fishing regulations, and other factors.

The following waterbodies have had a specific fish consumption advisory in effect for mercury since December of 2009: North Bass Lake, Owl Lake, Trude Lake, Turtle Flambeau Flowage, and Spider Lake

Mercury affects the human nervous system. Mercury can damage developing brains of children and may affect a child’s behavior and ability to learn. While mercury can be eliminated from the body, frequent ingestion of fish with high levels of mercury results in bioaccumulation (Lowndes & Helmuth, Proposed Guidance for the Classification, Assessment, & Management of Wisconsin Surface Waters. March 12, 2007).

Aquatic Invasive Species

Banded mystery snails are present in Echo Lake, Grand Portage Lake, Onland Lake, and Mercer Lake. Chinese mystery snails are present in Fisher Lake, Manitowish River, Spider Lake, and Weber Lake. Curly-leaf pondweed is found in Wilson Lake. Eurasian water-milfoil are present in Long Lake and Long Lake Creek. Furthermore, rusty crayfish have been found in Birch Lake, Manitowish River, Turtle Lake, North, Turtle Lake, South, and Cedar Lake.

Species of Special Concern

The following table contains federally-listed Threatened, Endangered, Proposed, and Candidate species found in Iron, Vilas, and Price counties, in which the Flambeau Flowage Watershed is located. A full list of special concern plants and animals for this watershed can be found on the state’s Natural Heritage Inventory (NHI).

Species	Status	Habitat	Taxa
Canada lynx (<i>Lynx canadensis</i>)	Threatened	While no resident populations are known from Wisconsin, the species occasionally occurs in northern forested areas, and counties listed are those with the highest likelihood of occurrence.	Mammal
Gray wolf (<i>Canis lupus</i>)	Endangered	Northern forested areas	Mammal
Kirtland’s warbler (<i>Dendroica kirtlandii</i>)	Endangered	Young jack pine stands (5 to 25 years old). Confirmed breeding in Adams county, potential breeding in the other counties.	Bird

State Natural and Wildlife Areas

Catherine Lake Hemlock-Hardwoods

Catherine Lake Hemlock-Hardwoods features an extensive stand of mature, mesic forest on rolling moraine located on the east side of Catherine Lake. Although the forest varies in quality and composition, the eastern half contains a relict old-growth stand dominated by large hemlock, yellow birch, and sugar maple, with the largest trees averaging near 50 inches in diameter. Super-canopy white pines occur near the lake. With some trees estimated at over 250 years in age, it is likely that the least disturbed areas of the State Natural Area were never clear-cut during the cut-over era. These areas contain old-growth characteristics including snags, tip-up mounds, coarse woody debris, and a multi-layered canopy. The groundlayer is diverse and includes species such as red baneberry, maidenhair fern, wild sarsaparilla, American starflower, Canada mayflower, early coral-root, sharp-lobed hepatica, lycopods, naked miterwort, large-leaved shinleaf, and twisted stalk. Wetter areas contain an understory that includes bog rosemary, grass pink, wild calla, pitcher plant, round-leaf sundew, mountain wood-sorrel, bunchberry, three-leaved goldthread, and yellow blue-bead lily. Scattered ephemeral ponds offer good habitat for amphibians. Associated with the extensive uplands forests are five small undeveloped lakes and a complex of wetland communities, including open bog, black spruce swamp, emergent marsh, sedge meadow, and alder thicket. The site supports numerous rare plants and animals, including black-throated blue

warbler, Cape May warbler, gray jay, giant rattlesnake plantain, and northern black currant. Catherine Lake Hemlock-Hardwoods is owned by the DNR and was designated a State Natural Area in 2007.

DuPage Lake Peatlands

DuPage Lake Peatlands features a vast peatland complex just north of the Manitowish River. Open bog, muskeg, and black spruce swamp are the predominant vegetation, although scattered patches of old-growth hemlock and islands of old-growth pine also occur. In all, the site supports eight undeveloped lakes including DuPage Lake, a deep 32-acre lake with very soft water. East of the lake are several stands of old-growth hemlock hardwood forest, which are especially noteworthy as they contain super-canopy white and red pine. The boggy wetlands have a deep carpet of sphagnum mosses and support ericaceous shrubs including cranberry, bog laurel, leatherleaf, sedges, and insectivorous plants. Stunted black spruce and tamarack are scattered throughout the wetland and in some places form a closed canopy bog forest. Of note are rare plants, including swamp pink (*Arethusa bulbosa*), large round-leaf orchid (*Platanthera orbiculata*), marsh willow-herb (*Epilobium palustre*), and the state-threatened algal pondweed (*Potamogeton confervoides*). The undeveloped lakes and large nesting trees are also important habitat for osprey. Other birds included common loon, sharp-shinned hawk, and broad-winged hawk. DuPage Lake Peatlands is owned by the DNR and was designated a State Natural Area in 2007.

Hay Creek-Hoffman Lake Wildlife Area

Hay Creek-Hoffman Lake Wildlife Area is a 13,800-acre property located eight miles northeast of Park Falls in Ashland and Iron Counties, which includes Lake Nine and the western shore of the Turtle-Flambeau Flowage. The property is heavily timbered with aspen, northern hardwoods, lowland conifer. This project was initiated as part of the “deer yard” acquisition program. In 1946, a large block of land was purchased from the Wisconsin Realty Corporation. The majority of the remaining purchases occurred since the early 1960’s. Present ownership is nearly 14,000 acres, with an overall project goal of 16,317 acres. Today, this property is primarily managed for whitetail deer, ruffed grouse, woodcock, and bears. Commercial timber harvest is the main habitat management tool and follows a harvest prescription designed to meet project goals while being silviculturally sound. This area also has a vast network of gated hunter walking trails and wildlife openings. In addition to hunting and trapping activities, great berry picking, off-trail snowshoeing, birding, and wildlife watching opportunities exist.

Lake Evelyn

Lake Evelyn is an undeveloped 55-acre soft-water seepage lake surrounded by wetlands and gently rolling uplands. While many northern Wisconsin lakes of this size are already developed or are planning development, Lake Evelyn is a rare and undeveloped wilderness lake. Of all lakes over 50 acres in Wisconsin, only 70 remain that have the majority of their shoreline in public ownership. With a maximum depth of nine feet, Lake Evelyn is a stained water lake with moderate clarity and contains a good quality fishery composed mainly of largemouth bass and panfish. The lake forms the headwaters of Evelyn Creek, a tributary to the Turtle River. The topography is level to rolling and vegetation is a mix of large white and red pine, with smaller pole-sized aspen on the uplands. The surrounding wetlands are composed of an open floating leather-leaf bog and a conifer swamp with scattered black spruce to the southwest. An active osprey (*Pandion haliaetus*) nest highlights the wildlife community and wolf usage is known to be very active in the general area. Lake Evelyn is owned by the DNR and was designated a State Natural Area in 1997.

Mary Lake

The three-acre Mary Lake is one of very few known meromictic lakes in Wisconsin. Meromixis, the permanent thermal stratification of the water, results from the lake having an extremely small surface area in comparison to its depth. Mary Lake has a small three-acre surface area but is disproportionately very deep, 67 feet. Due to the extreme relative depth in relation to surface area, watershed soils, and its protection from surrounding uplands, Mary Lake never “turns over” and circulates as the water temperature changes in the spring and fall as is typical of most other Wisconsin lakes. Instead, the lake stays stratified creating unusual chemical and biological layers. Internationally known to limnologists, extensive research has been conducted on the physical, biological, and chemical properties of the lake since the 1920’s. Mary Lake is second in a chain of five interconnected lakes and is primarily fed by land runoff and inflow from a small stream that connects Mary Lake to nearby Lake Rose. Mary Lake is nestled in a small basin and surrounded by dense forest, which helps shelter the lake from wind action. The surrounding forest is primarily second-growth northern hard-

wood forest, swamp hardwoods, and swamp conifers. Dominant species include white cedar, spruce, white pine, and balsam fir. Mary Lake is owned by the DNR and was designated a State Natural Area in 1999.

Moose Lake

Moose Lake is an exceptional example of a large, undeveloped lake in a wilderness setting. The 270-acre soft water drainage lake has a maximum depth of 12 feet and harbors a diversity of emergent and submergent aquatic plants. It drains into 13-acre Little Moose Lake. The fishery contains mostly northern lake fishes, including a reproducing population of muskellunge. While a diversity of wetland communities surround the lake, most of the shoreline is covered by a dense thicket of alder and sweet gale; the remainder is predominantly lowland conifer and hardwoods dominated by black spruce, white cedar, and black ash. The upland forest surrounding the lake has pockets of higher rocky terrain dominated by sugar maple, basswood, paper birch, and balsam fir. Sedge hummocks and alder mark the two small inlet streams and the site also harbors pockets of old-growth hemlock, especially to the south. The high canopy, mature timber, and numerous decomposing logs on the forest floor give this site a magnificent virgin appearance. Dominant trees are hemlock and yellow birch, some more than two feet in diameter at breast height. White spruce, white cedar, balsam fir, sugar maple, and red maple are found occasionally, and the groundlayer species composition is representative of northern boreal forest. Some dead standing hemlock and yellow birch accentuate the unmanaged appearance. Hemlock is reproducing as evidenced by seedlings and saplings. Large numbers of wildlife, including black bear, hooded merganser, and blue-winged teal, use the area. Breeding birds include bald eagle (*Haliaeetus leucocephalus*), northern goshawk (*Accipiter gentilis*), and common loon (*Gavia immer*). Moose Lake is owned by the DNR and was designated a State Natural Area in 1992.

Turtle-Flambeau Patterned Bog

The Turtle-Flambeau Patterned Bog features an extensive and diverse landscape containing numerous vegetation communities, including patterned bog, northern wet, mesic, and dry-mesic forest, and emergent aquatics. Created in 1926 by flooding lowland wetlands, the Turtle-Flambeau Flowage is located at the top of the Chippewa River watershed at the junction of the Turtle and Manitowish Rivers. The patterned bog community is quite complex and includes water tracks, sphagnum lawns, and discrete areas of large trees. Very rare in Wisconsin, this wetland type can be characterized as an herb- and shrub-dominated minerotrophic peatland with alternating moss and sedge-dominated peat ridges (strings) with saturated and inundated hollows (flarks). They are oriented parallel to the contours of a slope and perpendicular to the flow of groundwater. The peat "landforms" differ significantly in nutrient availability and pH within a patterned peatland, leading to a diverse flora that often includes numerous bog and fen species. The northern mesic forest is dominated by hemlock and large white pine, while the northern dry-mesic forest contains hemlock and hardwoods with remnant white pine stands. Both areas are important habitat for bald eagles and osprey. In fact, the flowage contains the largest concentration of eagles (*Haliaeetus leucocephalus*) and osprey (*Pandion haliaetus*) breeding pairs in Wisconsin. Other rare species include common loons (*Gavia immer*), merlin (*Falco columbarius*), black tern (*Chiladonias niger*), dragon's mouth orchid (*Arethusa bulbosa*), sparse-flowered sedge (*Carex pauciflora*), and white bog orchid (*Platanthera dilatata*). Turtle-Flambeau Patterned Bog is owned by the DNR and was designated a State Natural Area in 1996.

Watershed Actions

Grants and Projects

Lake Protection Grants - Mercer Lake Water Quality, Hydrology, and Watershed Study 09/01/2007 - Active

- The Mercer Lake Association in cooperation with the Town of Mercer and the US Geological Service (USGS) will conduct a lake/watershed evaluation and develop a final lake/watershed management plan. Project goals include: 1) Develop a water & phosphorus (including internal sediment loading) budget for Mercer Lake, including a model to simulate phosphorus loading changes & predict water quality improvements. 2) Work with Mercer Lake Association to analyze & interpret USGS report. 3) Determine amount of suspended solids & phosphorus entering the lake from the downtown commercial area in the Town of Mercer. 4) Analyze alternatives to treat stormwater runoff from urban area. 5) Develop subwatershed action management plan for watershed planning area. 6) Update Preliminary Lake Watershed Management Plan with USGS data; revise the Plan for Mercer Lake. 7) Present project updates at Association, Town & County meetings; invite interested parties. 8) Develop future courses of action to improve water quality

in Mercer Lake. Project deliverables include: * Precipitation data, stream stage & flow data presented “real-time” on USGS internet site. * Archive data in USGS computer database. * Publish data annually in USGS, Wisconsin data reports. * Hard copy & electronic map of Mercer Lake’s watershed and land cover by USGS. * USGS present interpretive information to the Lake Association at the annual 2011 meeting. * Technical report in the “Scientific Investigations Report” series prepared by USGS at the end of the project. * A subwatershed action plan identifying and prioritizing recommended actions and associated costs. * A Final Comprehensive Management Plan. Specific conditions: * Forward lake/watershed plan to WDNR for review and approval before adoption of the plan. * The WDNR will be provided electronic and hard copies of all data and or reports/plans generated as a result of this project.

Aquatic Invasive Species Grants - Long Lake Eurasian Water-milfoil (EWM) Control Project 04/02/2007 – Complete

- Long Lake Improvement Association sponsored an Aquatic Invasive Species Rapid Response grant that was completed by December 31, 2007. The project focused on chemically treating 0.25 acres of EWM in Long Lake. Project activities included: 1) Evaluation of last fall’s EWM chemical treatment; 2) Identification of areas with EWM and hand pulling or chemically treating any EWM found; and 3) Post-treatment survey mid-to-late summer followed by spot treatments or hand pulling of any EWM identified. Project deliverables included: 1) Final report describing the findings of the pre- and post-treatment surveys, GPS locations, and guidance for continued control actions. Specific conditions for this project: Final report needed Department review and approval. WDNR Lakes Management Coordinator was provided with an electronic (PDF or Word) and hard copy of final report.

Lake Planning Grants - Acquisition of Dissolved Oxygen Meter 10/01/2006 - Complete

- Trude Lake Property Owner’s Association sponsored a small scale lake planning grant to study Turtle-Flambeau Flowage and Trude Lake in Iron County with a study completion date of December 31, 2007. The project focused on purchasing a dissolved oxygen (DO) meter for Citizen Lake Monitoring Network (CLMN) sampling. Project activities included: 1) Purchase of YSI 550A-100 DO Meter, membrane kit and carrying case; 2) Performing DO/Temperature profiles as part of CLMN sampling; 3) Submittal of DO/Temperature profile data to WDNR; and 4) Presenting sampling results in newsletter. Project deliverables included: 1) YSI 550A-100 meter; 2) DO/Temperature profiles; and 3) Newsletter article/grant final report. WDNR Lakes Management Coordinator was provided with an electronic (PDF or word) and hard copy of newsletter article/grant final report.

Lake Planning Grants - Shoreland Property Owners Education Packet 10/01/2005 - Complete

- Vilas County Lakes Association (VCLA) sponsored a project which provided education through partnerships with the general public and lake associations by producing another 750 “Shoreline Property Owners Education Packets”, similar to those produced during 2005. The packets: 1) Welcomed new property owners to their Vilas County lake; 2) Educated new owners about lake and shoreland stewardship (the project’s main goal); 3) Strengthened lake associations, by providing accurate and important information that they can use to further lake protection goals; and 4) introduced shoreland owners to WI DNR, Vilas County, UW-Extension, and WI Association of Lakes and the resources they provide for shoreland property owners. The packets were available at the VCLA Annual meeting, Lake Fairs and Lake Association Meetings where VCLA had an educational booth, Vilas County realtors, and the Vilas County Courthouse at the Land and Water Conservation Office. Activities included: 1) VCLA researched and assembled the best available literature on lake and shoreline property management. 2) VCLA printed and/or gathered the literature and assembled the shoreland packets. 3) A newsletter announcement and e-mail alerted the partners that they were available. 4) Annual meeting announcement and distribution. 5) Distribution at Lake Associations and Lake Fairs - June-September 2006. 6) Distribution at Vilas County Land and Water Conservation Department - October-December 2006. Project deliverables included: 750 Shoreland Property Owners Education Packets. The WI Department of Natural Resources was provided a written and electronic report of activities completed through this project.

Lake Planning Grants - Mercer Lake Planning Grant Phase 1 10/01/2005 - Complete

- Mercer Lake Association conducted a lake/watershed evaluation and developed a lake/watershed management plan. The project included: 1) Meetings with Mercer Lake Association, Town of Mercer, and WI DNR; 2) Background data collection of Mercer Lake; 3) Field reconnaissance; 4) Definition of watershed and subwatershed drainage areas; 5) Categorization of present and future land use of lake/watershed area; 6) Identification of existing soil condition, wetlands, and surface waters; 7) Characterization of quality of existing lake/watershed discharges; 8) Conduct-

ing numerical analysis of water quantity and water quality; 9) Development of water quality analysis; 10) Detailed analysis of current lake monitoring activities; 11) Conducting a community-wide sociological survey; 12) Evaluation of watershed best management practices (BMPs); 13) Development of a Mercer Lake/Watershed Management Plan with implementation strategies. Project deliverables included: 1) Detailed analysis of water quality sampling results and Mercer Lake's TSI; 2) Summary of educational activities and public presentations throughout project; and 3) Results and interpretation of community-wide sociological survey. Mercer Lake/Watershed Management Plan was developed with detailed sections of watershed BMPs, ordinances, information and education, and easements. Specific conditions for this project: Project design plans, sociological survey questions, and Mercer Lake Management Plan was reviewed and received approval from the Lakes Coordinator before project began and adoption of final management recommendations. Applicant was required to provide a mid-term project update. Wisconsin Department of Natural Resources Lakes Coordinator was provided with electronic (PDF) and hard copies (2) of Mercer Lake Management Plan, blank data form used for sociological survey, and all raw data in electronic format. Project results were disseminated to the public via presentations to Mercer Lake Association and Town of Mercer.

Lake Planning Grants - Mercer Lake Planning Grant Phase II 10/01/2005 - Complete

- Mercer Lake Association conducted a lake/watershed evaluation and developed a lake/watershed management plan. The project included: 1) Meetings with Mercer Lake Association, Town of Mercer, and WI DNR; 2) Background data collection of Mercer Lake; 3) Field reconnaissance; 4) Definition of watershed and subwatershed drainage areas; 5) Categorization of present and future land use of lake/watershed area; 6) Identification of existing soil condition, wetlands, and surface waters; 7) Characterization of quality of existing lake/watershed discharges; 8) Conducting numerical analysis of water quantity and water quality, 9) Development of water quality analysis; 10) Detailed analysis of current lake monitoring activities; 11) Conducting a community wide sociological survey; 12) Evaluation of watershed best management practices (BMPs); and 14) Development of a Mercer Lake/Watershed Management Plan with implementation strategies. Project deliverables included: 1) Detailed analysis of water quality sampling results and Mercer Lake's TSI; 2) Summary of educational activities and public presentations throughout project; and 3) Results and interpretation of community wide sociological survey. Mercer Lake/Watershed Management Plan was developed with detailed sections of watershed BMPs, ordinances, information and education, and easements. Specific conditions for this project: 1) Project design plans, sociological survey questions, and Mercer Lake Management Plan was reviewed and received approval from the Lakes Coordinator before project began and adoption of final management recommendations; and 2) Applicant was required to provide a mid-term project update. Wisconsin Department of Natural Resources Lakes Coordinator was provided with electronic (PDF) and hard copies (2) of Mercer Lake Management Plan, blank data form used for sociological survey, and all raw data in electronic format. Project results were disseminated to the public via presentations to Mercer Lake Association and Town of Mercer.

Lake Planning Grants - Lake Management Planning for Rice & Echo Lakes 04/01/2005 - Complete

- The Rice Lake Property Owners Association in collaboration with Echo Lake Association, Iron County Lakes Alliance, Northwest Regional Planning Commission and ABDI Land and Water Conservation Department sponsored a project to create a comprehensive lake management plan that addresses issues of decreased water clarity, increased aquatic plant growth, public opinion, and future development pressures. All existing lake data as well as historic photographs, maps, etc. were collected by lake association volunteers. Volunteers also helped the consultant conduct water quality monitoring. The Northwest Regional Planning Commission prepared base maps of the two lakes including: existing land use, land ownership, soils, slope, groundwater and other related natural features. The Iron County UW-Extension (with the help of the lake associations) prepared and distributed a lake opinion survey to all lake property owners. UW-Extension analyzed the results and shared them with the lake associations and the public. A consultant combined all of the above to create a lake management plan. Products: 1) Base maps of land area surrounding both lakes; 2) Property owner survey results in tabular form; 3) Water quality data into state database; 4) Analysis of existing lake data; 5) Lake management plan incorporating all of the above; and 6) Quarterly lake association (combined) newsletter with project updates. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles.

Lake Planning Grants - Shoreland Property Owners Education Packets 10/01/2004 - Complete

- Vilas County Lake Association provided education through partnership with individual lake associations and the general public by producing 750 “Shoreline Property Owners Education Packets”. The packets welcomed new property owners, to their Vilas County lakes and educated them on lake and shoreline stewardship, this project’s main goal. It is an important way to strengthen Lake Associations, by providing them with important and accurate information. They can use these packets to further their goals of Lake Protection on their lake. Finally, it introduced shoreline owners to northern Wisconsin, county, and state agencies and the resources they provide for shoreland property owners. The packets were available at the Vilas County Lake Association annual meeting, lake fairs where Vilas County Lake Association had an educational booth, and the Vilas County Court House at the Land and Water Conservation Office. Activities included: 1) Vilas County Lake Association researched and assembled the best available literature on lake and shoreline property management; 2) They printed and/or gathered the literature and assembled the Packets; 3) A newsletter announcement and e-mail will alerted the partners that they were available; 4) Annual meeting announcement and distribution; 5) Distribution at Lake Associations and Lake Fairs - summer 2005; and 6) Distribution at Vilas County Land and Water Conservation Dept. - October through December 2005. A written and electronic report of activities completed through this project was provided to the Department.

Lake Protection Grants - Vilas County Aquatic Invasive Species Strategic Planning 07/01/2004 – Complete

- The Vilas County Land & Water Conservation Committee sponsored a project to develop and implement a three-year county-wide strategic plan to combat aquatic invasive species. A project coordinator was hired to establish a partnership committee made up of volunteers and to identify the problems and goals. A step-wise plan was established to realize the identified goals and push for the ultimate goal to stop or slow the spread of aquatic invasive species in Vilas County.

Lake Planning Grants - Lake Leaders Crew V Assistance 04/01/2004 - Complete

- The Vilas County Lake Association sponsored this project which sent two people from Vilas County to Lake Leaders Crew V. A summary report was provided detailing the activities under the grant and how the materials and information gained were used and distributed. All final products were provided to the Department in electronic (PDF) and hard copy format. *Please note that approval of the final report for final payment by the Lake Grant Program does not indicate Department approval of recommendations or strategies within the report.

Aquatic Invasive Species Grants Vilas County Land & Water Conservation Committee: Attacking Aquatic Exotics-A Resource Guide for Lake Organizations 10/01/2003 - Complete

- The Vilas County Land & Water Conservation Department sponsored a project which created a written resource guide as a tool for Vilas County lake organizations to fight either present or potential aquatic exotics. The guide included steps and actions that organizations can take to ward off invasions, and reactive actions to cope with an exotic species problem. The guide was produced in two formats, one was specific to Vilas County and one was generalized for statewide use. The resource guide was placed on the web and was delivered to Vilas County lake groups by hand delivery, mail, and CDs. The Department received copies of all data and reports produced in hard copy and electronic (PDF) format.

Lake Planning Grants - Invasive Aquatic Species Program 10/01/2003 - Complete

- The Vilas County Land & Water Conservation Department sponsored a project which focused on aquatic exotics within Vilas County. Included in this project: design and upgrade of web information, workshops, access to copies of educational materials, monitoring of Vilas County lakes for exotic invasions, upgraded lake group information for Vilas County lakes, and proactive management items, including plans, detailed aquatic plant surveys, and remediation planning. Prior to beginning the project the grantee received written approval of survey methods from DNR aquatic plant specialist, Laura Herman. The Department received both paper and electronic copies off all reports, web pages, publications, lake data, and other materials produced as part of this project. All of these items are available for DNR statewide use.

Lake Planning Grants - Mercer Lake Association Paleocore Analysis 04/01/2003 - Complete

- The Mercer Lake Association sponsored a project which completed a sediment core analysis to address existing water quality questions and assist in future planning efforts. The project included a detailed core analysis on Mercer Lake and a less detailed pre- and post-development analysis on Grand Portage Lake. Deliverables included: a written

report detailing water quality changes found in both cores and an analysis of the significance of findings. This report was shared with the public via press releases to surrounding communities, archival at the local library, and a presentation at the Mercer Lake Association annual meeting. This report was provided to the Department in electronic (PDF) and hard copy format. *Please note that approval of the final report for final payment by the Lake Grant Program does not indicate Department approval of recommendations or strategies within the report. **Paul Garrison, DNR Research, handled SLOH costs associated with this project via individual contract with the SLOH and with the Mercer Lake Association.

Lake Planning Grants - Mercer Lake Association Mercer Lake APM Plan 04/01/2003 - Complete

- The Mercer Lake Association sponsored a project which completed an aquatic plant survey and management plan for Mercer Lake. The survey method was appropriate to the lake and written approval was given by Laura Herman, Department Aquatic Plant Specialist, prior to beginning work. Deliverables included: A technical report detailing survey results, an aquatic plant management plan with recommendations, and implementation strategies. Voucher specimens were submitted to the Department for review and were retained by the Lake Association. Reports and other documentation were provided to the Department in electronic (PDF) and hard copy format.

Lake Planning Grants - Vilas County 2003 Invasive Species Program 04/01/2003 - Complete

- The Vilas County Land & Water Conservation Department sponsored a project to educate Vilas County lake residents and users regarding aquatic exotics. The project resulted in: the training of 50 to 75 Vilas County residents on identification and monitoring of exotics, monitoring and mapping of five main exotic species in Vilas County, an expanded database on those five key species (including a GIS data layer), and a Vilas County Invasive Aquatic Species Assessment Report, including management options for specific infestations. Project results were used to update the Vilas County Land and Water Resources Management Plan. The project also resulted in audio and videotape public service announcements for a media campaign and invasive species packets at nine local libraries. All final products were provided to the Department in electronic (PDF) and hard copy format.

Lake Protection Grants - Price County Lake Classification - Phase I 09/01/2001 - Complete

- This project focused on five areas of the Smart Growth compliant comprehensive plan. Project activities included: collecting additional water quality, public opinion and regulatory data, mapping of resources and influencing factors, outlining proposed changes to regulatory management tools, and generating proposals for new management tools. The project also strove to develop a public consensus around the project and proposed changes to management tools for the county inland lakes and rivers. Specific deliverables for this project included a final report on activities and accomplishments of the project. Items completed under previous grants were not funded or used as accomplishments as a part of this project. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results will be disseminated to the public by newsletter(s), public meeting(s), and/or local newspaper articles.

Lake Planning Grants - Vilas County Lakes Association: Vilas Volunteers 04/01/2000 - Complete

- The Vilas County Lake Association proposed to enlist volunteers on 16 Vilas County lakes to monitor water chemistry within the DNR's Self-Help monitoring program. The individuals were selected from the DNR's waiting list for that program and were supplied for three years of monitoring. Volunteers collected samples for total phosphorus and chlorophyll-A analysis, which complemented the water clarity (Secchi disk) monitoring at each lake. Data collected resides in the DNR's Self-Help data base and can be used to generate lake-specific and regional reports of lake water quality. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results will be disseminated to the public by newsletter(s), public meeting(s), and local newspaper articles.

Lake Planning Grants - Price County Land Use Plan 10/01/1999 - Complete

- Price County proposed to begin the process for a county-wide land use planning effort. Project activities included holding public meetings to gather public input and present the goals of the project, developing a shoreland property owners lake protection newsletter, creating a lake data and shoreland use library, creating a number of county water resource maps, and creating an Internet website containing the results and resources of the project. The

project established the necessary information groundwork for the actual land use plan to follow. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report.

Lake Protection Grants - Town of Sherman: Land Use Plan & Ordinance Development 09/01/1999 - Complete

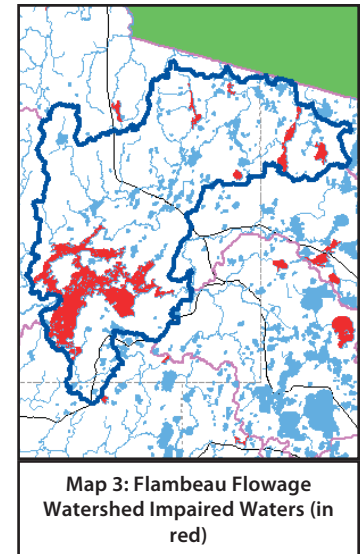
- The Town of Sherman developed a land use plan which provides guidelines for implementing protection of water resources and future land use recommendations. Issues addressed included existing land use, location of future commercial development, and high-density development within shorelands.

Lake Protection Grants - Phase II: Land Use Plan & Ordinance Development 09/01/1999 - Active

- Vilas County will complete its land use planning effort by using the township plans developed in Phase 1 to develop an integrated county-wide land use plan. The plan will recommend how local communities can better achieve the goals identified in Phase 1. From this needs assessment new and/or modified zoning regulations will be developed to further protect the county's resources.

Lake Protection Grants - Vilas County: Lake Classification Implementation Project 09/01/1999 - Complete

- The county implemented their newly amended shoreland zoning ordinance by tracking and evaluating compliance with the new ordinance, developing computer programs and forms for administration of the ordinance, conducting training sessions for zoning staff regarding the new ordinance, and providing public access to zoning information via a computer kiosk system in the zoning office.



Lake Protection Grants - Vilas County Land Use Ordinance 09/01/1998 - Complete

- The project included the development of 10 township land use plans; the development of an integrated, county-wide land use plan, based on the town plans; a comprehensive review and re-drafting of the shoreland ordinance; public information and education workshops to support the plan and ordinance development; and various maps portraying the following within the county: major watershed boundaries, surface water bodies, wetlands and other drainage ways, soils, land uses, proposed future land uses, unique/high quality natural resource features, historical and archeological sites, critical environmental corridors within urban areas, and vegetation types (04/07/1999, JCM).

Lake Protection Grants - Vilas County: Lake protection ordinances for shoreland development 02/01/1998 - Complete

- Vilas County Lakes proposed to develop a lake classification system that would reflect a lake's sensitivity level. The classification system and subsequent shoreland development regulations helped provide a means for enhancing the protection of lake shorelines and water quality. The following is a list of activities that were included in this lake classification project: 1) Specific personnel, time, tools and training will be dedicated to this effort; 2) A steering committee appointed by Vilas County to oversee and recommend criteria to be utilized in the lake classification project; 3) The classification system incorporated detailed land record information including, soil types, water resource mapping, existing information on physical, chemical & biological characteristics of lakes, as well as recent digital orthophotos of development information; 4) Inventoried all county and town shoreland ordinances and assessment of the extent of enforcement and resources allocated to enforcement; 5) Lake classification data and existing town ordinances were the basis for developing consistent county-wide policies and zoning standards; 6) Public information and education sessions were conducted in each of the fourteen towns to gather input and share classification system findings and proposed policy standards; 7) An attorney was contracted to draft ordinance language for the implementation of the proposed shoreland development policies; 8) Public hearing was held on the proposed ordinance changes; 9) GIS maps were developed for the lake classifications; and 10) 500 copies of the Shoreland Protection Manual were printed and distributed after final approvals were complete.

Lake Protection Grants - Lake of The Falls Association: Walleye Spawning Habitat Project 09/01/1997 - Complete

- Lake of the Falls Association proposed to establish a Walleye Spawning Habitat Project on Lake of the Falls. The project activities included six approved spawning beds made of approved materials. Other activities that were included besides the actual construction of the rock spawning beds were site preparation and clean-up as called for in the application.

Lake Planning Grants - Town Of Mercer: Township Lakes Development of Shoreland Dev./Aesthetic Development 10/01/1997 - Complete

- The Town of Mercer proposed to establish a set of design and development standards for construction and site improvement within the shoreland area that will graphically show site recommendations for maintaining waterfront northwoods aesthetics. This township-wide project included the following activities: 1) A photographic assessment; 2) Definition of shoreland development issues; and 3) Development of aesthetic design standards and graphic format examples. The Department of Natural Resources was provided with both a paper copy and an electronic copy of the final report. The project results were disseminated to the public by news letter(s), fact sheet(s), public meeting(s), local newspaper articles, and a display of information.

Lake Planning Grants - Town of Mercer: Lake Classification and Ordinance Development - Phase 1 02/13/1996 - Complete

- The Town of Mercer proposed to develop a long range land use and development plan to protect and improve its lakes' water quality and ecosystems. Phase 1 project activities consisted of: 1) Inventory and data gathering, including conducting a land use and environmental resource inventory of the town's lakes' watersheds, and identifying constraints to development; 2) Demographic and economic analysis; 3) Existing land use and development patterns analysis; and 4) Development of a lake classification system based on the ability to accommodate development and classification of all lakes in the township. The sponsor prepared a summary report including the results of the above activities. The results of the above activities were disseminated to the public by public meeting and local newspaper article. The sponsor provided the Department of Natural Resources with a paper copy and an electronic copy of the summary report.

Lake Planning Grants - Town of Mercer: Lake Classification and Ordinance Development - Phase 2 02/13/1996 - Complete

- The Town of Mercer proposed to develop a long range land use and development plan to protect and improve its lakes' water quality and ecosystems. Phase 2 project activities consisted of public education of the project and issues, public input to goals and objectives for land use and natural resource protection, determination and selection of alternatives/tools for implementation of goals, identification of deficiencies in shoreland protection to recommend language to update existing zoning ordinances and regulations, and review of enforcement of local ordinances and regulations. The sponsor prepared a final report of the project, including the results of the above activities. The results of the project were disseminated to the public by public meeting and local newspaper article. The sponsor provided the Department with a paper copy and an electronic copy of the summary report.

Lake Planning Grants - Vilas County Lake Management Plan Model and Planning Guide 01/10/1996 - Complete

- Vilas County proposed to perform the following activities in relation to developing a comprehensive lake management plan model and a lake planning resource guide: 1) Provide assistance and guidance to one or more lake organizations in developing and completing a comprehensive lake management plan; develop and complete an inventory of one or more lake's physical, chemical, biological, and social characteristics, including watershed, water quality, aquatic plants, and shoreline development information; 2) Develop and complete a Vilas County Lake Resource Guide booklet documenting the comprehensive lake management planning process, including other resources available to lake organizations; and 3) Conduct one or more lake education programs on comprehensive



Moose Lake, Photo by Thomas Meyer (WDNR photo)

lake management planning to share the “model” planning process and plan and lake resource guide county-wide.

Lake Planning Grants - Vilas County Lakes Eurasian Water-milfoil Monitoring 01/10/1996 - Complete

- Vilas County proposed to perform the following Eurasian water-milfoil monitoring and prevention activities: 1) Conduct at least two volunteer training workshops on EWM monitoring, provide list of the trained volunteers; 2) Conduct a spot check of the county’s 196 public boat landings for the presence of Eurasian water-milfoil; develop a list of lakes where it is present; 3) Input volunteer Eurasian water-milfoil monitoring data and boat landing spot check data into the county lake GIS database, produce GIS map printout illustrating volunteer monitors location and Eurasian water-milfoil’s presence; 4) Place Eurasian water-milfoil alert signs at the county’s 196 public boat landings; 5) Develop one model exotic species prevention sign at a key boat landing; 6) Develop a traveling display exhibit focusing on prevention and monitoring, use at the Northwoods Lake Fair; and 7) Assist with the development of one or more additional lake organizations in the county.

Lake Planning Grants - Price County Lakes Classification & Management Planning Model 10/01/1996 - Complete

- Price County proposed to 1) develop a list of parameters that will be applied to county lakes to produce a priority list of potentially impacted lakes; 2) conduct a survey of shoreland property owners and other lake users; 3) conduct an active information education program to keep citizens, local officials, etc. informed of the project; and 4) develop a model to incorporate environmental and sociological criteria into a planning model to evaluate different management options. These activities resulted in a lake screening process, a lake priority list, a survey of water resources stakeholders, and a water resource value model. The Department of Natural Resources was provided with a paper copy and an electronic copy of the final report. Information about the project was disseminated to the public by public meeting, newspaper articles, newsletter mailing, and report mailing.

Lake Planning Grants - Iron County Lakes Classification & Management Planning Model 10/01/1996 – Complete

- Iron County proposed to 1) develop a list of parameters that will be applied to county lakes to produce a priority list of potentially impacted lakes; 2) conduct a survey of shoreland property owners and other lake users; 3) conduct an active information/education program to keep citizens, local officials, etc. informed of project; and 4) develop a model to incorporate environmental and sociological criteria into a planning model to evaluate different management options. These activities resulted in a lake screening process, a lake priority list, a survey of water resources stakeholders, and a water resource value model. The Department of Natural Resources was provided with a paper copy and an electronic copy of the final report. Information about the project was disseminated to the public by public meeting, newspaper articles, newsletter mailings, and report mailings.

Lake Planning Grants - Vilas County Lakes Water Quality Monitoring Organization 05/05/1995 – Complete

- 1) Provided county recruitment, training, and support for volunteers working on the Self-help Lake Monitoring Program for phase I water clarity monitoring. 2) Developed a county lakes database. 3) Identified a local contact on all named lakes in Vilas County. 4) Assisted in development of lake associations or lake districts. 5) Assisted in the formation of at least one Adopt-A-Lake youth program. 6) Prepared a final report which included the tasks listed above. 7) The grantee disseminated information to the public by newsletter mailings, factsheet distributions, public meetings, local newspaper articles, TV and/or radio spots, and a poster display. The grantee provided the Department of Natural Resources with a paper copy and an electronic copy of the final report. Project results were reposted at the Vilas County UW-Extension, Eagle River Land Conservation Department, and Rhinelander.

Monitoring

Lakes Baseline and Trends Monitoring

River Monitoring to comply with Clean Water Act implementation - water quality standards: use designations, criterion, permit issuance and compliance, assessments, and impaired waters management.

Fisheries projects included a wide variety of “baseline” monitoring and targeted fieldwork to gain specific knowledge related to Wisconsin’s fish communities.

In close cooperation with UW Extension and Wisconsin Sea Grant, education efforts focus on working with resource professionals and citizens statewide to teach boaters, anglers, and other water users how to prevent transporting aquatic invasive species when moving their boats. Additional initiatives included monitoring and control programs.

Volunteer Monitoring

The Citizen Lake Monitoring Network, the core of the Wisconsin Lakes Partnership, involves over 1,000 citizen volunteers statewide. The goals are to collect high quality data, to educate and empower volunteers, and to share this data and knowledge. Volunteers measure water clarity, using the Secchi disk method, as an indicator of water quality. This information is then used to determine the lake's trophic state. Volunteers may also collect chemistry, temperature, and dissolved oxygen data, as well as identify and map plants, watch for the first appearance of Eurasian water-milfoil near boat landings, or alert officials about zebra mussel invasions on Wisconsin lakes.

Monitoring work in this watershed consists of lake monitoring and surveys for water quality, aquatic plants, aquatic invasive species, and ice observations. One Level 3 project was implemented in the UC14-Flambeau Flowage Watershed in 2010 utilizing volunteer assistance at three stations (SWIMS project ID: Turtle_Flambeau) to monitor the Turtle Flambeau Flowage. Volunteers collected and submitted samples for laboratory analysis of temperature, total phosphorus and chlorophyll a. All data were uploaded into the SWIMS database <http://prodoasjava.dnr.wi.gov/swims/welcome.do> from the State Lab of Hygiene.

Basin/Watershed Partners

Lake of the Falls Association, Long Lake Improvement Association, Mercer Lake Association, Rice Lake Property Owners Association, The Turtle Flambeau Flowage/Trude Lake Property Owners Association.

Recommendations

- WR program should conduct basic water quality monitoring on streams in the watershed in conjunction with monitoring the lakes they flow into and connect with, the highest priority streams for monitoring included: Turtle and Flambeau rivers and Pardee, Viran, Lone Lake, Weber, Dollar, and Beaver creeks.

Contributors

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DNR PUB WY-041 2011

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