

Section 14

About Flambeau Lake

Waaswaaganing-zaaga'igan (Torch light; place of)
—Our Earth¹

Introduction

The *Bear River Watershed Comprehensive Lake Management Plan* includes sections for each of the ten lakes in the watershed. The lakes are in the largest watershed in Lac du Flambeau, within the Reservation's boundaries, associated with high use landings, and have complete data sets required for a lake management plan. The purpose of the plan is to establish the current health of the watershed and lakes and suggest how to maintain or improve their health in the future.

This section includes introductory information about Flambeau Lake, a summary of how uses of the lake have changed over time, data from the community survey, and an assessment of the lake's health based on data for the lake's biology, chemistry, nutrients, habitat, bacteria, lake levels, and aesthetics. This section also includes an action plan to improve or maintain the overall health of Flambeau Lake.

Flambeau Lake is in the Bear River Watershed (Subwatershed HUC12-070500020201) west of the town center of Lac du Flambeau and west of Long Interlaken Lake (Figure 14-1).

An old man taught the Ojibwes the art of “fire hunting” for fish at night by the light of a pitch-filled, birch-bark torch he called waswaawan. The fire hunters became known as the Waswaagan, and their lake, Waswaagaming. To the Frenchmen who came to trade for furs, the lake was called, Lake of the Torches, or, la Lac du Flambeau.

—Michael J. Goc, *Reflections of Lac du Flambeau*²

Francois Victor Malhiot, clerk for the Northwest Company between 1804–1807, described Flambeau Lake as *worthier of the name of swamp than lake at this season (August). It would be easier to catch bullfrogs in nets than fish.*

—Michael J. Goc, *Reflections of Lac du Flambeau*³



Figure 14-1. Map of Lakes

Table 14-1. Basic Data for Flambeau Lake

Morphology	
Acreage (Acres)	1521
Maximum Depth (Feet)	78
Mean Depth (Feet)	28.5
Retention Time (Years)	9.33
Drainage Area (Acres)	3377
Drainage Basin/Lake Area Ratio	2.22
Vegetation	
Survey Data Collected	2011
Number of Native Species	34
Floristic Quality Index	40.56
Simpson's Diversity Index	0.93
Percent Vegetated (%)	61.19
Average Conservatism	7.06
Water Quality	
Trophic State	Mesotrophic
Limiting Nutrient	Phosphorus
Water Acidity (pH)	7.3
Sensitivity of Acid Rain	Low
Aquatic Invasive Species	
	Rainbow Smelt Purple Loosestrife

Table 14-1 provides a summary of Flambeau Lake's morphology, vegetation, and water quality. The lake is approximately 1521 acres and has a maximum depth of 78 feet. Flambeau Lake is classified as a drainage lake, meaning that it is fed by streams, groundwater, precipitation, and run off and is drained by a stream or channel. Flambeau Lake is the terminus lake to the Bear River watershed. The lake's flow enters Flambeau Lake through channels from Long Interlaken Lake and Pokegama Lake. The flow exits Flambeau Lake at its north end at the confluence of the lake and the Bear River. The lake level is maintained at that point by a dam installed during the logging boom. The water flows over the dam and into the Bear River.

Flambeau Lake stratifies annually with the hypolimnion maintaining dissolved oxygen above

5mg/L. With Secchi readings averaging 14.43 feet, the lake's water clarity is considered to be good.

Based on Secchi, total phosphorus, and Chlorophyll a data, Flambeau Lake is classified as mesotrophic (TSI 43). Mesotrophic lakes generally have medium levels of nutrients and water clarity when compared to other natural lakes.

Flambeau Lake's watershed is forested (55%), water (34%), wetlands (10%), and urban (1%).

There are 144 dwellings, mostly residential, within 300 feet of the lake's shoreline. Flambeau Lake has a public landing located at the Tribal Campground and Natural Resource complex (Figure 14-2). A bio-swale and rain garden captures more than 90% of the parking and building runoff. A berm of 10 feet before the boat landing diverts all water from the lake into the bio-swale to insure contaminated runoff or invasives do not make it to the lake directly.

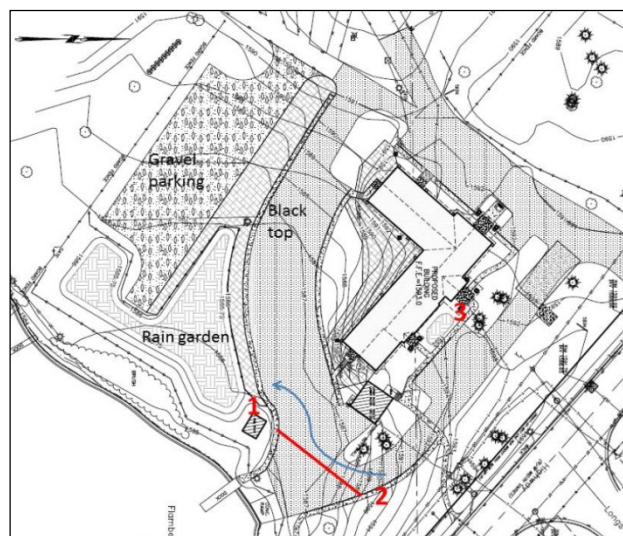


Figure 14-2. Tribal Campground and Natural Resource Complex

Brief History of Flambeau Lake

The history of Flambeau Lake, including how uses of the lake have changed over time, parallels the history of the other lakes in the Bear River Watershed as described in Section 3. Unless noted otherwise, the information here is footnoted in Section 3.

Paddling up the Flambeau River (Bear River) S.S.E. toward Lac du Flambeau, J.G. Norwood noted in 1847 that *the swamps again show themselves, and either side of the river up to Lac du Flambeau, the river is exceedingly crooked, ... We reached the lake late in the afternoon, and, crossing its north-west arm, camped near the old trading house of the American Fur Company, now deserted.*⁴

*Lac du Flambeau is the largest body of water we have seen in this region. It is exceedingly irregular in its outline, resembling rather an assemblage of several small lakes, united at one point by short narrow channels. It has a number of thickly wooded islands dotting its surface. The shores recede with a gentle slope, to the height of twenty and thirty feet, and are covered at some points with bushes and grass, and by a dense forest at others. The soil ... is a light sandy loam; and, judging from its general appearance, would hardly attract the attention of a cultivator. The Indians, however, who have a village on one of its shores, raise excellent potatoes, better indeed, than are usually grown, with all the aids of cultivation, in the valley of the Ohio.*⁵

Over a hundred years earlier, Chief Kishkemun and members of his band of Lake Superior Chippewa Indians made many similar journeys up and down the river and around the lake, noticing the same natural features as Norwood. Once the Ojibwe defeated the Sioux on Strawberry Island (Figure 14-3), the area was sufficiently secure for the band to establish the village noted in Norwood's journal.



Figure 14-3. Strawberry Island

Strawberry Island, long considered sacred to the Ojibwe, has its own unique history.

- Archeologist Robert Salzer found evidence in 1966 that Strawberry Island was inhabited as early as 200 B.C.⁶
- A 200 year old, 22-foot long dugout canoe was found under water near the Island in 1980. The canoe is now exhibited at the George W. Brown, Jr. Museum in Lac du Flambeau.⁷
- The last battle between the Sioux and the Ojibwa was fought on Strawberry Island in 1745.⁸
- An 1864 map drawn from the notes of a Federal surveyor points out that there were 2 log houses, 4 bark houses and 5 acres of cultivated land on Strawberry Island at the time.⁹
- In 1910, John Whitefeather sold the island to the Mills Family¹⁰
- In 1978, the National Register of Historic Places recognized Strawberry Island (Place of the Little People) as an historic site.¹¹
- On December 30, 2013, The Lac du Flambeau Band of Lake Superior Chippewa Indians bought Strawberry Island back from the Mills family.¹²

For hundreds of years Flambeau Lake was used by indigenous people for subsistence. Virtually every facet of their lives depended on their relationship with the lake and its surrounding habitats for food, medicine, building materials, and transportation.

With the arrival of the Europeans in the early to mid-seventeenth century, Flambeau Lake and the surrounding habitats took on a new use; to help

provide the world with furs. Lac du Flambeau became a transportation center for the fur trade, and Flambeau Lake became the hub for a network of canoe routes and portages extending in all directions.

The single most important route was the Flambeau Trail, which led from Lac du Flambeau to Lake Superior. Other routes linked Lac du Flambeau northeast to Lac Vieux Desert, east to the Wisconsin River, southeast to the Wisconsin River, and to the Chippewa River.¹³

Some believe a trading post was located on the small piece of land separating Long Interlaken and Flambeau Lakes. Others believe there may have been more than one fur trading post on the shores of Flambeau Lake, one on the north shore east of the old village and two west of the village. The search for artifacts was hampered by the higher lake level as a result of the construction of the dam.¹⁴

By 1840 the fur-bearing animals were gone and Flambeau Lake and its surrounding habitats took on another new use; to provide the country with timber and timber products. To facilitate the movement of logs from Flambeau Lake to the mills on Long Interlaken Lake, a dam was constructed at the confluence of Flambeau Lake and the Bear River in 1887 (Figure 14-4). Consequently, the water level of Flambeau Lake rose as much as three feet, destroying the shorelines and beds of wild rice. In 1922 the dam was rebuilt with an arched masonry bridge and spillway.¹⁵



Figure 14-4. Bear River Dam

East across the bay from the Old Indian Village in Flambeau Lake, on a point, sits *Gichi Mashkiki* (Big Medicine Rock, Figure 14-5). According to legend, *Wenaboozho*, won the rock during the Moccasin Game. The rock was small but grew in size as *Wenaboozho* carried the rock home. The rock became so large that it couldn't be carried, so *Wenaboozho* started rolling it. As he did this, a path was cut into the ground and filled with water becoming the Bear River. *Wenaboozho* left the rock where it is now, possible because he grew weary from rolling it. The native ancestors recognized the Big Medicine Rock as a spiritual location and it is still shown respect today.¹⁶

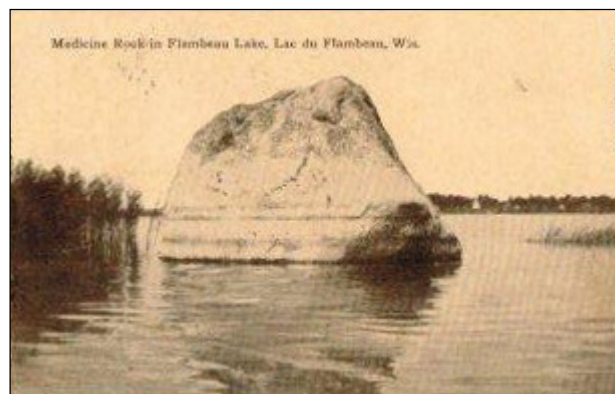


Figure 14-5. Medicine Rock

By 1913, the trees around Flambeau Lake were gone and most of the surrounding habitats were destroyed. In the early 1900's, however, the logging industry was already being replaced by the service industry, which used Flambeau Lake and its surrounding habitats to meet the recreational needs and demands of tourists and seasonal residents.

As a result of the Dawes Act in 1887, some of the lakefront property on Flambeau Lake was transferred from the Tribe to non-Tribal residents, opening the shorelines to development. Resorts started appearing on many of Lac du Flambeau's lakes, including Flambeau Lake.

In 1918, Paul Geidel and his wife bought property on Flambeau Lake so they could build a summer home there. Evidently they had so many visitors from

Chicago, they decided to turn the home into a business, Kimrock Lodge (Figure 14-6).¹⁷



Figure 14-6. Kimrock Lodge

By the 1960s, visitors to Flambeau Lake could choose from Frank's Pine Haven Resort or Hodel's Kimrock Chalet.¹⁸ Today, tourists may stay at the Tribal campground, which opened in 1970.¹⁹

Community Survey²⁰

Approximately 3,000 households in Lac du Flambeau were invited to participate in a mail survey during the summer of 2012 to provide information for preparing the *Bear River Watershed Comprehensive Lake Management Plan*. The survey was developed with assistance from the Wisconsin Department of Natural Resources and was approved by the WDNR before it was distributed.

The survey includes questions on topics such as residents' perceptions of the quality of lake water, fishery, and overall environment; residents' familiarity with aquatic invasive species and aquatic plants; residents' perceptions of current and ideal shoreline landscaping; and residents' interests in a variety of workshops. The survey, data tables, and other information related to the survey are in the appendix.

One-third of the questionnaires (996) were returned completed, representing 51 lakes. Of the returned questionnaires, 576 (58%) provide information on the ten lakes in the Bear River watershed and of these, 54 (9%) focus on Flambeau Lake.

Tables presenting results of the survey are presented throughout the rest of this section. Care should be taken when interpreting the survey data because in many cases the number of respondents for Flambeau Lake is very low.

Assessing Lake Health

Medical doctors assess human health by examining a patient's blood work, height, weight among numerous other measures (quantitative data) and by considering information like the patient's answers to questions, comments, even body language (qualitative data). Similarly, lake managers assess lake health by examining the lake's oxygen, nitrogen, phosphorus, among other measures (quantitative data) and by considering additional information about the lake like the presence of aquatic invasive species, nuisance aquatic plants, or even presence of trash (qualitative data).

Flambeau Lake Health Report

Assessing the health of Flambeau Lake has included examining qualitative and quantitative data pertinent to the lake's biology, chemistry, nutrients, habitat, bacteria, aesthetics, and fish tissue. These categories are introduced in the next few pages and are addressed at length in the rest of the section.

Table 14-1 shows the categories, their subdivisions (Indicator Assessments), and the ratings that have been applied to them, *Excellent*, *Good*, *Fair*, *Poor*, *Concern* or *Not Assessed* (See Section 10 for details on rating).

The Biology Category reflects an assessment of the number and magnitude of invasive species. Flambeau Lake has rainbow smelt and purple loosestrife, but neither at nuisance levels. Other than purple loosestrife, the lake does not have any invasive plants.²¹ The floristic quality index²² is excellent (FQI 40.56), and the lake's overall status for the Biology Category is *good*.

Table 14-2. Flambeau Lake Health Report

Category	Indicator Assessment		Overall Status
Biology	Invasive aquatic plant	Excellent	Good
	Invasive fish	Good	
	Invasive invertebrate	Good	
	Invasive wetland plant	Good	
	FQI	Excellent	
Chemistry	Dis. Oxygen (DO)	Excellent	Excellent
	pH	Excellent	
	Temperature	Excellent	
	Ionic Strength	Excellent	
	Sus. Solids (SS)	Excellent	
Nutrients	Phosphorus P	Good	Excellent
	Chlorophyll a	Excellent	
Habitat	Plants H	Excellent	Good
	Riparian Zone	Good	
	Littoral zone	Good	
Bacteria	Bacteria	Excellent	Excellent
Aesthetics	Oil & Grease	Excellent	Excellent
	Taste & Odor	NA	
	Turb/Color	Excellent	
	Nuisance Plants	Excellent	
	Trash/Debris	Good	
Tissue	Spec. Chem. Hg	Concern	Concern
Lake Level	Level	NA	NA

The Chemistry Category reflects an assessment²³ of data for dissolved oxygen, pH, temperature, ionic strength, and suspended solids as compared to Water Quality Standards Criteria.²⁴ Dissolved Oxygen for Flambeau Lake during the summer does not reach below 5mg/L, the criteria for cool water fish, so it has a status of *Excellent*. Flambeau Lake's overall status for the Chemistry Category is *excellent*.

The Nutrients Category reflects an assessment²⁵ of data for phosphorus and Chlorophyll *a* levels as compared to National Lake Survey (NLS) thresholds²⁶ for the Upper Midwest ecoregion health conditions and for the upper limit compared to Wisconsin's new Water Quality Standards for a two-story fishery lake.²⁷ The NLS was a study of Lakes across the United States, and thresholds for good, fair and poor were developed based on the data collected for each ecoregion. Flambeau Lake's

overall status for the overall Nutrients Category is *excellent* as average total phosphorus is 15.20µg/L (good, missing excellent by 0.20µg/L), and Chlorophyll *a* is 2.8µg/L (excellent).

The Habitat Category reflects an assessment²⁸ of Flambeau Lake's aquatic plants, riparian zone (shoreline), and littoral zone (shallow water along shoreline). Comparisons are made with eco-regional data from WISCAL Macrophyte Impairment²⁹ and National Lake Survey thresholds.³⁰ All indicators for Flambeau Lake have a rating of *good* or *excellent*. Flambeau Lake's overall status for the Habitat Category is *good*.

The Bacteria Category reflects an assessment³¹ of summer *E. coli* measurements that were taken weekly and then compared to Water Quality Standards criteria³² for human health protection. Flambeau Lake's overall status for the Bacteria Category is *excellent*.

The Aesthetics Category reflects an assessment of data and information on water quality, color, and turbidity as well as an assessment of reports received by the Tribal Natural Resources Department for Flambeau Lake on the presence of oil, grease, nuisance aquatic plants, and trash/debris. This information is compared to narrative criteria as described the Water Quality in the Water Quality Standards.³³ Flambeau Lake's overall status for the Aesthetics Category is *excellent*.

The Tissue Category reflects an assessment of the amount of mercury in the flesh of fish in Flambeau Chain of Lakes as compared to the Water Quality Standards.³⁴ Larger edible fish have more mercury in their flesh than what is protective for human health concerns. Flambeau Lake's overall status for the Tissue Category is of *concern*.

The Lake levels were assessed for Flambeau Lake but a condition criteria has not been developed at

this time. Information about lake levels is presented at the end of this section.

Biology Category

Biology is the science of living organisms. The organisms that live together in the lake interact in large part based on their food relationships (Food Web). The food pyramid for lakes (Figure 14-7) shows the proportion of biological production to the yield of large fish. The organisms are in balance after thousands of years of naturally evolving together within these food relationships. Invasive species, however, are organisms that evolved originally in other locations and when they move into a naturally balanced area disrupt the native organisms' relationships.

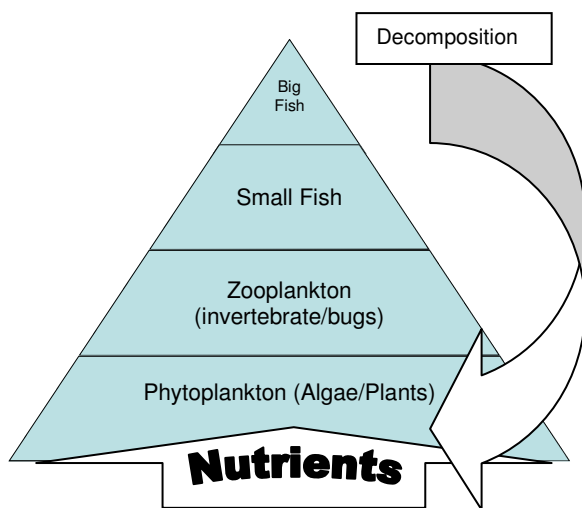


Figure 14-7. Lake Food Pyramid

Invasive species are a great concern. Their introduction can cause changes of native organisms' distribution and abundance and contribute to water quality degradation. The introduction of the invasive aquatic plant, Eurasian water milfoil, can cause the reduction in large game fish as the native insects and small fish have not evolved to eat EWM, causing a loss of food resource for large fish and an overabundance of plant matter.

Flambeau Lake has rainbow smelt and purple loosestrife (see Section 7 for specifics). At this time,

however, there is no evidence that they are disturbing the abundance or distribution of native organisms or causing economic or ecological harm.

To help determine the extent of residents' familiarity with Aquatic Invasive Species (AIS), the community survey asked residents to answer a few questions about AIS. Their responses to some of the questions follow.

Residents were asked if they had heard of AIS before reading about them in the survey. For Flambeau Lake, 10 of 24 respondents (42%) indicated they had prior knowledge of AIS as compared to 171 of 576 (30%) for respondents of the ten lakes in the Bear Watershed, and 300 of 996 (30%) for all respondents from Lac du Flambeau.

Residents having prior knowledge of AIS were shown a list of AIS and then asked which, if any, are currently in the lake. Table 14-3 shows the responses of 10 residents for Flambeau Lake (% Perceived Presence). The table also shows whether the AIS are actually in the lake (Actually Present). For example, 3 of the 10 residents believe that banded mystery snail is in the lake, when in fact it is not. The table shows there is a general disconnection between residents' perceptions of the presence of AIS and the actual presence of AIS.

Table 14-3. Flambeau Lake - Perceived vs Actual Presence of AIS

AIS	# Respondents	Perceived Presence	Actually Present
Banded Mystery Snail	3 of 10	30%	No
Eurasian Water Milfoil	1 of 10	10%	No
Rainbow Smelt	1 of 10	10%	Yes
Chinese Mystery Snail	2 of 10	20%	No
Freshwater Jellyfish	1 of 10	10%	No
Rusty Crayfish	2 of 10	20%	No
Curly-leaf Pondweed	0 of 10	0%	No
Purple Loosestrife	1 of 10	10%	Yes
None of Above	5 of 10	50%	

The same 10 respondents were asked to identify what they believe is threatened by AIS. Table 14-4 summarizes the responses for Flambeau Lake, the ten lakes in the Bear River Watershed, and the 51 lakes in the survey. The largest percentages of responses for all three groups of respondents show that native fish, aquatic plants, and water quality as most threatened. The table also shows that respondents for Flambeau Lake believe amphibians are equally threatened. The lowest percentage of responses for all three groups of respondents is for air quality. Respondents for Flambeau Lake rate aquatic plants, and wetlands equally low.

Table 14-4. Flambeau Lake - Perceived to be Threatened by Aquatic Invasive Species

	Flambeau Lake		Bear River Lakes		All Lakes	
	# Respondents	%	# Respondents	%	# Respondents	%
Native Fish	4 of 10	40%	75 of 171	44%	113 of 302	37%
Air Quality	2 of 10	20%	9 of 171	5%	16 of 302	5%
Aquatic Plants	2 of 10	20%	60 of 171	35%	92 of 302	31%
Wetlands	2 of 10	20%	31 of 171	18%	45 of 302	15%
Shoreline Plants	4 of 10	40%	47 of 171	28%	72 of 302	24%
Amphibians	4 of 10	40%	33 of 171	19%	48 of 302	16%
Water Quality	4 of 10	40%	83 of 171	49%	125 of 302	41%
Crustaceans	3 of 10	30%	32 of 171	19%	42 of 302	14%
Other	0 of 10	0%	5 of 171	3%	8 of 302	3%
None	2 of 10	20%	28 of 171	16%	72 of 302	24%

The same residents were also asked if they are concerned about AIS getting into the lake. Table 14-5 shows that for 9 respondents for Flambeau Lake, 34% indicate *extremely concerned*, 46% *somewhat concerned*, 14% *not too concerned*, 0% *not concerned at all*, and 6% *unsure*. Data for all three reference groups shows respondents have great concern about AIS getting into the lakes.

Table 14-5. Flambeau Lake - Concern about AIS Getting into the Lake

	# Respondents	Extremely	Somewhat	Not Too	Not at All	Unsure
Flambeau Lake	9	34%	46%	14%	0%	6%
Bear River Lakes	170	49%	41%	4%	0%	7%
All Lakes	294	42%	42%	9%	2%	6%

The same residents were asked if they have been taking time to look for AIS in the lake. Table 14-6 shows that for 10 respondents affiliated with Flambeau Lake, 40% indicate *not at all*, 30% *once a season*, 0% *monthly*, 10% *weekly*, and 20% *daily*. The data for Flambeau Lake is similar to the data for the other lakes and shows that despite concern for AIS, very few residents indicate they spend time looking for AIS regularly.

Table 14-6. Flambeau Lake - Time Spent Checking for AIS During Open Water Season

	Flambeau Lake		Bear River Lakes		All Lakes	
	# Respondents	%	# Respondents	%	# Respondents	%
Not at all	4 of 10	40%	66 of 161	41%	114 of 280	41%
Once a Season	3 of 10	30%	45 of 161	28%	85 of 280	30%
Once a Month	0 of 10	0%	30 of 161	19%	47 of 280	17%
Once a Week	1 of 10	10%	12 of 161	8%	21 of 280	8%
Once a Day	2 of 10	20%	8 of 161	5%	13 of 280	5%

Chemistry Category

Chemistry is the science of matter and its properties and composition with a particular focus on the properties of chemical bonds. Dissolved oxygen, pH, temperature, ionic strength, and suspended solids each have a particular role in chemical bonding and movement of chemicals within the lake.

Seasonal changes and water temperature of the lake have an impact on the amount of dissolved oxygen in the lake, important for fish respiration and viability (see Section 9, *About Understanding Lakes*).

Dissolved oxygen in Flambeau Lake during the summer and late winter does not reach below 5mg/L for the full water column, the minimum criteria for cool water fish (Figure 14-8). Lake whitefish (*Coregonus elupeaformis*), for example, is a cool water fish that is very susceptible to temperature and dissolved oxygen.

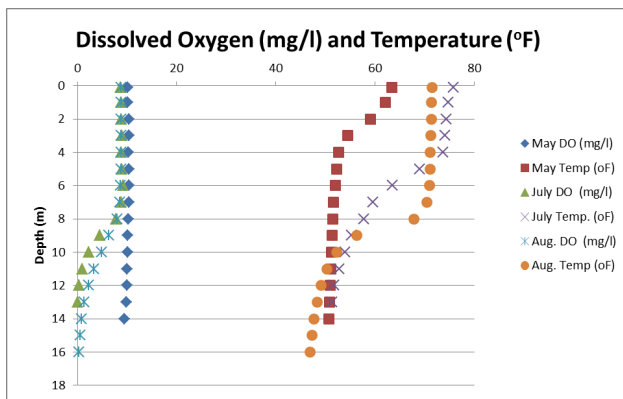


Figure 14-8. Dissolved Oxygen and Temperature Values for Flambeau Lake at Various Depths

Calcium for Flambeau Lake as measured in 1990 was on average 3 mg/L, quite low, meaning Flambeau may be less susceptible to infestations of zebra mussels.

pH is the measure of acidity or the negative logarithm of the hydrogen ion concentration (see Section 9, *About Understanding Lakes*). The pH range for Flambeau Lake is variable yet averages neutral with a variance of plus or minus 1.5. Much of the variation is likely due to whether the measurements were taken off of the bottom sediments or at the surface.

Nutrients Category

Based on Secchi, total phosphorus, and chlorophyll data, Flambeau Lake's trophic state is mesotrophic, meaning it has medium amounts of nutrients to

support a productive food web. A productive food web includes a diversity of rooted plants, macro-invertebrates (insects), and healthy fish populations.

Phosphorus and nitrogen are two nutrients that play key roles in limiting the growth of aquatic plants and algae (see Section 9, *About Understanding Lakes*). Of these, phosphorus is most critical to Flambeau Lake.

Phosphorus originates from sources like human and animal wastes, soil erosion, detergents, septic systems and runoff from lawns. Phosphorus is the limiting nutrient for Flambeau Lake, meaning that when the amount of phosphorus increases, the probability of algae growth also increases. Total phosphorus between 10 and 18ug/L is associated with mesotrophic and medium production of biomass (Figure 14-9).

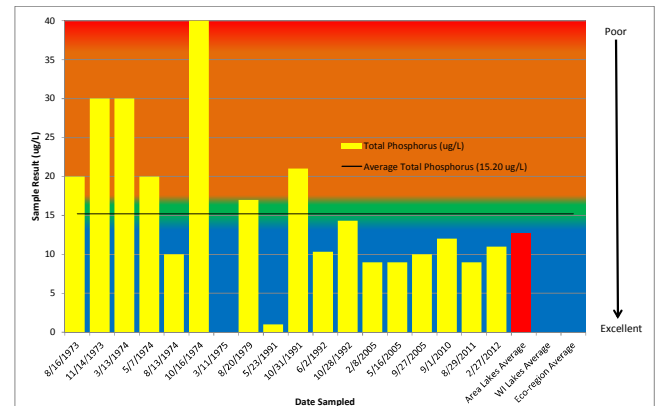


Figure 14-9. Flambeau Lake Phosphorus Concentrations

Phosphorus Prediction and Uncertainty Analysis Module

Observed spring overturn total phosphorus (SPO): 11.0 mg/m³

Observed growing season mean phosphorus (GSM): 17.0 mg/m³

% Confidence Range: 70%

As the amount of algae increases, it is likely that the amount of Chlorophyll *a* increases (Figure 14-10). Chlorophyll *a* is a green pigment present in all plant life and is necessary for photosynthesis. The amount of Chlorophyll *a* is a common measure of water quality.

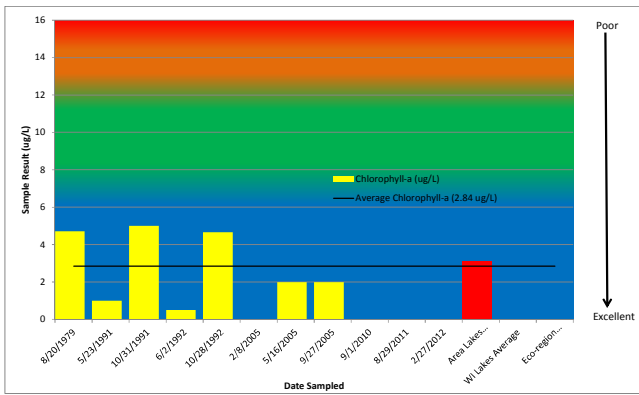


Figure 14-10. Chlorophyll *a* Concentrations in Flambeau Lake

Figure 14-11 shows Secchi, total phosphorus, and Chlorophyll *a* for Flambeau Lake from 1973 until present. No significant change in water quality is noted over this time period.

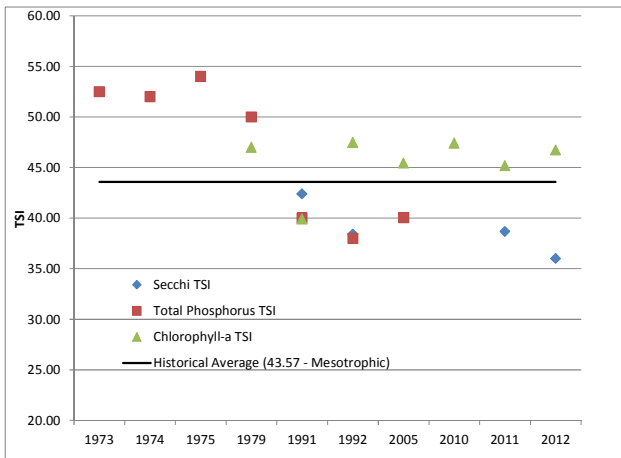


Figure 14-11. Secchi Depth, Total Phosphorus, and Chlorophyll *a* Trends for Flambeau Lake

Flambeau Lake, however, is in the heart of downtown Lac du Flambeau, where the lake's watershed runoff (Figure 14-12) is the primary source of total phosphorus. Though the lake's shoreline has been almost completely developed, more growth and development are expected with the arrival of new residents and requisite housing, roads, businesses, and support services.

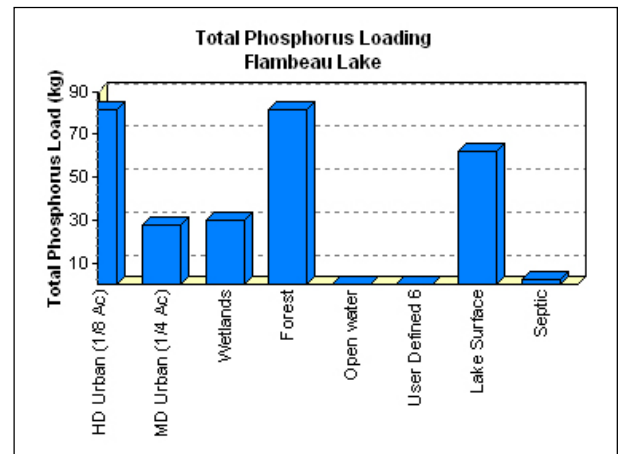


Figure 14-12. Primary Flambeau & Long Interlaken Lakes Phosphorus Sources

Future amounts of phosphorus for Flambeau Lake can be anticipated by using a tool (Wisconsin Lake Modeling Suite - WiLMS) designed to predict phosphorus levels based on changes of land use in the watershed (Figure 14-13).

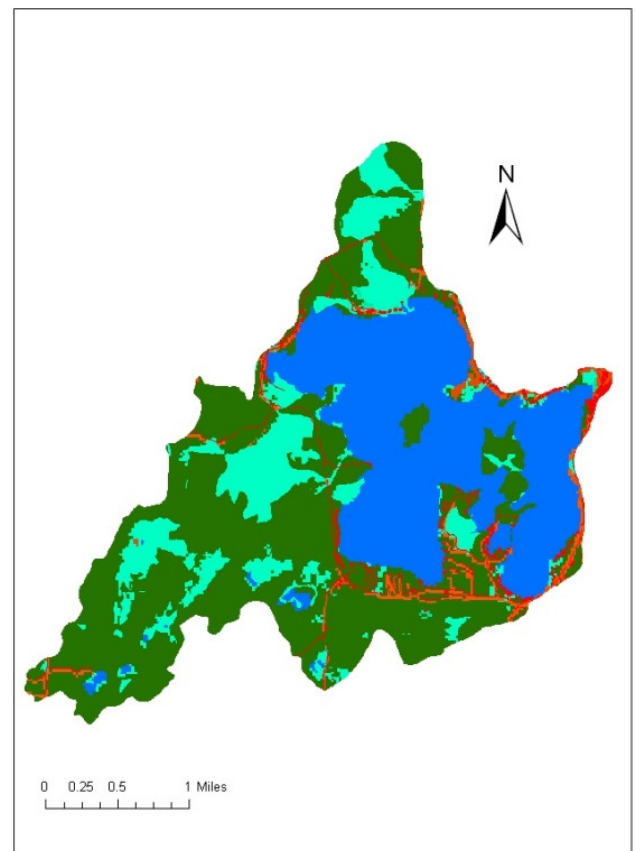


Figure 14-13. Flambeau and Long Interlaken Lake Land Use (Red – Developed; Blue – Open Water; Light Green – Wetland; Dark Green – Forest)

Use of the WiLMS tool reveals that High and Medium Disturbance areas characterized by the presence of roads, homes, buildings, parking areas, and lawns yield the most total phosphorus per unit area. Forested and wetland areas contribute less total phosphorus as the runoff is slowed and allowed to seep into the ground instead of washing into the lake transporting sediment and phosphorus.

The WiLMS tool suggests that changing land use patterns can reduce the amount of total phosphorus. Moreover, this tool can account for unique drainage patterns caused by the presence of the fish hatchery and storm water collection pond which diverts storm water discharge from the Casino on Pokegama Lake to Long Interlaken Lake (from one sub-watershed to another sub-watershed). Table 14-7

Table 14-7. WiLMS Model Phosphorus Calculations shows that such modifications bring the actual values closer to the calculated values. Values for Pokegama Lake, for example, went from 20 ug/l to 18 ug/l. Modifications for the fish hatchery inputs have not been accounted for at this time due to lack of data.

Table 14-7. WiLMS Model Phosphorus Calculations

Total Phosphorus in ug/l	Flambeau Lake	Long Interlaken Lake	Pokegama Lake
Actual average lake phosphorus	14	10	15
Calculated based on land uses in the delineated sub-watersheds	12	12	20
Calculated based on land uses with the casino area going into Long Lake	13	13	18

Habitat Category

Habitat refers to a specific place that is inhabited by a particular organism. Habitat includes all that the organism needs to live, including physical factors such as soil, temperature, light; and biotic factors, such as the availability of food and shelter from predators (Figure 14-14). The Habitat category includes substrate (rock, sand, muck); aquatic plants; riparian zone (shoreline); and littoral zone (shallow water along shoreline).

Substrate is the surface on which an organism grows, and rock, sand, and muck are the primary substrates of a lake. Flambeau Lake's substrates at the northwest and east ends is primarily muck, while sand and rock characterize much of the remaining shorelines. (Figure 14-15). Substrate often indicates the type of plants that will grow in an area. The diversity of Flambeau Lake's substrate is important to the health of the lake's fishery.

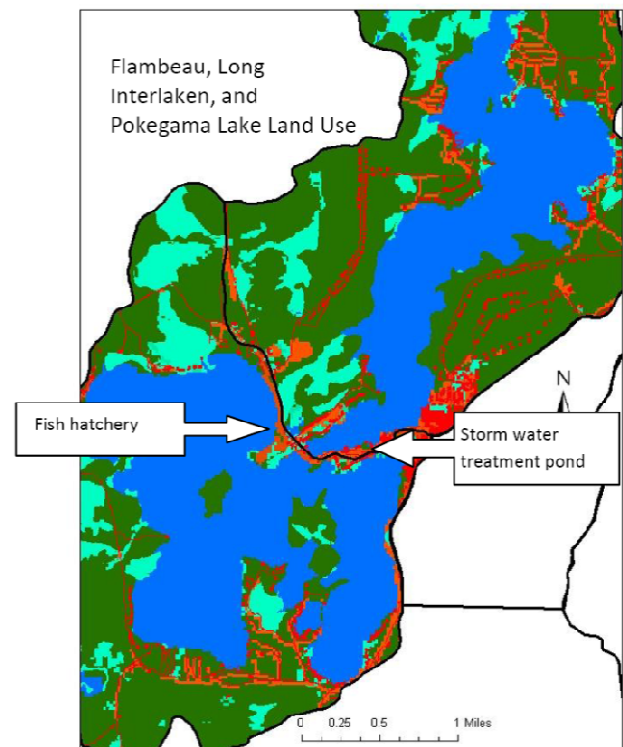


Figure 14-14. Flambeau, Long Interlaken, and Pokegama Lake Land Use

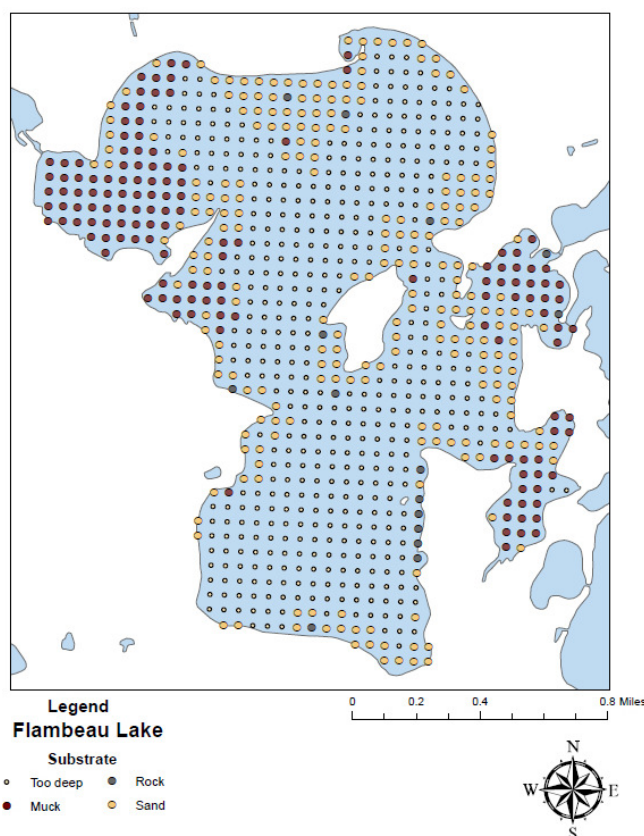


Figure 14-15. Substrate Map of Flambeau Lake

Aquatic plants (macrophytes) are plants that grow in the water either submerged (all under water), emergent (sticking out of the water), or floating leaf. The north end of Flambeau Lake has a large area of dense submerged plants with the most predominant being fern pondweed.

The Tribal Natural Resources Department assessed the aquatic plants in Flambeau Lake in 2011 by following the Wisconsin Department of Natural Resources Protocol for conducting an aquatic plant point intercept survey (see Section 8).

Table 14-8 presents the statistics associated with the point intercept survey, and Figure 14-16 shows plant locations and additional data. The table shows that of the 527 sites sampled, vegetation was found at 320 sites and 523 sites were shallower than the maximum depth of plants, 30 feet. The total number of plant species found (Taxonomic Richness - Frequency of Occurrence) was 34 plants, and the

Simpson Diversity Index was 0.93. (See Section 8 for detailed explanations of the terms).

- Frequency of occurrence is an estimate of how often a particular plant species is likely to be found within a lake. The estimate is based on an analysis of the data collected during the point intercept survey.
- Simpson's Diversity Index is a measure of how diverse a plant community is in the lake. The index is within a range of 0 to 1. The higher the value, the more diverse the plant community is in a particular lake. Plant diversity is an indicator of the lake's overall resiliency. Generally, a lake with high species diversity is considered to be more stable than a lake with low species diversity because it has a greater ability to withstand environmental fluctuations. A lake with a diverse plant community is better equipped to compete with exotic infestations than is a lake with low diversity.

Table 14-8. 2011 Aquatic Plant Community Statistics, Flambeau Lake, Vilas County, WI

Aquatic Plant Community Statistics	2011
Total sites sampled	527
Total sites with vegetation	320
Total site shallower than max depth of plants	523
Frequency of occurrence at sites shallower than maximum depth of plants	64.19%
Simpson Diversity Index	0.93
Maximum Depth of Plants (Feet)	30
Taxonomic Richness (Number Taxa)	34*
Average Number of Species per Site (sites less than max depth of plant growth)	1.82
Average Number of Species per Site (sites with vegetation)	2.97

* - There was one specie sampled that was not identified.

Table 14-9 lists the aquatic plants found in Flambeau Lake and shows the Floristic Quality Index (FQI) for the lake. The FQI is the extent to which a lake's plant community is similar to that of a pristine or undisturbed lake. The higher the floristic

quality index, the closer a lake is to an undisturbed system. FQI is used to determine whether a lake's plant community is changing over time. It is also used to determine the extent to which a lake's plant community is similar to other lakes in the same ecoregion. The Floristic Quality Index for Flambeau Lake is 39.77, meaning most of the plants can tolerate moderate disturbances. (See Section 8).

Littoral Zone Habitat

The littoral zone extends along the shoreline from the water's edge into the water to a depth of about 30 feet for Flambeau Lake. This is the area where most of the aquatic plants grow, providing shelter for fish to reproduce and protect their young. The plants also reduce erosion caused by waves, stabilizing the shoreline.

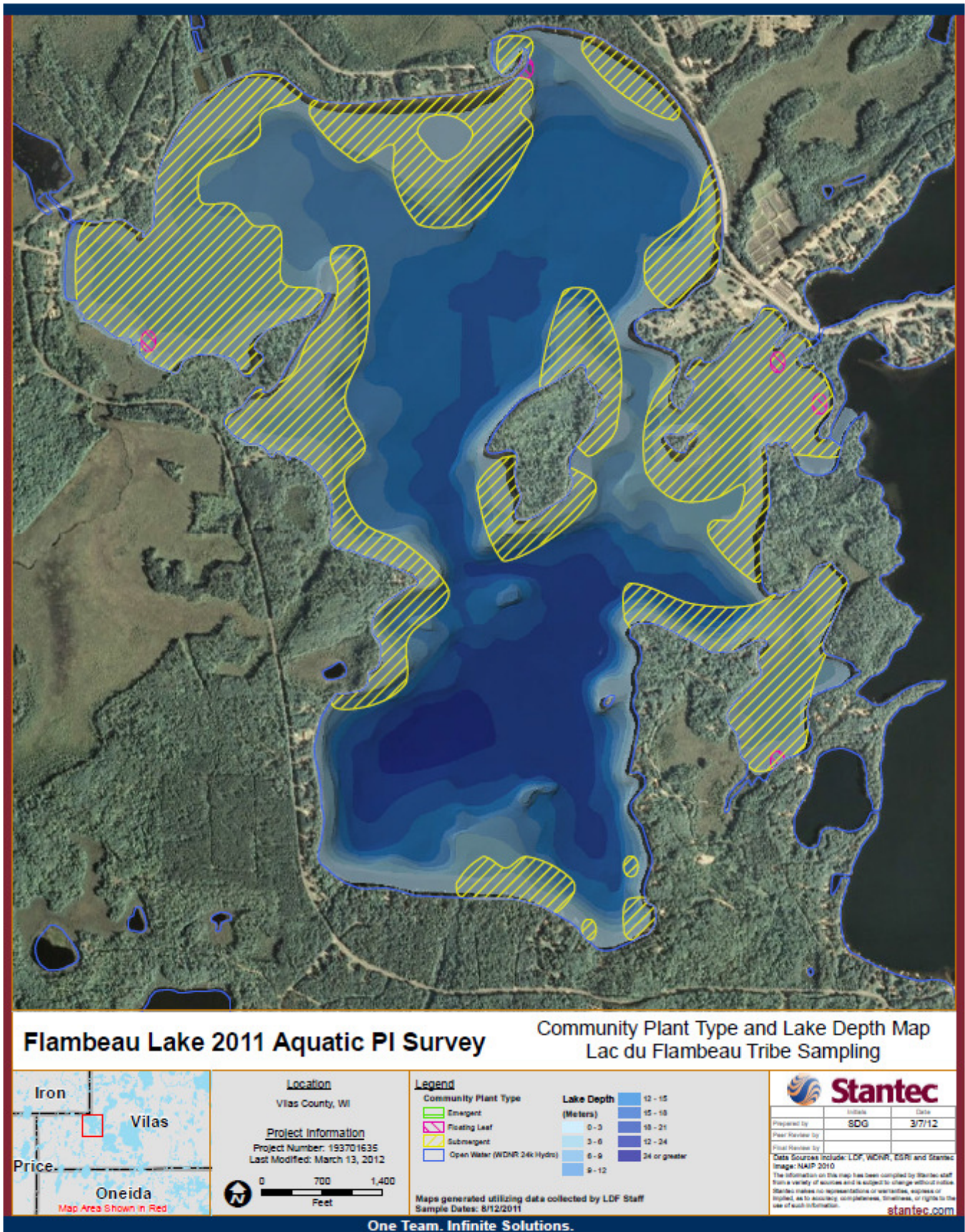


Figure 14-16. Flambeau Lake 2011 Aquatic Point Intercept Survey

Table 14-9. 2011 Floristic Quality Index, Flambeau Lake, Vilas County, WI

Genus	Species	Common Name	Coefficient of Conservatism C
<i>Bidens</i>	<i>beckii</i>	Water marigold	8
<i>Brasenia</i>	<i>schreberi</i>	Watershield	6
<i>Ceratophyllum</i>	<i>demersum</i>	Coontail	3
<i>Chara</i>	<i>sp.</i>	Muskgrass	7
<i>Eleocharis</i>	<i>acicularis</i>	Needle spikerush	5
<i>Elodea</i>	<i>canadensis</i>	Common waterweed	3
<i>Eriocaulon</i>	<i>aquaticum</i>	Pipewort	9
<i>Heteranthera</i>	<i>dubia</i>	Water star-grass	6
<i>Isoetes</i>	<i>sp.</i>	Quillwort	8
<i>Juncus</i>	<i>pelocarpus</i>	Brown-fruited rush	8
<i>Lobelia</i>	<i>dortmanna</i>	Water lobelia	10
<i>Myriophyllum</i>	<i>alterniflorum</i>	Alternate-flowered water-milfoil	10
<i>Myriophyllum</i>	<i>heterophyllum</i>	Variou-leaved water-milfoil	7
<i>Myriophyllum</i>	<i>sibiricum</i>	Northern water-milfoil	6
<i>Myriophyllum</i>	<i>tenellum</i>	Dwarf water-milfoil	10
<i>Najas</i>	<i>flexilis</i>	Slender naiad	6
<i>Najas</i>	<i>gracillima</i>	Northern naiad	7
<i>Nitella</i>	<i>sp.</i>	Nitella	7
<i>Nuphar</i>	<i>variegata</i>	Spatterdock	6
<i>Potamogeton</i>	<i>amplifolius</i>	Large-leaf pondweed	7
<i>Potamogeton</i>	<i>epiphydus</i>	Ribbon-leaf pondweed	8
<i>Potamogeton</i>	<i>foliosus</i>	Leafy pondweed	6
<i>Potamogeton</i>	<i>gramineus</i>	Variable pondweed	7
<i>Potamogeton</i>	<i>illinoensis</i>	Illinois pondweed	6
<i>Potamogeton</i>	<i>nodosus</i>	Long-leaf pondweed	7
<i>Potamogeton</i>	<i>richardsonii</i>	Clasping-leaf pondweed	5
<i>Potamogeton</i>	<i>robbinsii</i>	Fern pondweed	8
<i>Potamogeton</i>	<i>strictifolius</i>	Stiff pondweed	8
		Total Species	32
		Mean C	7.03
		Floristic Quality Index (FQI)	39.77

Please note: There is no Coefficient of Conservatism for exotic species such as Eurasian Water-Milfoil or for species not identified to the species level (*Sagittaria* sp.).

Coefficient of Conservatism C

- 0-3 taxa found in wide variety of plant communities and very tolerant of disturbance.
- 4-6 taxa typically associated with specific plant communities and tolerate moderate disturbance.
- 7-8 taxa found in narrow range of plant communities and tolerate minor disturbance.
- 9-10 taxa restricted to a narrow range of synecological conditions, with low tolerance of disturbance.

To help determine the extent of residents' perceptions of aquatic plants, the survey asked residents if their enjoyment of the lakes was impaired by the presence of aquatic plants in the littoral zone. Table 14-10 shows that 31% of 51 residents from Flambeau Lake indicate *never*, 45% *rarely*, 16% *sometimes*, 2% *often*, and 6% *always*. When comparing the data for Flambeau Lake with the data for the other lakes, it appears that aquatic plants are perceived to have had a slightly greater negative impact.

Table 14-10. Flambeau Lake - Whether Aquatic Plants Impede Enjoyment of the Lake

Lakes	# Respondents	Always	Often	Sometimes	Rarely	Never
		%	%	%	%	%
Flambeau Lake	51	6%	2%	16%	45%	31%
Bear River Lakes	556	3%	4%	16%	44%	33%
All Lakes	957	3%	7%	21%	40%	29%

Residents were asked if they or members of their households have tried to control aquatic plant growth by removing plants from the lake. Table 14-11 shows that 85% of 34 respondents for Flambeau Lake indicate *never*, 9% *some years*, and 6% *yearly*.

Table 14-11. Flambeau Lake - Removal of Aquatic Plants from the Lake

Lakes	# Respondents	Yearly	Some Years	Never
		%	%	%
Flambeau Lake	34	6%	9%	85%
Bear River Lakes	458	6%	14%	80%
All Lakes	816	8%	18%	74%

Residents were also asked if they or members of their household have removed trees that have fallen into Flambeau Lake. Table 14-12 shows that 88% of 33 respondents indicate *never*, 9% *some years*, and 3% *every year*. The data for the respondents of Flambeau Lake are very similar to the data to the other lakes. They rarely remove trees that have fallen into the lake.

Table 14-12. Flambeau Lake - Removal of Fallen Trees from the Lake

Lakes	# Respondents	Yearly	Some Years	Never
		%	%	%
Lake Flambeau	33	3%	9%	88%
Bear River Lakes	456	2%	27%	72%
All Lakes	814	1%	24%	75%

Residents were asked whether there is a need to control aquatic plants for Flambeau Lake. Table 14-13 shows that 16% of 44 respondents indicate *definitely no*, 16% *probably no*, 21% *probably yes*, and 5% *definitely yes*. Forty-three percent indicate they are *not sure*.

Table 14-13. Flambeau Lake - Whether Aquatic Plant Control is Needed

	Flambeau Lake	Bear River Lakes	All Lakes
	44 Respondents	503 Respondents	868 Respondents
Definitely yes	5%	8%	8%
Probably yes	21%	21%	19%
Probably no	16%	27%	29%
Definitely no	16%	9%	12%
Unsure	43%	35%	32%

Residents were asked what should be done if an aquatic invasive plant is found in the lake. Table 14-14 shows that for 10 respondents for Flambeau Lake, 20% indicate *remove with chemicals*, 20% *remove mechanically*, 30% *remove with biological*

control, 50% remove by hand, 20% do nothing/no treatment, and 60% indicate they need more information.

Table 14-14. Flambeau Lake - Preferences for Treating/Removing Aquatic Invasive Plants

	Flambeau Lake	Bear River Lakes	All Lakes
	10 Respondents	171 Respondents	302 Respondents
Apply chemicals	20%	18%	15%
Use machines	20%	21%	19%
Bio-control	30%	25%	24%
No treatment	20%	3%	2%
Pull by hand	50%	49%	51%
Need more info.	60%	41%	41%

Riparian Zone Habitat

The Riparian zone is the land area along the shoreline from the water's edge inland. In general this area is where most people access the lake via stairs or paths. It sometimes includes boathouses, storage sheds, homes, lawns, and other structures.

The riparian zone contributes the most nutrients from erosion, fertilizers, septic systems, and general runoff. The area is critical in providing woody habitat for fish and leaf material for invertebrates, like the dragon fly which lives a life cycle requiring both water and land. It is also critical in providing habitat to sustain other animals that rely on the lakes, like song birds, eagles, loons, otter, deer, along with a multitude of other creatures. A poor riparian habitat often results in fewer species and excess nutrients, while a good riparian habitat is replete with abundant wildlife and healthy levels of nutrients.

To help determine the extent of residents' perceptions of the riparian zone, the community survey asked residents to describe the landscape in the 35 foot buffer between the shoreline and their house, and to identify what they believe should be in an ideal landscape for the same area.

Table 14-15 lists several landscape features ordinarily found in riparian zones. Residents were asked to check those features that characterize the current riparian landscape (Current) for their property and then check those features that they believe should be in an ideal riparian landscape (Ideal). The table compares residents' descriptions of the current landscape with their perceptions of an ideal landscape. For example, 36% of respondents affiliated with Flambeau Lake identify mowed grass as a feature of the current buffer zone for their property, yet 28% of them identify mowed grass in an ideal landscape.

Table 14-15. Flambeau Lake - Current Shoreline Landscaping vs Ideal Shoreline Landscaping

	Flambeau Lake		Bear River Lakes		All Lakes	
	36 Respondents		481 Respondents		847 Respondents	
	Current	Ideal	Current	Ideal	Current	Ideal
Mowed grass	36%	28%	45%	30%	41%	28%
Rock terrace	22%	28%	19%	24%	16%	20%
Wild	67%	31%	44%	26%	44%	28%
Native prairie grasses	25%	22%	24%	27%	26%	24%
Wood terrace	3%	11%	4%	9%	5%	9%
Sand beach	19%	25%	25%	31%	26%	33%
Rain garden	8%	19%	2%	6%	2%	4%
Flower gardens	14%	11%	10%	10%	9%	9%
Shrubs	31%	19%	36%	25%	31%	22%
Wild with wood picked up	22%	17%	23%	21%	27%	22%
Trees	56%	39%	70%	50%	66%	47%
Something else	3%	0%	3%	2%	4%	3%
It doesn't matter		8%		7%		7%

The current primary features identified by all three respondent groups include mowed grass, wild, shrubs, and trees. When characterizing the ideal landscape, the same respondents prefer landscapes characterized by less mowed grass and less wild with fewer trees and shrubs, but more sand beach.

Residents were asked if they are interested in learning about landscape designs tailored to help protect the lakes and habitats. Table 14-16 shows that of 22 respondents for Flambeau Lake, 6% indicate *no interest*, 44% *little interest*, 15% *some interest*, 3% *a lot of interest*, and 32% *don't know*.

Table 14-16. Lake Flambeau Lake - Interest in Learning about Landscape Design

	Flambeau Lake	Bear River Lakes	All Lakes
	22 Respondents	443 Respondents	787 Respondents
No interest	6%	4%	4%
Little interest	44%	40%	40%
Some interest	15%	5%	6%
A lot of interest	3%	11%	11%
Don't know	32%	40%	39%

Assessment of Riparian & Littoral Zones

The Habitat Category reflects an assessment²⁷ of Flambeau Lake's aquatic plants, riparian zone (shoreline), and littoral zone (shallow water along shoreline). Comparisons are made with ecoregional data, National Lake Survey thresholds²⁸ and WISCALM (Table 10-4).

Riparian cover includes cover-class estimates of large and small diameter tree cover in the >5m high vegetation layer; woody and non-woody vegetation in the mid-layer (0.5 to 5 m); and woody, non-woody, inundated, and barren classes in the ground cover layer (<0.5 m) of the 10 lakeshore plots. Littoral cover index excludes submerged aquatic macrophytes, but increases the weighting of floating and emergent macrophytes.

Table 14-16 compares the thresholds developed by WISCALM for Plants and the National Lake Survey for Riparian Zone and Littoral Zone to the index value were calculated based on the assessment of Flambeau lake's habitat.

Table 14-17. Index Values for Environmental Assessment Parameters

Indicator Assessment	Index Value	Water Quality Assessment Thresholds			
		Excellent	Good	Fair	Poor
Plants	64.19	Below 79.7%	89.7% - 79.8%	89.8% - 94.8%	100% - 94.9%
Riparian Zone	0.81		>0.8074	0.5906-0.8074	<0.5906
Littoral zone	0.84		>0.7001	0.4156-0.7001	<.4156

Lakeshore habitat is the biggest problem in the nation's lakes; over one-third exhibit poor Shoreline condition. Poor biological health is three times more likely in lakes with poor lakeshore habitat.³⁵

To help learn about residents' perceptions on habitat and environmental change, the community survey asked residents if elements of the habitat have been changing over time. Table 14-18 shows the responses for Flambeau Lake, the Bear River watershed project lakes, and the other lakes. The data are very similar for all three response groups. The predominant response is *no change*.

Bacteria Category

Bacteria is assessed based on a measure of the most probable number (MPN) of *E. coli* in 100 milliliters of water. *E. coli* is the abbreviated name of the bacterium in the family *Enterobacteriaceae*, named *Escherichia coli*. The presence of *E. coli* in our intestines is normal. The presence of *E. coli* in swimming areas indicates that other microorganisms (including the ones that could causes illness) that live in the gastrointestinal track could also be present. The water quality criterion to protect human health, 235 MPN, is based on an illness rate of eight per 1,000 swimmers. Figure 14-17 shows *E. coli* measurements taken at the public beach on the south end of Flambeau Lake weekly during the swimming months from 2007–2013. The high numbers correlate with the presence of Canada

Table 14-18. Flambeau Lake - Perceptions of Environmental Change

	Shorelines	Wetlands	Streams	Air	Forests	Grasslands	All Environment
Flambeau Lake							
#Respondents	45	47	47	46	45	45	46
Improving	2%	2%	0%	4%	9%	4%	7%
No change	49%	36%	36%	57%	49%	44%	46%
Worsening	31%	17%	19%	15%	24%	16%	33%
Don't know	18%	45%	45%	24%	18%	36%	15%
Bear River Lakes							
#Respondents	534	522	513	522	524	513	526
Improving	5%	3%	1%	3%	4%	2%	5%
No change	52%	51%	42%	68%	52%	48%	54%
Worsening	30%	12%	11%	8%	24%	10%	23%
Don't know	13%	34%	46%	22%	20%	40%	18%
All Lakes							
#Respondents	923	901	873	909	910	882	903
Improving	4%	2%	1%	3%	4%	2%	4%
No change	56%	55%	45%	71%	57%	52%	59%
Worsening	28%	12%	9%	5%	20%	7%	19%
Don't know	13%	31%	45%	21%	19%	40%	18%

Geese in and around the swimming areas, particularly those near areas of grass and lawns.

under the jurisdiction of Vilas County are on a three-year pumping/inspection schedule.

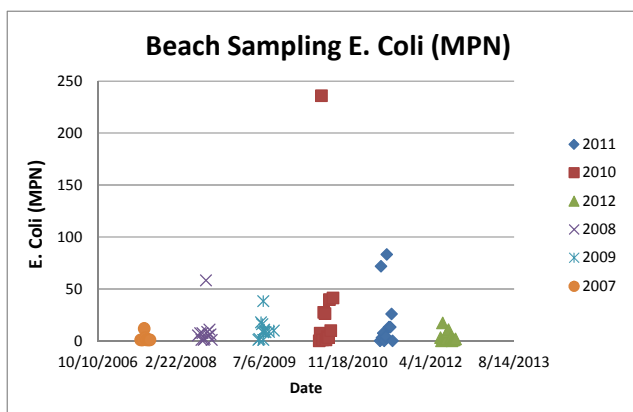


Figure 14-17. *E. coli* Bacteria Trends

Generally, the Tribe is responsible for septic systems on property owned by the Tribe, and Vilas County is responsible for septic systems on property on non-Tribal land. Currently, all septic systems

Residents were asked how often they have their septic tank inspected. Table 14-19 shows that for 36 respondents of Flambeau Lake, 22% indicate they *do not own the property*, 50% *at least every three years*, 14% *no septic tank*, 8% *more than every three years*, and 6% *no inspection*.

Table 14-19. Flambeau Lake - Septic Tank Inspection

	Flambeau Lake	Bear River Lakes	All Lakes
	36 Respondents	360 Respondents	609 Respondents
Do not own property	22%	7%	4%
At least every 3 years	50%	67%	71%
No tank	14%	9%	6%
More than	8%	12%	12%

every 3 years			
No inspection	6%	6%	7%

Aesthetics Category

The Aesthetics Category includes data and information on water quality, color, and turbidity. It also reflects an assessment of reports received by the Tribal Natural Resources Department for Flambeau Lake on the presence of oil, grease, nuisance aquatic plants, trash, and debris.

Reports and concerns submitted by residents to the Tribal Natural Resources Department on the turbidity and color of the lake water are not uncommon.

The extent to which lake water appears to be clear or murky is a function of the total amount of solids that are suspended in the water. Generally, the greater the amount of suspended solids in the water, the murkier it appears.

The major source of turbidity in open water away from shore is typically phytoplankton (algae). Closer to shore, suspended matter also comes from sources such as septic systems, sewage treatment plants, storm runoff, shoreline erosion and lake bottom sediments.

The major effect of turbidity noticed by lake property residents might simply be aesthetic—people do not like to look at dirty water. High levels of turbidity can, however, cause major problems by inhibiting the penetration of light, leading to the suffocation of larvae, damage to fish gills, fish reproduction, and loss of aquatic plants and habitat.

Turbidity or cloudy water can be measured in a variety of ways. A method commonly used in Lac du Flambeau to measure water clarity is to employ a Secchi disk. The 8-inch diameter disk with white and black quadrants is tied to a line and lowered slowly down into the water. The depth at which the white quadrants are no longer visible is taken as a measure of the transparency of the water. This

information provides a way to look at changes in water clarity over a long period of time. Secchi data also correlates to total phosphorus and trophic state index data. Figure 14-18 shows that over the past 22 years no significant change in water clarity has occurred for Flambeau Lake.

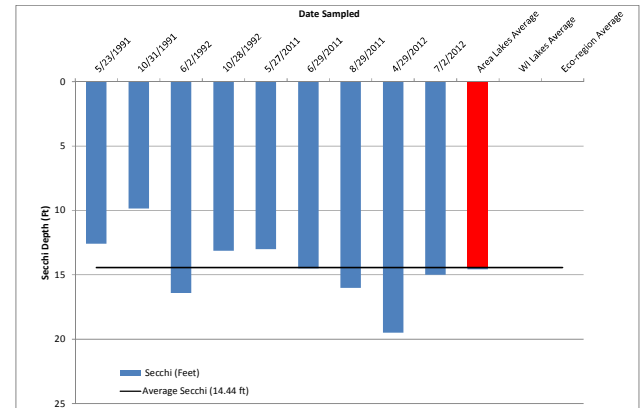


Figure 14-18. Secchi Depths for Flambeau Lake 1991–2012

The Secchi disk was created by Father Pietro Angelo Secchi in 1865. He was a priest, astronomer, and professor of physics who taught for a time at Georgetown University in Washington, DC.³⁶

The color of lake water reflects the type and amount of dissolved organic chemicals it contains.

Transparent water with a low accumulation of dissolved materials appears blue and indicates low productivity. Dissolved organic matter, such as humus, peat or decaying plant matter, can produce a yellow or brown color. Some algae produce a reddish or deep yellow color. Water rich in phytoplankton and other algae usually appears green.

Volunteers for Flambeau Lake have recently been subjectively observing and recording the lake's water color as part of the WDNR's Citizen Lake Monitoring Network. Table 14-20 summarizes the observations. The numbers preceding the colors indicate the number of dates of observation. Green was recorded 4 times. Blue or brown water was not observed. The specific dates of the observations are available on the Citizen Lake Monitoring Network website at <http://dnr.wi.gov/lakes/clmn/>. The website

also shows that the observers reported that the water appeared to be clear as opposed to murky.

Table 14-20. Flambeau Lake - Lake Water Color

Year	May	June	July	August
2011	1 Green	1 Green		1 Green
2012			1 Green	

In order to learn about residents' perceptions of the lake water quality, the community survey posed a few questions about water quality. Residents were asked to describe the current water quality of Flambeau Lake and whether they believe that quality has been changing. Table 14-21 shows that 29% of 48 respondents for Flambeau Lake indicate that the current water quality of the lake is *excellent*, 54% *good*, 10% *fair*, 6% *poor*, 0% *very poor*, and 0% are *unsure*. The data for Flambeau Lake regarding perceptions of current water quality are reasonably consistent with the data for the other lakes identified in the table.

Table 14-21. Flambeau Lake - Perception of Current Water Quality

Lakes	# Respondents	Excellent	Good	Fair	Poor	Very Poor	Unsure
		%	%	%	%	%	%
Flambeau Lake	48	29%	54%	10%	6%	0%	0%
Bear River Lakes	554	38%	49%	7%	3%	0.2%	3%
All Lakes	956	34%	53%	7%	3%	0.1%	3%

Table 14-22 shows that 0% of 42 respondents for Flambeau Lake indicate that water has been *improving*, 64% *no change*, 10% *worsening*, and 26% are *unsure*. Again, the data for Flambeau Lake are reasonably consistent with the data for the other lakes noted in the table.

Table 14-22. Flambeau Lake - Perception of Change in Water Quality

Lakes	# Respondents	Improving	No Change	Worsening	Unsure
		%	%	%	%
Flambeau Lake	42	0%	64%	10%	26%
Bear River Lakes	519	1%	60%	17%	22%
All Lakes	719	2%	62%	16%	20%

Fish Tissue Category & Fishery

The Fish Tissue Category refers to the amount of mercury in fish flesh as compared to Water Quality Standards. Larger edible fish have more mercury in the fish flesh than what is protective for human health concerns. Tribal Water Quality Standards are protective for subsistence fish consumption and the criterion to protect human health is 0.16 PPM.

Anthropogenic (meaning caused by human activity) sources of mercury are mainly from coal fired electric utilities emissions that ultimately enter the lake and watershed via rainwater. The chemistry of Lac du Flambeau Lakes is such that mercury becomes mobilized into the food chain accumulating in larger fish at the top of the food chain. Reductions in mercury emissions on coal fired power plants have helped to reduce mercury in the rain. A comparison of 1992 data to 2007 data shows a trend of reduction, yet more than what is protective for human health.

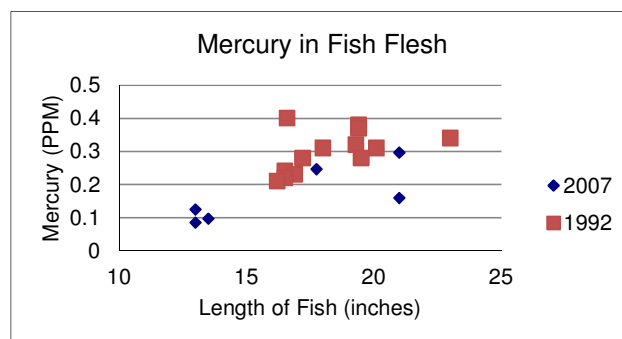


Figure 14-19. Mercury Concentration in Fish Tissue vs Size in Inches

Flambeau Lake's fishery supports both subsistence and sport fishing. The lake's fishery includes panfish such as bluegill and black crappie and gamefish like smallmouth and largemouth bass, northern pike, musky, and walleye. The lake also includes lake sturgeon.

The Tribal Hatchery has a history of stocking Flambeau Lake, particularly with walleye, musky, and sturgeon. Table 14-23 shows the numbers of these fish that have been stocked in Flambeau Lake from 2003–2012.

Table 14-23. Number of Fish Stocked 2003–2012 - Flambeau Lake (1,145 acres)

Year	Walleye		Sturgeon	Musky
	Fry	Fingerlings	Fingerlings	Fry
2012	500,000	22,050		
2011	2,500,000	34,291		15,000
2010	1,000,000	17,562		
2009	1,500,000	9,500	115	25,000
2008	1,500,000	5,460		25,000
2007	1,000,000	14,280	152	
2006	1,600,000	19,120		
2005	1,500,000	23,250	586	
2004	450,000	35,640		
2003	400,000	9,938		

In order to determine residents' perceptions on the quality of fishing and whether that quality has been changing, the survey asked residents a few questions about the fishery. Residents were asked if they have fished or speared on Flambeau Lake within the past ten years. Thirty-four of 54 (63%) respondents for Flambeau Lake responded affirmatively.

These respondents were then asked to identify the type of fishing they employed. Of those who responded, 97% indicate *open water hook and line fishing*, 41% *ice fishing*, 9% *spearing*, and 0% *netting*.

The residents who have fished or speared within the past ten years were asked to describe the current quality of fishing on the lake, and how, if at all, the quality of fishing on the lake has changed during the past ten years.

Table 14-24 shows that of the 33 Flambeau residents who responded about the current quality of fishing, 9% indicate *excellent*, 33% *good*, 39% *fair*, 12% *poor*, and 6% *very poor*. Zero percent indicate *unsure*.

Table 14-24. Flambeau Lake - Perceptions of Current Quality of Fishing

	Flambeau Lake	Bear River Lakes	All Lakes
	33 Respondents	397 Respondents	750 Respondents
Excellent	9%	5%	5%
Good	33%	34%	34%
Fair	39%	42%	44%
Poor	12%	13%	11%
Very Poor	6%	4%	4%
Unsure	0%	3%	2%

Regarding whether the quality of fishing has changed during the past ten years, Table 14-25 shows that of 34 Flambeau Lake respondents, 12% indicate fishing has *been improving*, 29% *no change*, 38% *worsening*, and 8% *unsure*. A higher percentage of respondents for Flambeau Lake indicate the quality of fishing has been improving as compared to respondents of the other lakes.

Table 14-25. Flambeau Lake - Perceptions of Change of Fishing Quality

	Flambeau Lake	Bear River Lakes	All Lakes
	34 Respondents	414 Respondents	750 Respondents
Improving	12%	9%	8%
No Change	29%	28%	31%
Worsening	38%	42%	42%
Unsure	8%	21%	20%

Lake Water Levels

Lake levels fluctuate naturally due to precipitation and evaporation, both of which can vary widely from season to season and year to year. Low levels may cause stressful conditions for fish and increase the number of nuisance aquatic plants. High water levels can boost the amounts of nutrients from runoff of flooded lakeshore soils. Another consequence of fluctuating water levels is shoreline erosion.

Volunteers from Lac du Flambeau have been subjectively observing and noting lake water levels through the WDNR's Citizen Lake Monitoring Network for many years, while in 2012 the Tribal Natural Resources Department began to collect water level data systematically for selected lakes. With assistance from North Lakeland Discovery Center, Vilas County Association of Lakes, and Town Lakes Committee, monitoring equipment was installed and calibrated on sites at Little Crawling Stone Lake, Fence Lake, Flambeau Lake (Figure 14-20), Ike Walton Lake, and White Sand Lake. The equipment at the Flambeau Lake site is being monitored by the Tribal Resources Department while equipment at the other sites is being monitored by volunteer lakefront property owners.

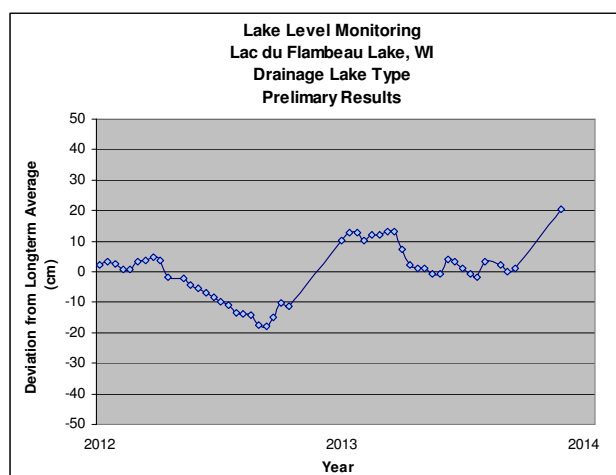


Figure 14-20. Lake Water Level Fluctuations During 2012-2014

The number of observations of lake levels noted through the Citizen Lake Monitoring Network since 2011 are shown in Table 14-26.

Table 14-26. Flambeau Lake - Number of Observations of Lake Water Levels

Year	Low	Normal	High
2011		3	
2012		1	1

Other Survey Results for Flambeau Lake

Residents affiliated with Flambeau Lake who responded to the survey in 2012 shared their perceptions on several topics in addition to those already presented in this section.

Activities & Watercraft

From a list of activities (fishing excluded), residents were asked to identify those in which they most often choose to participate. The activities most often identified include relaxing and enjoying nature (59%), swimming (61%), and motor-boating (74%). The activities least often identified include sailing (9%), ricing (4%), and trapping (4%).

From a list of different types of watercraft, residents were asked to identify those which they and members of their household use most often. The watercraft most often identified include motorboats with more than 25 hp (56%), motorboats with less than 25 hp (37%), and canoes or kayaks (52%). Watercraft least often identified include row boats (19%), jet skis (19%), and sailboats (7%). Four percent of the respondents indicate they and members of their household do not use watercraft.

Issues of Concern

From a list of 16 concerns, residents affiliated with Flambeau Lake were asked to identify three concerns about the lake that they believe are of most concern. For those who responded, Table 14-27 shows the three issues of greatest concern include *aquatic invasive species* (24%), *loss of fish habitat* (22%), and *degradation of water quality* (26%). The issue of least concern *loss of wildlife*

habitat (2%). The items on the list are of *no concern* to 15% of the respondents.

Table 14-27. Flambeau Lake - Lake Issues of Most Concern

	Flambeau Lake	Bear River Lakes	All Lakes
	54 Respondents	576 Respondents	1074 Respondents
Algae bloom	19%	17%	16%
Light pollution	17%	10%	8%
Shoreline runoff	15%	14%	12%
Aquatic invasive species	24%	42%	35%
Loss of fish habitat	22%	25%	22%
Water quality degradation	26%	27%	23%
Boat traffic	17%	16%	15%
Loss of shoreline	19%	13%	10%
Septic discharge	13%	18%	15%
Degradation of native aquatic plants	17%	11%	9%
Loss of wildlife habitat	2%	10%	10%
Excessive aquatic plant growth	20%	12%	10%
Noise pollution	15%	6%	6%
Shoreline development	13%	13%	11%
Excessive fishing	17%	12%	10%
Shoreline erosion	19%	18%	10%
Not concerned about any of these	15%	17%	19%

Interest in Attending Workshops

Residents were asked if they have an interest to attend workshops on a variety of topics related to the lakes and habitats. Table 14-28 shows the largest percentages of responses for all three response groups include *identifying AIS* and *identifying aquatic plants*. There some interest in attending a workshop on limnology.

Table 14-28. Flambeau Lake - Interest in Attending Workshops

	Flambeau Lake	Bear River Lakes	All Lakes
	54 Respondents	576 Respondents	1074 Respondents
Preventing AIS	9%	13%	11%
Starting a lake association	6%	5%	14%
Controlling Purple Loosestrife	15%	17%	14%
Identifying AIS	39%	42%	38%
Lake Stewardship	7%	13%	11%
Identifying aquatic plants	32%	38%	36%
Limnology	24%	22%	20%
Other	4%	5%	4%
No interest	30%	28%	28%

Town Website

Residents were asked how often, if at all, they check the town's website to get information about the Town Lakes Committee, such as newsletters, meeting agendas, and information on AIS. Table 14-29 shows that of 45 respondents for Flambeau Lake, 2% indicate *often*, 11% *sometimes*, 22% *rarely*, and 64% *never*.

Table 14-29. Flambeau Lake - Accessing the Town's Website

	Flambeau Lake	Bear River Lakes	All Lakes
	45 Respondents	541 Respondents	938 Respondents
Never	64%	60%	63%
Rarely	22%	26%	23%
Sometimes	11%	14%	12%
Often	2%	1%	1%

Accessing Information

Residents were asked where they would most likely go to get information about environmental issues. Table 14-30 shows that residents are most likely to seek information from the Wisconsin Department of Natural Resources and the Tribal Natural Resources Department.

Table 14-30. Flambeau Lake - Accessing Sources of Information for AIS

	Flambeau Lake	Bear River Lakes	All Lakes
	54 Respondents	576 Respondents	1074 Respondents
Tribal Natural Resources Department	48%	37%	31%
Town Lakes Committee	6%	21%	18%
Wisconsin DNR	50%	61%	59%
LdF Town Hall	15%	19%	19%
Tribal Main Office	13%	7%	5%
Other	7%	9%	9%

- I. Preserve or Improve Current Water Quality.
- II. Prevent Infestations of Aquatic Invasive Species.
- III. Control or Reduce the Spread of Aquatic Invasive Species.
- IV. Broaden Residents' Understanding of Swimmer's Itch.
- V. Reduce User Conflicts.
- VI. Strengthen or Increase Collaborations.

Setting the Pace & Flambeau Lake

In summary, Flambeau Lake has a very healthy ecosystem with many strong qualities. The primary challenge is ensure these attributes do not degrade from their current conditions. At the same time, there is room for improvement, particularly with respect to improving the lake's habitat and aesthetics, monitoring the presence of mercury in fish tissue, and guarding against the arrival of aquatic invasive species.

The following tables, Setting the Pace, constitute a long-term action plan to maintain or improve the overall health of Flambeau Lake. The plan includes six goals with supporting objectives and activities. The goals include:

Table 14-31. Setting the Pace - Flambeau Lake

Goal I - Preserve or Improve Current Lake Water Quality					
Objective A - Provide residents with opportunities to learn about the current lake water quality and how they can help preserve or improve it.					
Potential Activities	Facilitator(s)	Evaluation	Limitations		Timeframe
			Limitations	Cost Estimates	
1. Attend CLMN Workshops	Tribe, TLC, Lake Assoc.	# Attendees	Availability of workshops & support of Tribe, Town, Lake Associations	\$50 per attendee	Annual
2. Attend CBCW Workshops	Tribe, TLC, Lake Assoc.	# Attendees	Availability of workshops & support of Tribe, Town, Lake Associations	\$50 per attendee	Annual
3. Teach at After-School Program	Tribe/TLC	Pre & Post Survey	Support of Tribe & School, availability of volunteers	\$35 per volunteer	Annual Spring Term
4. Host Limnology/Ecology Workshops	Tribe/TLC	# Attendees, workshop evaluation	Availability of presenters, # registrants	\$100 per attendee	Every 2-3 years
5. Host Lake Steward Workshops	TLC/Tribe	# Attendees, workshop evaluation	Availability of presenters, # registrants, support of partnering organizations	\$300 per registrant (based on 50 registrants)	Every 3-4 years
6. Host Landscaping/Shoreline Habitat Workshops	Tribe/TLC	# Attendees, workshop evaluation	Availability of presenters, # registrants, support of Tribe, Town	\$100 per attendee	Every 2-3 years
7. Update Webpages	Tribe, TLC, Lake Assoc.	# Clicks	Support of Tribe, Town, Lake Associations	Variable	Ongoing
8. Host Lakes Fest	Tribe	# of Attendees	Support of Tribe, presenters, attendees	\$7,000 per Event	Annual

Table 14-32. Setting the Pace - Flambeau Lake

Goal I - Preserve or Improve Current Lake Water Quality					
Objective B - Continue monitoring lake water quality.					
Potential Activities	Facilitator(s)	Evaluation	Limitations		Timeframe
			Limitations	Cost Estimates	
1. Improve or establish standards for assessing aesthetics	Tribe/WDNR	Implementation of improved/new standards Report Card: Aesthetics	Support of Tribe & WDNR	\$30,000 to establish	Ongoing once established
2. Collect data on lake water levels, temperature, chemistry, clarity, nutrients	Tribe/TLC/ Lake Assoc	Data Reports Report Card: Biology, Chemistry, Nutrients	Support of Tribe, WDNR, Volunteers	\$20,000	Annual
3. Expand & implement schedule of Point Intercept Surveys	Tribe	WDNR Verification Report Card: Biology, Habitat	Support of Tribe, WDNR	\$7,000 average per lake	Ongoing
4. Conduct shoreline sweeps	Tribe/TLC/ Lake Assoc	CLMN Data Sheets Report Card: Biology, Habitat, Aesthetics	Support of Tribe, TLC, Volunteers	\$12 per hour, .58 per mile	Annual
5. Conduct individual property sweeps	Tribe/TLC/ Lake Assoc	CLMN Data Sheets Report Card: Biology, Habitat, Aesthetics	Support of Tribe, TLC, Property Owners	\$48 per property	12 per season
6. Collect data on bio-accumulative pollutants (fish tissue)	Tribe	Database Report Card: Tissue	Support of Tribe	\$20,000	Annual
7. Collect & analyze data on stream flow	Tribe/USGS	Report Card: Flow	Support of Tribe & USGS	\$16,000	Annual
8. Expand participation in CLMN	Tribe/TLC/ Lake Assoc.	CLMN Data Sheets Biology, Chemistry, Nutrients	Support of TLC, Lake Associations	\$12 per hour, .58 per mile	Ongoing
9. Collect & analyze data on weather/climate	Tribe/ Volunteers	List of sources	Support of Tribe	\$10,000	Annual
10. Expand taking core samples from the lakes	Tribe	Reports of data Report Card: Biology, Habitat	Support of Tribe	\$50,000-\$100,000 for all lakes	One time lake
11. Identify impact of the operation of motor vehicles and motorboats on the lakes	Tribe	Report of study Report Card: Aesthetics	Support of Tribe	\$10,000-50,000 per study	To be determined
12. Identify impact of forestry clear-cutting practices on the lakes	Tribe	Report of Study Report Card: Habitat, Nutrients	Support of Tribe	\$20,000-70,000	To be determined
13. Consider monitoring species of concern, like frogs, bats, etc.	Tribe/TLC/ Lake Assoc	Document discussions	Support of Tribe, TLC, Lake Associations	\$12 per hour, .58 per mile	To be determined
14. Consider maintaining/expanding propagation of wild rice	Tribe	To be determined	Support of Tribe Availability of resources	To be determined	To be determined
15. Consider monitoring for spiny waterflea	Tribe/TLC/ Lake Assoc	To be determined	Support of Tribe, TLC, Lake Associations	To be determined	To be determined

Table 14-33. Setting the Pace - Flambeau Lake

Goal I - Preserve or Improve Current Lake Water Quality					
Objective C - Minimize impact from development.					
Potential Activities	Facilitator(s)	Evaluation	Limitations		Timeframe
			Limitations	Cost Estimates	
1. Identify shoreline restoration needs	Tribe	Report of Study Report Card: Habitat, Nutrients	Funding	\$10,000 for five lakes	Ongoing
2. Establish shoreline restoration demonstration project	Tribe	Finished project Report Card: Habitat	Funding, Available shoreline	\$10,000 per 100 feet of shoreline	2015
3. Restore selected shorelines	Tribe	Finished projects Report Card: Habitat	Land ownership, jurisdictions	\$10,000 per 100 feet of shoreline	2015, ongoing
4. Encourage lake home shoreline restorations	Vilas Co/Tribe	Finished projects Report Card: Habitat	Support of Tribe, County, & Landowners	\$10,000 per 100 feet of shoreline	Ongoing
5. Install erosion controls bank stabilization	Tribe/Vilas Co	Finished projects Report Card: Habitat	Support of Tribe, Federal funding	\$3,000 per erosion site	Ongoing
6. Review & suggest best management practices on all land-disturbing projects	Tribe	Report of study Report Card: Habitat	Support of Tribe, Federal funding	\$10,000-\$50,000	Annual
7. Review & comment on all storm water projects	Tribe	Reports/documents Report Card: Habitat, Nutrients, Bacteria	Support of Tribe, Federal funding	\$10,000-\$50,000	Annual
8. Review & comment on all National Pollution Discharge Elimination Permits	Tribe	Reports/documents Report Card: Habitat, Nutrients, Bacteria	Support of Tribe, Federal funding	\$10,000-\$50,000	Annual
11. Work with Planning and Land Department for future low-impact development initiatives	Tribe	Report Report Card: Habitat, Nutrients, Chemistry	Support of Tribe	Variable	To be determined
12. Review & update water quality standards and shoreline codes	Tribe	Revised documents Report Card: All categories	Support of Tribe, Federal funding	\$50,000 per review	Triennial
13. Enforce inspection schedule for all development initiatives	Tribe	Completion reports Report Card: All categories	Support of Tribe, Federal funding	\$20,000	Annual
14. Conducting septic inspections	Tribe/Vilas Co	Report of inspections Report Card: Nutrients Bacteria	Support of Tribe, Vilas County	\$150 per unit	Ongoing
15. Evaluating Dam Permit Applications	Tribe, WDNR, Army Corps of Engineers	# permits evaluated Report card: habitat, lake levels	Jurisdiction, Federal funding	Variable	Ongoing
16. Review & comment on all potential rules or permits regulating mercury emissions	Tribe	Reports/documents Report Card: Fish Tissue	Support of Tribe, Federal funding	\$10,000-\$50,000	Annual

Table 14-34. Setting the Pace - Flambeau Lake

Goal II - Prevent Infestations of Aquatic Invasive Species					
Objective A - Provide the public with opportunities to learn about Aquatic Invasive Species and how to prevent their introduction.					
Potential Activities	Facilitator(s)	Evaluation	Limitations		Timeframe
			Limitations	Cost Estimates	
2. Encourage volunteers to attend training sessions provided by the Clean Boats Clean Waters (CBCW) program	TLC/Tribe/ Lake Assoc	Identify number of attendees	Availability of workshops, volunteers, & help from lake associations	\$50 per attendee	Annual
3. Periodically offer workshops locally on how to identify and prevent AIS	TLC	Agendas, participant evaluations	Availability of presenters and registrants, & help from lake associations	\$35 per attendee	Annual
4. Encourage volunteers to attend training sessions provided by the Citizen Lake Monitoring Network (CLMN)	TLC/Tribe	Identify number of attendees	Availability of workshops, volunteers, & help from lake associations	\$50 per attendee	Annual
5. Disseminate information via media, including Town, Tribal, and Lake Association websites	TLC/Tribe/ Lake Assoc	Copies of releases	Availability of writer(s)	Variable	Ongoing
6. Highlight AIS and prevention in documents produced locally, such as newsletters, brochures	TLC/Tribe/ Lake Assoc	Copies of documents	Availability of writers	Volunteers @ \$12/hour & .58/mile	Ongoing
7. Highlight AIS prevention at landings through signage & distribution of educational materials	TLC/Tribe Lake Assoc	Periodic review of signage	Availability of new signage & WDNR education materials	Cost of signage, volunteers @ \$12/hour, .58/mile, WDNR materials	Ongoing
8. Identify local Key Communicators who will speak about AIS at community events	TLC/Tribe	List of individuals	Availability of communicators	Volunteers @ \$12/hour, .58/mile	Annual
9. Ask resorts & select businesses to distribute AIS information	TLC/Lake Associations	List of accepting business	Availability of materials, approval of businesses	Volunteers @ \$12/hour, .58/mile, WDNR materials	Annual
10. Continue hosting the Lake Steward Workshop	TLC/Tribe	Participant evaluation	Availability of presenters, # registrants, support of partnering organizations	\$300/registrant (based on 50 registrants)	Every 3-4 years

Table 14-35. Setting the Pace - Flambeau Lake

Goal II - Prevent Infestations of Aquatic Invasive Species					
Objective B - Provide the public with opportunities to actively and purposefully look for Aquatic Invasive Species.					
Potential Activities	Facilitator(s)	Evaluation	Limitations		Timeframe
			Limitations	Cost Estimates	
2. Organize and support whole-lake shoreline sweeps	Tribe/TLC/Lake Assoc	# sweeps, participant feedback Report Card: Biology	Support of TLC, Tribe & Lake Associations	\$12/hour, .58/mile, supplies @ \$300/lake	Annual
3. Support establishing system of personal property sweeps	TLC/Lake Assoc	# properties, participant feedback Report Card: Biology	Support of TLC & Lake Associations	Volunteers @ \$12/hour, .58/mile	Annual
4. Inspect watercraft at landings	Tribe/TLC/Lake Assoc	# inspectors, # hours inspection Report Card: Biology	Support of TLC, Tribe, Lake Associations, Volunteers, WDNR	\$12/hour, .58/mile, supplies @ \$200/landing	Annual
5. Coordinate SCUBA diving/snorkeling sweeps near landings	TLC/Tribe	Log Report Card: Biology	Support of Tribe & volunteers	\$500/season	Annual
6. Provide convenient drop-off points on each lake for suspected AIS samples	TLC/Lake Assoc	# participants Report Card: Biology	Support of TLC & lake associations	\$100 per lake	Annual

Table 14-36. Setting the Pace - Flambeau Lake

Goal III - Control or Reduce the Spread of Aquatic Invasive Species					
Objective A - Provide the public with opportunities to learn about local infestations of Aquatic Invasive Species and how they can help control or reduce their spread.					
Potential Activities	Facilitator(s)	Evaluation	Limitations		Timeframe
			Limitations	Cost Estimates	
2. Encourage volunteers to attend training sessions provided by the Clean Boats Clean Waters (CBCW) program	TLC/Tribe/Lake Assoc	# of attendees	Availability of workshops, volunteers, & help from lake associations	\$50 per attendee	Annual
3. Offer TLC workshops on how to identify and control or reduce AIS	TLC	Agendas, participant evaluations	Availability of presenters and registrants, & help from lake associations	\$30 per attendee	Annual
4. Encourage volunteers to attend training sessions provided by the Citizen Lake Monitoring Network (CLMN)	TLC/Tribe/Lake Assoc	# of attendees	Availability of workshops, volunteers, & help from lake associations	\$50 per attendee	Annual
5. Disseminate information via media, including Town, Tribal, and Lake Association websites	TLC/Tribe/Lake Assoc	Copies of releases	Availability of writer(s)	Volunteers @ \$12/hour, .58/mile	Ongoing
6. Highlight AIS and prevention in documents produced locally, such as newsletters, brochures	TLC/Tribe/Lake Assoc	Copies of documents	Availability of writers	Volunteers @ \$12/hour, .58/mile, printing	Ongoing
7. Highlight AIS control at landings through signage & distribution of educational materials	TLC/Tribe/Lake Assoc	Periodic review of signage	Availability of new signage	Cost of signage, volunteers @ \$12/hour, .58/mile, WDNR materials	Annual
8. Identify local Key Communicators who will speak about AIS at community events	TLC/Tribe/Lake Assoc	List of individuals	Availability of communicators	Volunteers @ \$12/hour, .58/mile	Annual
9. Ask resorts & select businesses to distribute AIS information	TLC/Tribe/Lake Assoc	List of accepting businesses	Availability of materials & approval of businesses	Volunteers @ \$12/hour, .58/mile	Annual
10. Continue hosting the Lake Steward Workshop	TLC/Tribe	Participant evaluation	Availability of presenters, # registrants, support of partnering organizations	\$300 per registrant (based on 50 registrants)	Triennial

Table 14-37. Setting the Pace - Flambeau Lake

Goal III - Control or Reduce the Spread of Aquatic Invasive Species					
Objective B - Reduce the scope of existing infestations of purple loosestrife and minimize the spread of the infestations to new locations.					
Potential Activities	Facilitator(s)	Evaluation	Limitations		Timeframe
			Limitations	Cost Estimates	
1. Establish Action Team & Action Plan	TLC	Written Plan	Support of TLC/Tribe/Town	\$12/hour. .58/mile	Annual
3. Continue inter-agency relationships on Purple Loosestrife (Tribe, WDNR, Public School)	TLC/Lake Assoc	Survey agencies	Support of agencies	Variable	Annual
4. Raise & distribute beetles	TLC/Lake Assoc	150 plants & 200,000 beetles Report Card: Biology, Habitat	Support from Tribe, WDNR, school, & availability of volunteers, materials, roots & seed beetles	\$3,000-5,000	Annual
5. Host or conduct workshops on Purple Loosestrife	TLC/Lake Assoc	Agendas, participant evaluations	Support of volunteers & other agencies	\$30/attendee	Annual
6. Provide residents with information on bio-control	TLC/Lake Assoc	Documents provided	Support of TLC/Tribe/Lake Associations	\$1000 printing/supplies	Annual
7. Consider restoring tall native wetland plants to infested areas	Tribe/TLC/Lake Assoc	Document discussions	Support of TLC/Tribe/Lake Associations, others	To be determined	To be determined

Table 14-38. Setting the Pace - Flambeau Lake

Goal III - Control or Reduce the Spread of Aquatic Invasive Species					
Objective C - Continue monitoring infestations of Rainbow Smelt and Rusty Crayfish.					
Potential Activities	Facilitator(s)	Evaluation	Limitations		Timeframe
			Limitations	Cost Estimates	
1. Publicize history of previous actions to monitor/control infestations	Tribe	Documents	Tribal Support	\$12/hour, .58/mile	Ongoing
2. Conduct workshop on the fishery, including monitoring smelt and crayfish	Tribe/TLC	Agenda, participant evaluations	Tribal Support	\$12/hour, .58/mile	Ongoing
3. Continue monitoring Rainbow Smelt & Rusty Crayfish	Tribe/Volunteers	Documents Report Card: Biology	Tribal Support, TLC Support	\$12/hour, .58/mile	Ongoing

Table 14-39. Setting the Pace - Flambeau Lake

Goal IV - Broaden Residents' Understanding of Swimmer's Itch					
Objective A - Provide residents with a variety of educational experiences and materials on Swimmer's Itch, including alternatives treating it or reducing the probability of contracting it.					
Potential Activities	Facilitator(s)	Evaluation	Limitations		Timeframe
			Limitations	Cost Estimates	
1. Establish Action Plan	Bear River Team	Written Plan	Support of Tribe, Town, Availability of volunteers	\$12/hour, .58/mile	Annual
2. Review current research and literature	Bear River Team	List of items reviewed	Availability of research & literature	\$12/hour, .58/mile	Ongoing
3. Contact appropriate professionals and authorities about Swimmers' Itch	Bear River Team	List of individuals/organizations	Availability of professionals	\$12/hour, .58/mile	Ongoing
4. Host community-wide workshops	Bear River Team	Agenda & evaluation of participants	# registrants, availability of presenters	\$30/attendee	Annual
5. Distribute information in newsletters, bulletins, and PSAs	Bear River Team	Copies of items distributed	Support of partnering agencies	\$12/hour, .58/mile	Annual
6. Identify alternatives for treating it or reducing the probability of contracting it	Bear River Team	Summative report	Availability of alternatives	\$12/hour, .58/mile	To be determined
7. Conduct or participate in a research study of Swimmer's Itch	Bear River Team	Final research report	Support of partnering agencies	\$150,000	To be determined

Table 14-40. Setting the Pace - Flambeau Lake

Goal V - Reduce User Conflicts					
Objective A - Provide the public with opportunities to learn about user conflicts.					
Potential Activities	Facilitator(s)	Evaluation	Limitations		Timeframe
			Limitations	Cost Estimates	
1. Determine extent of user conflicts	Tribe	Survey	Tribe/TLC/Funding	To be determined	Triennial
2. Develop & distribute education materials on minimizing user conflicts	Tribe, WDNR	Availability of materials, distribution list	Support of Tribe, WDNR, availability of resources	To be determined	Ongoing
3. Host workshop on fishery (size limits, stocking, etc.)	Tribe	# attendees, workshop evaluation	# registrants, support of Tribe, availability of resources	\$100/attendee	Quadrennial
4. Joint review of current enforcement (# wardens, incidents, etc.)	Tribe/Town	Report	Support of Tribe & Town	To be determined	To be determined

Table 14-41. Setting the Pace - Flambeau Lake

Goal VI - Strengthen or Increase Collaborations					
Objective A - Encourage participation in educational experiences related to partnerships and collaborations.					
Potential Activities	Facilitator(s)	Evaluation	Limitations		Timeframe
			Limitations	Cost Estimates	
1. Provide workshop(s) on how to establish a lake association	TLC	# attendees, workshop evaluation	Support of TLC, # registrants	\$50/attendee	Biennial
2. Encourage attendance at Lake Leaders Institute	TLC/Tribe/ Lake Assoc	# attendees	Availability of volunteers, resources	\$800/attendee	Biennial
3. Encourage attendance at Wisconsin Lakes Conference	TLC/Tribe/ Lake Assoc	# attendees	Availability of volunteers, resources	\$800/attendee	Annual
4. Encourage attendance at Vilas County Lakes Association	TLC/Tribe/ Lake Assoc	# attendees	Availability of volunteers, resources	\$100/attendee	Annual
5. Encourage attendance at Lakes Fest	Tribe/TLC/ Lake Assoc	# attendees	Support of partnering agencies	\$7,000/event	Annual

Table 14-42. Setting the Pace - Flambeau Lake

Goal VI - Strengthen or Increase Collaborations					
Objective B - Provide a variety of ways to share information about watershed and lake planning.					
Potential Activities	Facilitator(s)	Evaluation	Limitations		Timeframe
			Limitations	Cost Estimates	
4. Present information at Local, County, State, & National conferences and meetings	Tribe/TLC	Per host agency	Support of Tribe, Town, availability of presenters	Variable	Per host agency

Table 14-43. Setting the Pace - Flambeau Lake

Goal VI - Strengthen or Increase Collaborations					
Objective C - Focus on ways to reach out to individuals and organizations.					
Potential Activities	Facilitator(s)	Evaluation	Limitations		Timeframe
			Limitations	Cost Estimates	
1. Establish system for contacting new residents	TLC	# Residents contacted	Support of TLC	\$100/visit	Ongoing
2. Encourage the WDNR to establish a protocol for writing watershed and lake management plans.	Bear River Action Team	Development of protocol	Support of WDNR	TBD	To be determined
3. Revise the current <i>Rapid Response Plan</i>	Tribe/TLC	Availability of revised plan	Tribal support	\$1,000-\$5,000	Quinquennial
4. Consider establishing a watershed plan for the other watersheds in Lac du Flambeau	Tribe/TLC	Additional watershed plans	Positive evaluation of Bear River Watershed plan, support of Tribe & TLC, availability of volunteers and resources	\$50,000/watershed	To be determined
5. Evaluate establishing the position of Invasive Species Coordinator for Lac du Flambeau	Tribe/TLC	Report	Support of Tribe, Town, & Lake Associations	TBD	To be determined
6. Develop an indigenous arts and sciences institute	Tribe/Universities	# Participants	Support of Tribe and Universities	\$4,000,000	To be determined

Notes for Section 14

1. GIDAKIIMINAAN (*Our Earth*): An Anishinaabe Atlas of the 1836, 1837, and 1842 Treaty Ceded Territories (Great Lakes Indian Fish & Wildlife Commission, 2007) 50.
2. Michael J. Goc, *Reflections of Lac du Flambeau: An Illustrated History of Lac du Flambeau, Wisconsin, 1745-1995* (New Past Press Inc., 1995) 11-12.
3. Ibid, 20.
4. R.G. Norwood was a field scientist who participated in a geological survey in 1847 of Wisconsin sponsored by the U.S. government. His report was presented to Congress in a letter by David Owen in 1848, *Letter of the Secretary of the Treasury, communicating a report of the geological reconnaissance of the Chippewa Land District of Wisconsin, and the northern part of Iowa*. Pages 91-93. <https://archive.org/details/lettersecretary00offigoog>
5. Ibid.
6. Goc, 153.
7. Ibid, 154.
8. Ibid.
9. Ibid, 127.
10. Ibid, 149.
11. Lac du Flambeau Chamber of Commerce website. <http://www.lacduflambeauchamber.com/index.html>.
12. Conversation with Georgine Brown, Member, Lac du Flambeau Culture Committee, February 2014.
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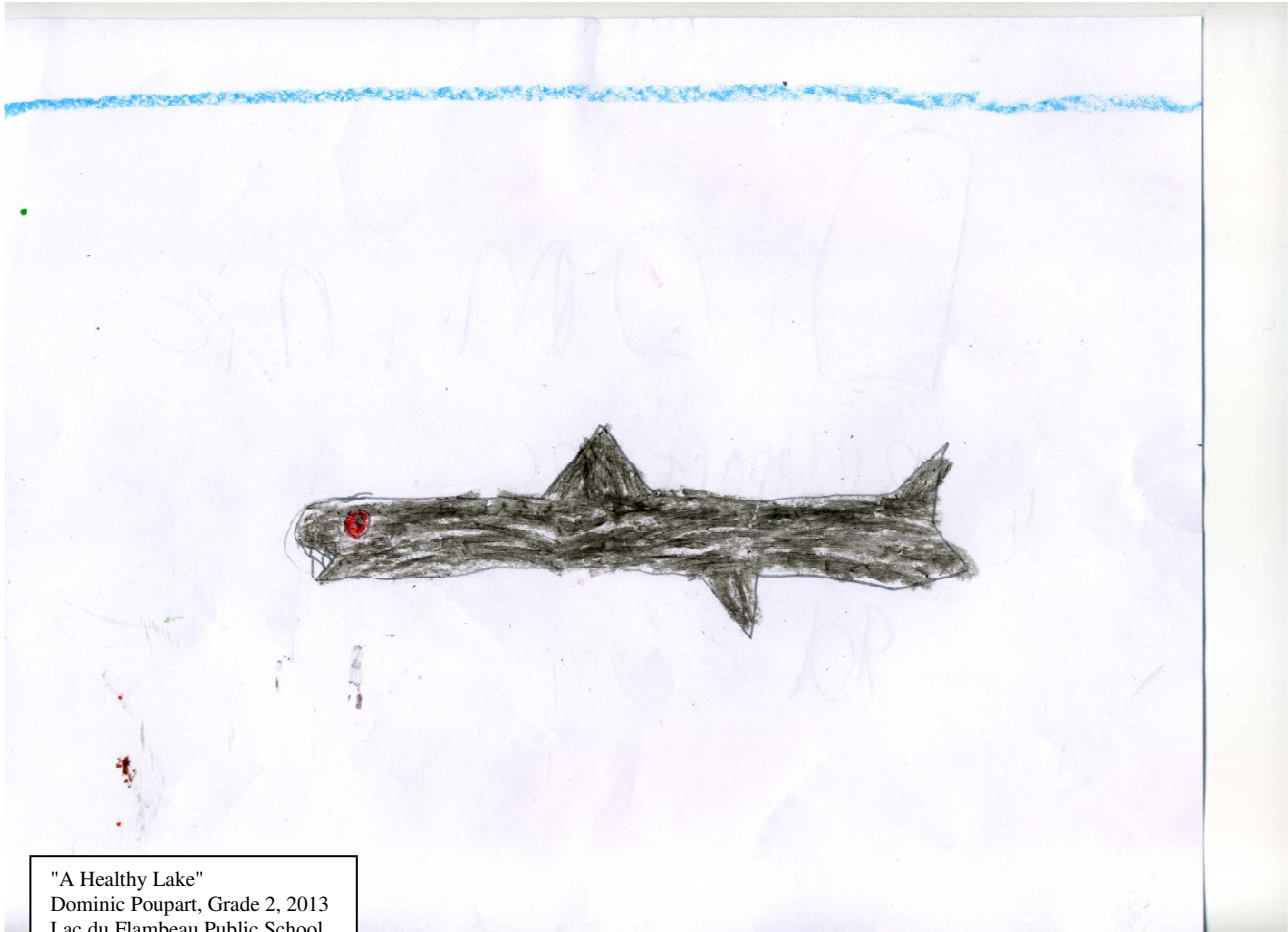
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"A Healthy Lake"
Dominic Poupart, Grade 2, 2013
Lac du Flambeau Public School